ANNUAL REPORT

2024 - 2025

CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING

One Vision. One Goal... Advanced Computing for Human Advancement…

Governing Council

(As on 31st March 2025)

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Overview

Centre for Development of Advanced Computing (C-DAC) is the premier R&D organization of the Ministry of Electronics and Information Technology (MeitY) for carrying out R&D in IT, Electronics and associated areas. Today, C-DAC has positioned itself to be in leading position in the areas of High-Performance Computing (HPC), Quantum Computing, Artificial Intelligence, Digital India RISC-V, Strategic Technologies, eGovernance, Healthcare Technologies, Cyber Security and Cyber Forensics, Power Electronics, Automotive & Communication Technologies, Internet of Things, Education Technologies and Capacity building initiatives. During the year 2024-25, C-DAC achieved significant technological advancements, organized various events for stakeholder engagement, and received numerous recognitions. Brief of activities undertaken during the year is mentioned below.

C-DAC has deployed 35 high-performance computing (HPC) systems across three phases, boasting a cumulative compute power exceeding 37 PFLOPS. Hon'ble Prime Minister, Shri Narendra Modi virtually launched three PARAM Rudra systems at Inter-University Accelerator Centre (IUAC), New Delhi (with compute capacity 3.1 PFLOPS), Giant Metrewave Radio Telescope (GMRT) Pune with compute capacity (1.0 PFLOPS) and S. N. Bose National Centre for Basic Sciences (SNBNCBS), Kolkata with compute capacity (838 TFLOPS) under NSM on September 26, 2024. C-DAC's indigenously designed Rudra-I server platform is poised to ensure India's self-sufficiency to design, develop and deliver as per country's needs. A wide range of applications such as Early Warning Systems for Flood Prediction, Forest Fire-spread Prediction, Seismic Imaging for Oil & Gas Exploration, Urban Modeling for Resource Allocation, Genomics and Drug Discovery for Disease Treatment, Materials Science, and Computational Chemistry optimized and scaled for underneath architecture/processor. The PARAM systems cater to computational demands of academia, researchers, MSMEs, and startups in areas of national and strategic importance.

These HPC systems are accessed via the National Knowledge Network (NKN) by over 10,700 researchers and academicians from more than 243 institutes nationwide. To date, 1,600+ Ph.D. research scholars have executed over 11.4 million jobs on these systems, resulting in the publication of 1,500+ research papers in highly reputed journals both in India and internationally. Additionally, more than 25,500 human resources have been trained in HPC and AI skills, further strengthening India's capabilities in these fields.

C-DAC has established the QuBIT Studio lab to advance the field of Quantum accelerated computing. C-DAC has been selected as a key member institute in three major initiatives under the National Quantum Mission (NQM), reflecting its pivotal role in advancing India's quantum technology ecosystem. It is a core partner in two Technical Groups focused on the development of photonic quantum processors, in collaboration with IISc Bangalore, aimed at establishing indigenous capabilities in scalable quantum hardware. Additionally, C-DAC has been chosen as the lead technical institution in the Quila (Quantum Internet with Local Access) initiative, which envisions deploying a secure, over 2000 km-long, fiber-based Quantum Key Distribution (QKD) network across the country, laying the foundation for a future-ready quantum communication infrastructure.

Under Digital India RISC-V (DIR-V) program, C-DAC has successfully designed and developed the VEGA series of microprocessors, including India's first indigenous 64-bit multi-core RISC-V based Superscalar Out-of-Order Processor. The VEGA series, which consists of six 32/64-bit single/dual/quad-core superscalar out-of-order high-performance processor cores, matches the performance of commercially available processors and is suitable for strategic, industrial, and commercial applications. Several SoC chips integrating the VEGA processors are in development, including the successfully fabricated 32-bit single-core SoC (THEJAS32), and the taped-out 64-bit single-core SoC (THEJAS64), at the Indian foundry SCL, Chandigarh. Additionally, a development platform based on the THEJAS32 ASIC, named ARIES, has been created. These fully indigenous boards are designed for learning, embedded system design, and IoT applications, complete with Board Support Packages, SDK with integrated toolchain, IDE plug-ins, Debugger, and support documentation. THEJAS64 SoC ASIC, ARIES Eco and ARIES Nova Boards were launched by Shri Ashwini Vaishnaw, Union Minister of Electronics and Information Technology on January 11, 2025 during his visit at C-DAC Pune.

The Design Linked Incentive (DLI) Scheme aims to provide financial incentives as well as design infrastructure support across various stages of development and deployment of semiconductor design for Integrated Circuits (Ics), Chipsets, System on Chips (SoCs), Systems & IP Cores and semiconductor. Under Chips to Start-up (C2S) Programme Support - 100 Institutes, 13 Start-ups/ MSMEs are supported financially, Various FPGA boards identified and recommended by the CEPC were procured and distributed to all 100 participating institutes under C2S Programme, and More than 285 organizations are supported for the EDA tool support including institutes supported for funds. Shri Ashwini Vaishnaw, Union Minister of Electronics and Information Technology, remotely announced the winners of Analog and Digital Design hackathons on March 20, 2025.

Artificial Intelligence is one of the focus areas of C-DAC for the initiatives which are designed to address complex challenges across diverse domains, including healthcare, agriculture & environment, language computing and security, driving innovation and impactful solutions. The various activities have been carried out, which includes RIGE Sense, SUFAL, PEST-TRACK, Mastitis Detector and Feck check.

C-DAC has developed and deployed strategically significant indigenous systems and solutions for Defence, Space, Emergency Response, Disaster Management, and Internal Security. C-DAC is associated with ISRO in developing and supplying indigenously developed technologies for qualification tests of various stages of the ISRO mission programs. The some of these solutions include, Ultrasonic Solid-propellant Burn Rate Measurement System (USBRMS), PRIAMP, a high accuracy instrumentation amplifier, SoUNDS, a Non-Destructive Test (NDT) & Evaluation system and Autonomous Bathymetric Survey Vessel.

During the year, C-DAC has developed and deployed several software solution and services. This includes, GeoSadak, tailored Web-GIS product, Tamizh Megam Cloud initiative for Electronics Corporation of Tamil Nadu Limited, ChatDB, Digital ERP for digitizing the processes of the Directorate General of Quality Assurance (DGQA), etc. Shri Rajnath Singh, Hon'ble Defence Minister, inaugurated the 'Defence Testing Portal (DTP)' during the Aero India event held in February 2025. Dr. Jitendra Singh, Hon'ble Minister of Science and Technology, Govt. of India has launched KoshaSHRI - Sanskrit Dictionary Article Authoring Tool (AAT) on December 16, 2024, on the occasion of the 5th Anniversary celebration of the Science and Heritage Research Initiative (SHRI) at New Delhi.

C-DAC has implemented various e-Governance projects and solutions including Centralized Claim Processing & Settlement System for Coal Mines Provident Fund Organization (CMPFO), Sugam Portal for CDSCO, Regulatory Framework for Real Estate Authority for Punjab, Wood Based Industries Licensing System and Gram Sadak Survey (GSS) Mobile App for PMGSY. C-DAC has also contributed to Aadhaar based platforms and services, including Aadhaar Authentication & e-KYC Platform and Aadhaar Data Vault, ensuring secure storage and authentication of sensitive information for the intended entities. ECGC's Enterprise Resource Planning (ERP) system Portal was unveiled by Shri Piyush Goyal, Union Minister for Commerce and Industry, Government of India at Mumbai on September 13, 2024.

During the year, C-DAC's initiatives have advanced health technology significantly, exemplified by initiatives like eSanjeevani-National Telemedicine Service and e-Sushrut HMIS, implemented in numerous health facilities nationwide, including railways and AIIMS institutions, demonstrating its robust scalability and impact in public health management. Other solutions deployed by C-DAC include e-Aushadhi – Drugs and Vaccine Distribution Management System, eRaktKosh (Centralized Blood Bank Management System), e-Upkaran (Equipment Maintenance & Management System - EMMS), etc. C-DAC has also developed Free and open-source (FOSS) toolkits and SDKs for easy integration of Digital Health Standards to achieve interoperability between health systems and programs within the country.

C-DAC has also developed various eLearning systems and solutions including OLabs NextG: Next Generation Online Labs (Olabs), Structured Assessment for Analysing Learning (SAFAL), Parikshak - an automated program grading tool, MeghSikshak Learning Management System (LMS) and BOSS-Based Student Assessment Solution for Samagra Shiksha Initiative.

A suite of products has been developed by C-DAC in area of Cyber Security and Cyber Forensics. This includes, CDACSIEM (C-DAC Security Information and Event Management), Rakshak DNS - a safe, secure, protective DNS resolver, FakeCheck (Deepfake Detection System), etc. Blockchain based solutions, Vishvasya, Praamaanik, and NBFLite were launched by Shri S. Krishnan, Hon'ble Secretary, MeitY, on September 4, 2024 for large scale adoption of Blockchain application development. C-DAC has also been providing cyber forensic services to various Law enforcement agencies which includes InTrust - asset, traffic and automatic vulnerability assessment system for Zero Trust Network and Cyber-Forensic Framework for User-Centric Human Threat Intelligence Analysis.

Public transit solutions for smart mobility, Vehicle priority & road safety solutions, Autonomous Robots for agriculture, Smart vision sensors are various areas under Automotive technology that C-DAC has worked during last year. NCMC and QR Compliant Automatic Fare Collection (AFC) Apps for Metro Operators, Next Generation Driver Assistance Systems (NG-DAS), 5G C-V2X Platform for On-Road Vehicles (PROVE), Traffic Signal Controller (CUTE-NG) for road traffic are some of the technologies developed.

As a part of National Mission on Power Electronics Technology (NaMPET), which focuses on advancing indigenous R&D, deployment, and commercialization of power electronics technologies in India, C-DAC has worked on High performance WBG MEMS sensors, Indigenous Electrical system emulator, Indigenous MVB controller for TCN based locomotives, power quality devices, including STATCOM and DVR, Smart Meter with TEJAS32 (VEGA) RISC-V processor, E Rickshaw Battery Charger, Planar magnetic Components, etc.

C-DAC's Three-phase smart energy meters, Go-Paryavekshak (Go-P), an advanced IoT-based cattle health monitoring system and Air Quality Monitoring System, AirPravah are few solutions developed by C-DAC in the area of IoT which are helpful in making Indian homes and cities smarter. Efforts have also been initiated in developing solutions and framework like Multifunctional Drone with in-built AI, IoT Security Ecosystem and IoT based precision agriculture framework.

Various activities in the areas of Capacity building and Skill Development have been carried out by C-DAC. FutureSkills PRIME, SwaYaan, Work Based Learning, Information Security Education and Awareness (ISEA) are some of the notable initiatives of MeitY and C-DAC undertaken during the period. C-DAC has conducted the IT training programs for personnel of Government sectors, Indian Armed Forces, IT companies, Insurance, Energy sector, Municipal corporations, Indian Railways, Town Planning and Commissions, Authorities along with various Ministries and Departments.

The activities steered during the year have resulted in 122 research publications, 22 patents, 6 awards/ recognitions and conduct of 20 major events. The annual report covers the achievements and major activities of C-DAC during the year 2024-25.

Major Activities in Thematic Areas

High Performance Computing (HPC)

C-DAC has been engaged in design, development and deployment of HPC infrastructure, research and development of HPC technology components, HPS system software and HPC-scale applications, HPC Solutions and Services, and build skills in development of scalable HPC applications in varied domains of national interest under National Supercomputing Mission (NSM). Key activities carried out by C-DAC in this thematic area during 2024-25 are given below.

National Supercomputing Mission (NSM)

Under NSM approved by Cabinet Committee on Economic Affairs (CCEA) in 2015, MeitY through C-DAC is actively involved in indigenous R&D in Peta-scale computing systems encompassing HPC Components (including processor, server board, interconnect, cluster, cooling system), HPC System Software, HPC Applications, and HPC Solutions and Services. It is mandated to design and develop Indigenous systems targeted at Exascale ecosystem in phased manner: from "Assembly" to "Manufacturing" to "Design and Manufacturing" of HPC systems and deployment of Petascale computing systems across the country. NSM aims at Atmanirbhar Bharat in HPC for undertaking investigation by the scientific community of the country.

Deployment of HPC systems across nation

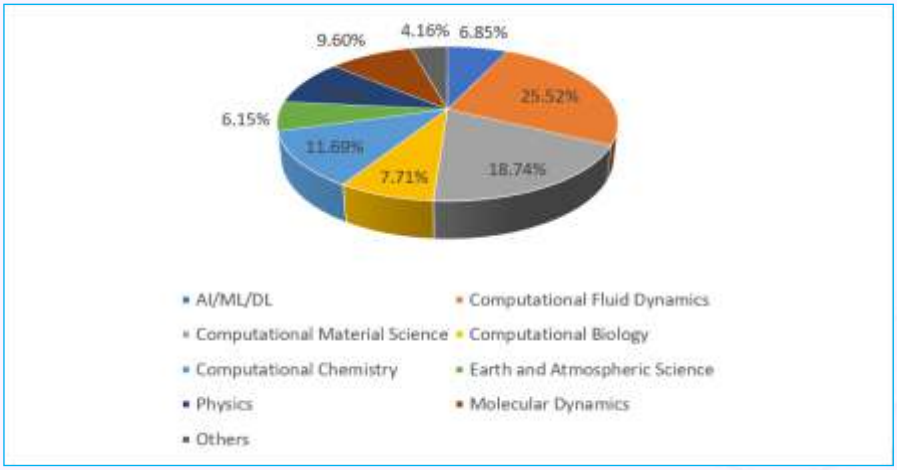
HPC Systems, Facilities and Technologies

Under NSM, 40 HPC systems with cumulative capacity of more than 64 PF is planned to be built and commissioned. Till March 2025, C-DAC has deployed 35 HPC systems with cumulative capacity of 37 PF at various academic institutions, organizations and Research and Development (R&D) labs across the country including, i.e. IISc, IITs, C-DAC, etc. Five more systems with compute capacity of 33 PF are in various stages of development and are expected to be commissioned by December 2025.

On September 26, 2024, Hon'ble Prime Minister, Shri Narendra Modi virtually launched three PARAM Rudra systems at Inter-University Accelerator Centre (IUAC), New Delhi (with compute capacity 3.1 PFLOPS), Giant Metrewave Radio Telescope (GMRT) Pune with compute capacity (1.0 PFLOPS) and S. N. Bose National Centre for Basic Sciences (SNBNCBS), Kolkata with compute capacity (838 TFLOPS) under NSM.

Unveiling of three "Param Rudra" supercomputers at IUAC New Delhi, GMRT-TIFR Pune, SN Bose NCBS Kolkata by Prime Minister Narendra Modi developed under the NSM

The significant number of components utilized in building PARAM Rudra systems are designed, manufactured and assembled locally. They include C-DAC's Rudra servers and HPC Software Stack. A wide range of applications from scientific & engineering and data science domains are optimized and scaled for underneath architecture/ processor. The PARAM systems cater to computational demands of academia, researchers, MSMEs, and startups in areas of national and strategic importance. The utilization of systems for different application domains during 2024-25 is:



Utilization of HPC systems for different application domains

The contribution of HPC systems to the R&D has been highly impactful, providing advanced computational resources to over 10,700 users, including more than 1,650 PhD scholars across 243 academic and scientific research institutions. Over 114 + lakh computing jobs have been executed on the HPC systems (installed under NSM), leading to the publication of over 1,570 research papers in both national and international journals. Additionally, more than 25,500 human resources have been trained in HPC and AI skills, further strengthening India's capabilities in these fields.

AI Research Analytics and Knowledge Dissemination Platform (AIRAWAT)

Under the initiative from MeitY, C-DAC has implemented Proof of Concept (PoC) for AI Research Analytics and Knowledge Dissemination Platform (AIRAWAT) of 200 AI Petaflops at C-DAC, Pune. Though novel in its scope, AIRAWAT is in line with India's approach of facilitation of innovation, rather than implementation. As a computing facility designed specifically to execute tasks relevant to ML/ DL applications, it is bolstering AI research and application in India. It acts as a common computational cloud platform for Big Data Analytics and Assimilation with a large, power-optimized AI cloud infrastructure connecting Centers for Research Excellence in Artificial Intelligence (COREs), Indian Centers for Transformational AI (ICTAIs) and other Academic, Research Labs, Scientific Community, Industry and the Start-Ups institutions with National Knowledge Network. The startups and industries like Tech Mahindra have been onboarded and are using Hosted LLM vision model and is being accessed by agencies like Gujrat Informatics Limited, ONGC, etc.

AIRAWAT Statistics	
Total Number of Users	204
No of enrolled Projects	62
No of associated Organization	65
Number of Startups	56

The AIRAWAT PoC of 200 AI Petaflops was commissioned in May-2023 and integrated with PARAM Siddhi – AI of 210 AI PF to give a total peak compute of 410 AI PF Mixed Precision (13.17 PF DP) and sustained compute capacity of 8.5 PF DP. The combined 'AIRAWAT-PSAI' system ranked 75th in the world (No. 1 in India) in 61st edition of Top 500 Global Supercomputing at the International Supercomputing Conference (ISC 2023) in Germany.

PARAM Siddhi-AI: PARAM Siddhi-AI is HPC-AI system developed in India with dual precision Rpeak of 6.5 PF (210 PF mixed precision) and 4.6 PF Rmax. It is being augmented with next generation high performing NVIDIA H200 GPUs by 126.6 AI PF (4.2 PF DP). This will accelerate AI training, HPC, and data analytics applications further.

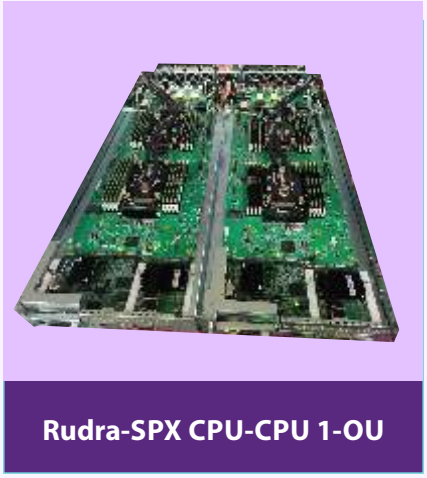
PARAM Siddhi-AI Statistics	
Total Number of Users	928
No of enrolled Projects	255
No of associated Organization	142
No of Jobs completed	59074

Build Approach Development under NSM

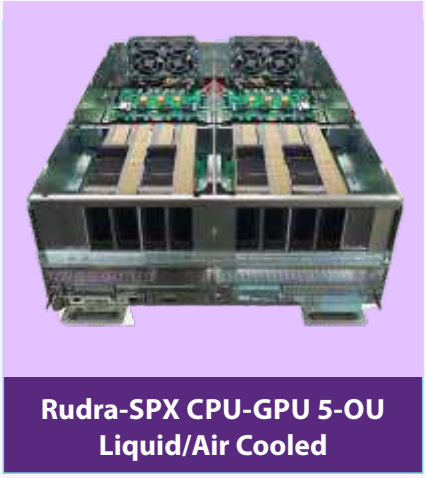
Indigenous Rudra-I server: C-DAC's indigenously designed Rudra-I server platform is poised to ensure India's self-sufficiency to design, develop and deliver as per country's needs, and has critical strategic and national importance. PARAM Rudra systems under NSM are built using Rudra-I server. C-DAC has partnered with M/s. VVDN Technologies, M/s. Kaynes Technologies and M/s. Avalon Technologies Ltd with technology transfer of server design for proliferating Rudra servers in commercial server market.

Rudra-SPX server is being developed using Intel's 4th and 5th generation Xeon Scalable Processor (Sapphire Rapids, Emerald Rapids). It is designed with effective thermal design to support up to 350W TDP processor. It will be available in two configurations; 1OU (CPU-CPU) and 5OU (CPU-GPU).

Rudra-I - CPU-CPU 1-RU



Rudra-SPX CPU-CPU 1-OU



Rudra-SPX CPU-GPU 5-OU Liquid/Air Cooled

Rudra-SPX CPU-GPU configuration

Rudra servers have exceptionally greater acceptance and edge in security conscious environments and businesses. HPC applications were benchmarked. Performance was found to be at par with clusters with commercial servers elsewhere.

Rudra based SSD storage server MK1 is designed to provide perfect combination of flash performance and capacity, ensuring it can adapt to evolving technological needs. The dual processor provides maximum SSD performance, while the remote DMA feature enhances throughput. A redundant power supply ensures high availability. Six storage servers are integrated with PARAM Rudra. It achieved a sequential read and write speed of 80 Gbps and a random read and write speed of 2,500 KIOPS.

Rudra based SSD storage server

Indigenous HPC Network – Trinetra: C-DAC's "Trinetra" is an integral component of PARAM system. The objective of Trinetra design is to realize high bandwidth, low latency, scalable network fabric supporting industry-standard programming interfaces. OFED compliant software stack supports Industry standard programming interfaces such as MPI and legacy TCP/IP using emulation. Trinetra-A, is based on 100 Gbps physical link layer and adopts 3D Torus network topology using six such links to achieve an aggregate 600 Gbps throughput. Trinetra-A is deployed in PARAM Rudra 1PF system installed at C-DAC Pune.

Trinetra-A

Trinetra-B is based on 200 Gbps physical link layer technology and uses 10 such links to realize 'Supercluster' topology which is improvement over 3D Torus used by Trinetra-A. The development of Trinetra-B is nearing completion and the primary deployment would be done in PARAM Rudra 20PF system at C-DAC Bangalore.

Trinetra-B

Design and Development of Direct Cooled Liquid Cooled (DCLC) System: A Coil-on-Chip (CoC) Liquid Cooling System has been designed and optimized based on CFD simulation studies. It extracts 330 W from two CPUs (165 W from each processor) to cool Rudra server board.

A 330 W coil on chip-based cooling system for Rudra Server

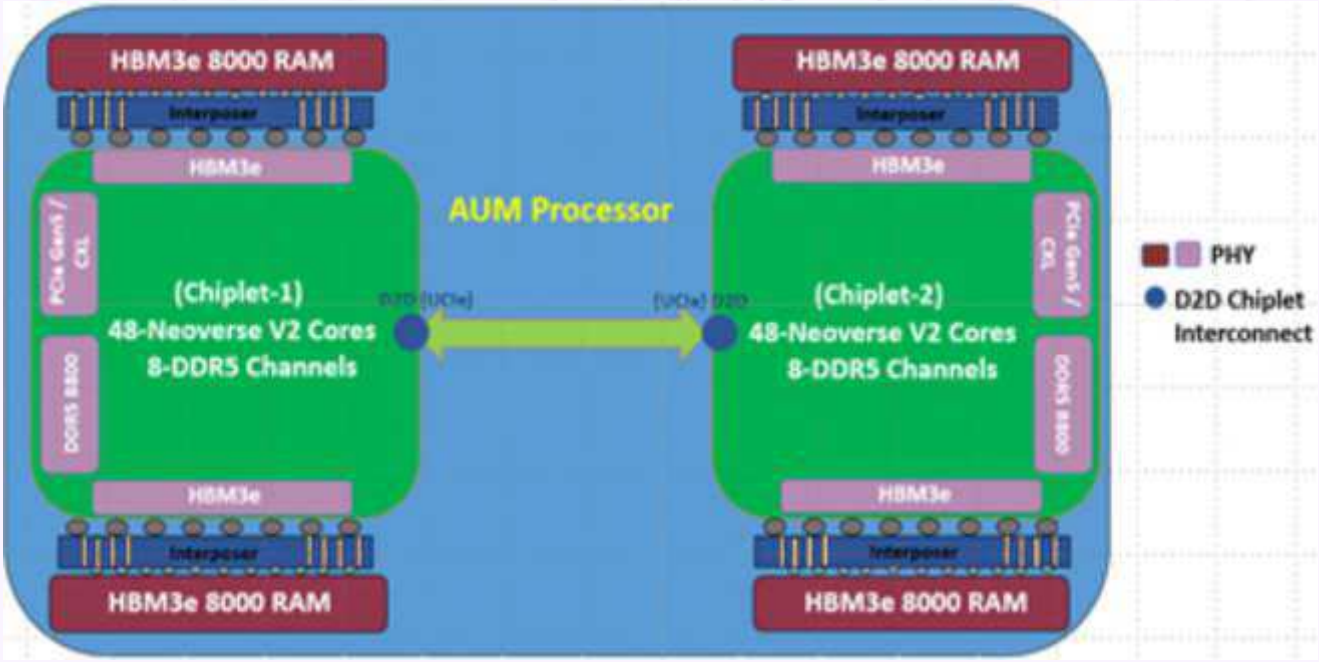
The integrated CoC has been tested by running High-Performance Linpack (HPL) benchmark test and its thermal performance of chip cooler has been found to be satisfactory. It's thermal performance needs to be improved further as compared to commercial liquid chip cooler. For efficient cooling of heated liquid in outside environment, a 30-kW modular Panel Water Cooler with Provision of Air and Indirect Evaporative Cooling (PWC_A&EC) has been designed, developed, fabricated and experimentally tested at Indian Institute of Technology Bombay. The PWC_A&EC cools the warm liquid generated from a DCLC based HPC system and the cooled liquid is recirculated back to HPC server for extracting heat from CPUs. The 30 kW PWC_A&EC system has been installed at Indian Institute of Science Education and Research (IISER), Pune for cooling of PARAM Brahma HPC System and integrated with the existing Thermax dry cooler to supplement additional cooling requirements as shown below.

30 kW Panel Water Cooler installed at IISER, Pune

Rudra PARAM Shavak: Powered by the Rudra Server, Rudra PARAM Shavak continues to strengthen India's HPC ecosystem by providing affordable, compact supercomputing solutions for academia, research, and industry.

RUDRA PARAM Shavak with BOSS OS

It is built with a custom Linux from Scratch (LFS) - based BOSS OS. The issues including expired wget links, GRUB boot failures, chroot debugging, package errors, and NVIDIA driver compatibility have been resolved. The same is tested and validated key HPC applications (GROMACS, LAMMPS, NAMD, WRF, etc.) with Intel oneAPI MPI, OpenMPI, and multiple compilers. It is integrated KDE Plasma into BOSS OS, providing a modern and user-friendly desktop environment. It was exhibited at HiPC 2024, the 31st IEEE International Conference on HPC, held in Bangalore.
Indigenous HPC Processor SoC (AUM): Aligning with the "Atmanirbhar Bharat" initiative of Government of India, C-DAC is developing an indigenous HPC Processor SoC (AUM). It is based on Arm Neoverse V2 architecture in TSMC 5nm technology node. It will have 96 Cores, 144 GB of HBM3e memory, 16-DDR5 channels and 128-PCIe Gen5 lanes. It will provide ~5 TFLOPS performance at ~350 W TDP and will enable future HPC Systems development with best-in-class HPCG benchmark figures in the industry. The design of AUM processor chip is in progress. Chip will be taped-out in first quarter of 2026 and samples of AUM processor chip will be available in fourth quarter of 2026.



AUM SoC - Architecture

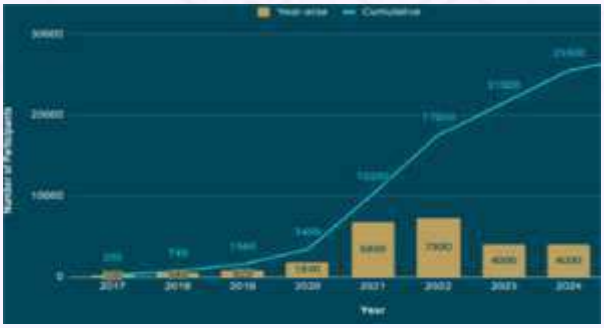
NSM Human Resources Development (HRD)

During the year, the NSM HRD continued its mission to create a skilled pool of HPC-aware professionals to meet the growing demand for expertise in HPC technologies. It offered diverse trainings tailored to different participant needs for comprehensive skill development across all levels of expertise:

- HPC Awareness Workshops – Introduced HPC basics and applications
- Centre for HPC Upskilling and Knowledge-sharing (C-HUK) - Advanced Certificate Course in HPC (ACC-HPC) is being offered across all C-DAC centres.
- Faculty Development Programs – Focused on enhancing educators' HPC skills
- Domain-Specific Workshops – Addressed fields like Molecular Dynamics, NLP, and CFD
- Hackathons and Bootcamps – Promoted innovation and hands-on problem-solving
- Internships – Provided students with hands-on experience through HPC-related projects
- C-DAC ACTS Courses – Diploma courses in system administration and application programming

NSM HRD - Outcome

- **Participants Trained:** Over 4,000 participants including students, researchers, and educators
- **Programs Conducted:** 25+ workshops and training programs, covering both introductory and advanced topics in HPC
- **Collaborations:** Partnerships with industry leaders like Intel and NVIDIA amplified the quality of training and resources
- **Community Building:** The NSM Users Forum and other initiatives fostered collaboration among participants, strengthening India's HPC ecosystem



Cumulative trend of trained participants

HPC System Software

ParaS Compiler: ParaS is a versatile compiler designed to enable seamless execution across a wide range of computing hardware, including CPUs and accelerators (GPUs, AI, TPUs etc.,). By supporting Unified Programming, the ParaS Ecosystem will enable developers to write their code once and run it on multiple computing platforms, making the development process simpler and more efficient. It is made available for free usage on NSM systems and for open-source communities through https://nsmindia.in website.

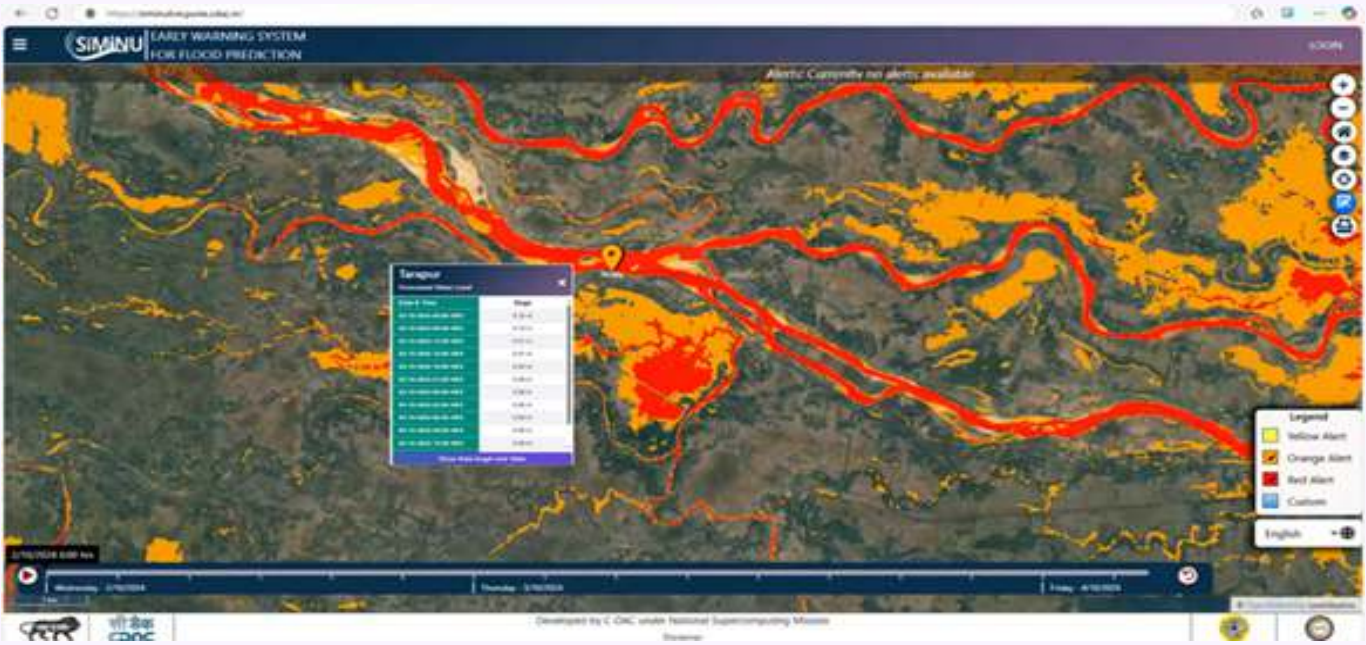
HPC Applications

By prioritizing areas such as Early Warning Systems for Flood Prediction, Forest Fire-spread Prediction, Seismic Imaging for Oil & Gas Exploration, Urban Modeling for Resource Allocation, Genomics and Drug Discovery for Disease Treatment, Materials Science, and Computational Chemistry, NSM not only met global standards but also enhanced India's scientific and technological capabilities. These efforts contribute to national progress and security, empowering the nation to effectively respond to and overcome its most critical challenges.

Focus on Applications of National Importance under NSM

Early Warning System for Flood Prediction for River Basins of India: Early Warning System for Flood Prediction for River Basins of India - a high-accuracy, two-day advance flood prediction system - has been developed. It provides forecasts of water levels and inundation extents for the Mahanadi River Basin. Leveraging NSM HPC resources, the

simulations are completed in just two hours, significantly enhancing flood preparedness. Between August and October, 2024, approximately 150 simulations were conducted on PARAM Rudra for the Mahanadi River Basin. The use of HPC has improved lead times, enabling faster and more precise hydrodynamic simulations, thereby strengthening flood preparedness and response. PARAM Rudra was also used for embankment breach simulations at selected locations provided by Odisha State Disaster Management Authority (OSDMA). A geospatial portal SIMiNU is designed for flood prediction, decision making and dissemination, in Indian river basins. This dashboard has been well received, with emphasis on its operationalization.



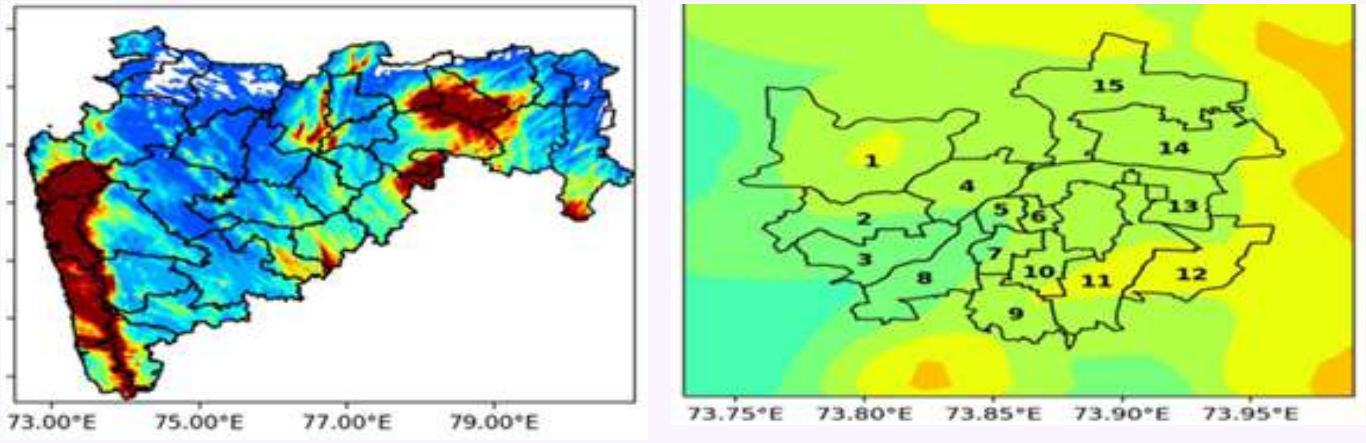
A geospatial portal SIMiNU for flood prediction

ANUGA: Significant optimizations have been made to the open-source code ANUGA, reducing runtime of a 5-day simulation at 900 sq. m. resolution from 23 hours to under two hours for a 2-day simulation. To enhance accuracy, the code has been refined to support a 300 sq. m. mesh resolution, integrating these improvements into the main code and making them available in open-source repositories. The optimized code completes a 2-day simulation at 300 sq. m. resolution in just three hours. Additionally, compute-intensive functions like compute_fluxes, extrapolation, update_conserved_quantities and protect_against_infinites were ported to GPU using CuPy.

Near-real time fire emission estimation and fire forecasting system for Delhi Air Quality: C-DAC has conducted research on impact analysis of the fire emissions from the North-West region of India over Delhi-NCR and its accurate quantification. The extent of fire emitted pollutants contributed to the already severe pollution in Delhi and the heavily populated regions located downwind of the fires. An accurate temporal and spatial estimate of biomass burning emissions was developed to effectively implement control measures toward the reduction of biomass burning emissions.

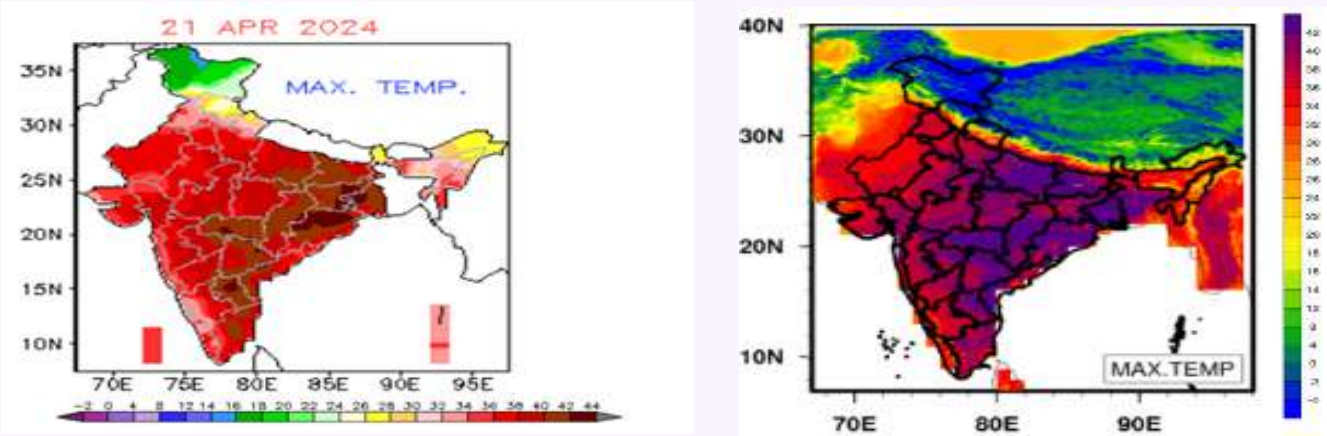
Urban Modeling - Development of multi-sectorial simulation lab and science-based decision support framework to address urban environment issues: To ensure seamless operational forecast for users, an automated tool/system has been developed to convert various data formats into model-ready inputs, ensure observation data quality, and validate modelling outputs across local, regional, and global scales. Urban modelling, operating procedures, technology advancement, meteorological, air quality, and hydrological services are all provided by this system. Urban parameterization, urban canopy, UHI, boundary layer, atmospheric, chemical, and morphology data assimilation are being modelled using this HPC and big data analytic technology-based development in conjunction with an interoperable cross-sectorial data, metadata, and query framework, as well as a test bed for business as usual and what-if scenarios.

Daily weather forecast over India and heavy rainfall event forecast: This application is aimed at setting up the Weather Research and Forecasting (WRF) model for daily weather forecasts and predicting heavy rainfall events over Pune, Bhubaneswar, and Bangalore. C-DAC and IIT Bhubaneswar worked together to set this model through rigorous sensitivity experiments. C-DAC has been running the finalized WRF modelling system to generate a 3-day forecast of daily rainfall all over India at 5 km spatial resolution and 0.5 km resolution over selected cities. The WRF model greatly improved forecast accuracy compared to IMD and NCEP GFS data. The model setup was found to show excellent efficiency in simulating rainfall over India and, especially, over Pune. C-DAC is sharing daily rainfall forecast information containing ward wise information as a tabular form along with spatial distribution maps over Pune to IMD, PMC, PCMC and WRD on daily basis.



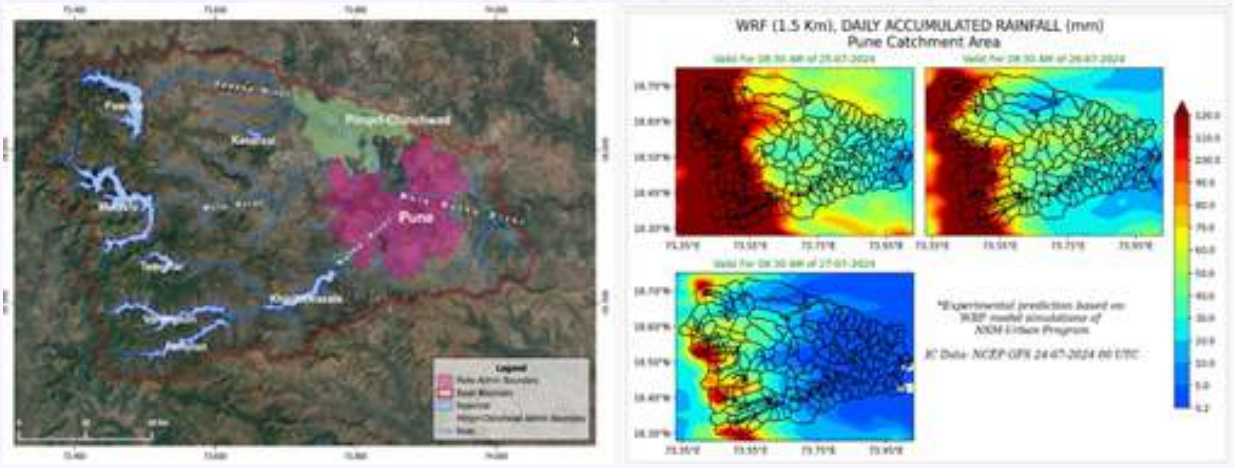
Ward wise rainfall information shared with various agencies

Daily heatwave forecast over India shared with India Meteorology Department (IMD): The major objective is to forecast the heat wave events over urban cities and to estimate its impact on the local atmosphere in terms of heat stress and urban heat island. The model is running with a single-layer urban canopy model which accounts for the urban city structures into account. Model simulated temperatures were validated against ground-based and satellite data. During March-May 2024, C-DAC shared daily heat wave and heat stress information with IMD Delhi.

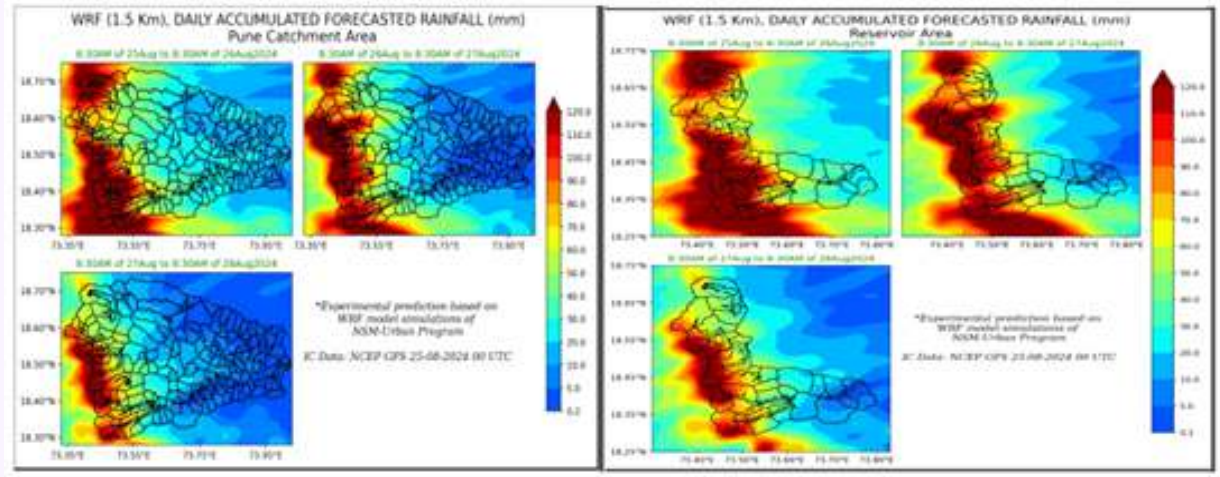


(a) IMD observed (b) C-DAC simulated maximum temperature over India on 21 April 2024 when most of the Indian subcontinent was under heat wave condition

Automated and Coupled Hydro-Met Multi-Model Framework for Operational Flood Forecast for Monsoon Period 2024 for Pune: A forecasted data of 72 hrs with a lead time for Ward level rainfall, flooded areas/hotspots have been shared to Disaster Management officer, PMC and PCMC for the period from June to September 2024. The data contains ward level flooded locations with time of flooding, duration of flooding and depth of flood water in those areas. The data was useful to Reservoir Authorities to understand the rainfall conditions more accurately and lead time for effective operations in monsoon and specifically heavy rainfall situations having advanced of rainfall time and locations and reservoir discharges.



Pune Hydrology Catchment



Forecasted Reservoir U/S Catchment Rainfall, water inflows, water level and dam spillway discharge data and ground-truthing

Ward level Rainfall, flooded areas/hotspots for PMC

Development of an automated HPC based model execution workflows and Decision support System: Automated HPC based meteorology, air quality and hydrology model execution workflows facilitate end-users with automated model execution on HPC comprising of automated data download, model execution, model output validation and visualization. An integrated decision support system (DSS) was developed that visualizes various parameters present in the simulation results. Using this DSS, the end-user is able to view a combined as well as inter-related effects of meteorology, air quality and hydrology, on the urban environment.

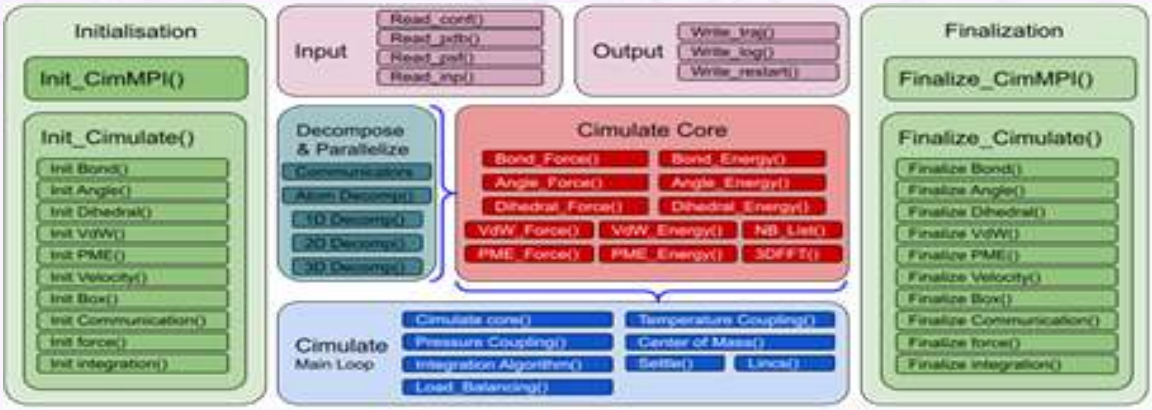
HPC based automated Modeling and Decision Support Portal

Multi-Node Multi-GPU version of OpenFOAM (RapidCFD) Optimized for NSM platform: The Multi-Node Multi-GPU version of OpenFOAM (RapidCFD) is scalable CFD framework designed for HPC. This extended version integrates RapidCFD with OpenMPI 3.0 and OpenFOAM-v1912 for efficient preprocessing and post-processing while leveraging multi-node, multi-GPU acceleration for large-scale fluid simulations. The Multi-Node Multi-GPU version of OpenFOAM is validated with standard CFD benchmarks such as 3D-Lid Driven Cavity and Dam Break case, achieved significant speedup.

Energy Exascale Earth System Model (E3SM): E3SM leverages computational resources to simulate the Earth's climate and energy systems with unprecedented resolution and complexity. Its reliance on HPC systems allows it to manage large-scale simulations that require intensive data processing, memory, and parallel computing. Given its potential and its connection to the Earth sciences domain, it adds a valuable new area to our exploration activities. Notably, the E3SM-kernel has been ported on the PARAM-Rudra IUAC system.

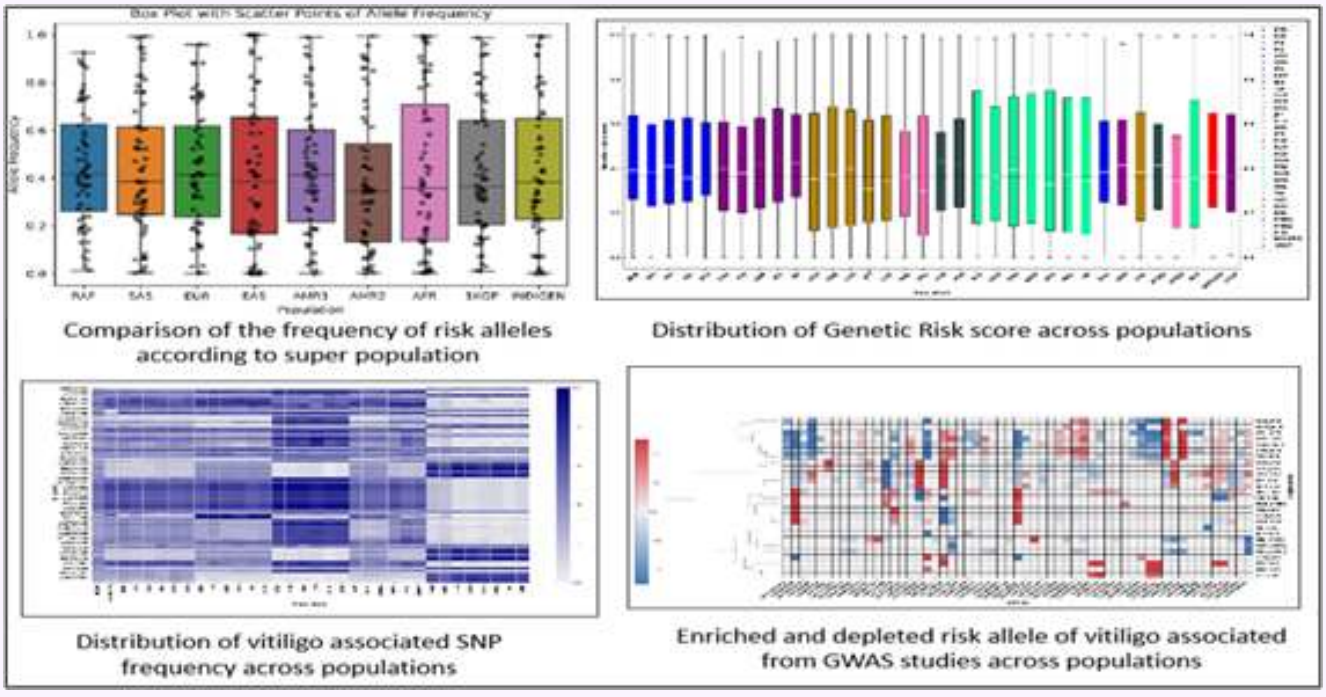
SeisRTM: A HPC Software suite for seismic imaging to aid oil and gas exploration: SeisRTM is an efficient Reverse Time Migration (RTM) software. It provides high-resolution 2D and 3D seismic images of complex geological sub-surfaces using large, acquired seismic datasets. Developed indigenously on NSM infrastructure, it includes 3D RTM capabilities designed for upstream oil and gas exploration companies. It enables oil companies to reduce costs and dependence on expensive software licenses for RTM-based subsurface imaging. It is deployed in Geodata Processing and Interpretation Center (GEOPIC) at ONGC, KDMIPE Campus, Dehradun during February 2025.

CIMULATE: Cimulate is a parallel molecular dynamics software, useful in simulation of biomolecules required for research into the field of drug discovery. It was launched at the "Accelerating Biology 2025" event.



Cimulate

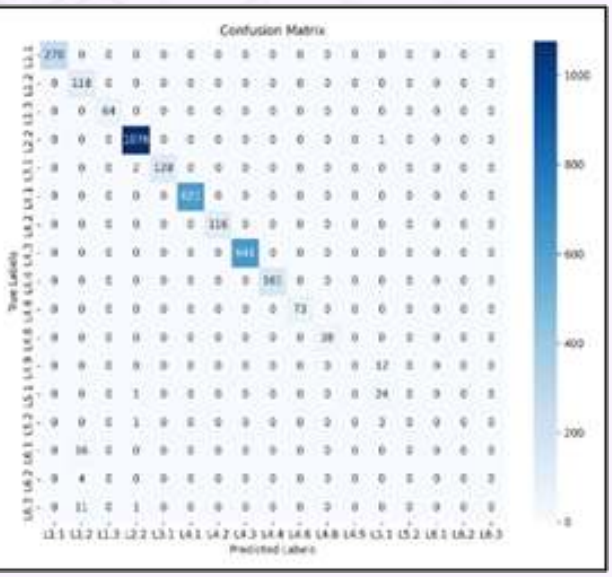
Genetic studies for vitiligo genes across populations: Vitiligo is an autoimmune progressive skin depigmentation disorder caused by melanocyte loss, with genetic predisposition playing a key role. The study analyzed 64 of alleles for enrichment and depletion across populations using data from the 1000 Genomes Project and IndiGen, with the 1000 Genomes dataset as a reference. The differential enrichment and depletion of risk alleles across populations provided insights into genetic susceptibility to vitiligo. This analysis aids in SNP prioritization, helping to explain its varying prevalence among ethnic groups.



Genetic studies for vitiligo genes across populations

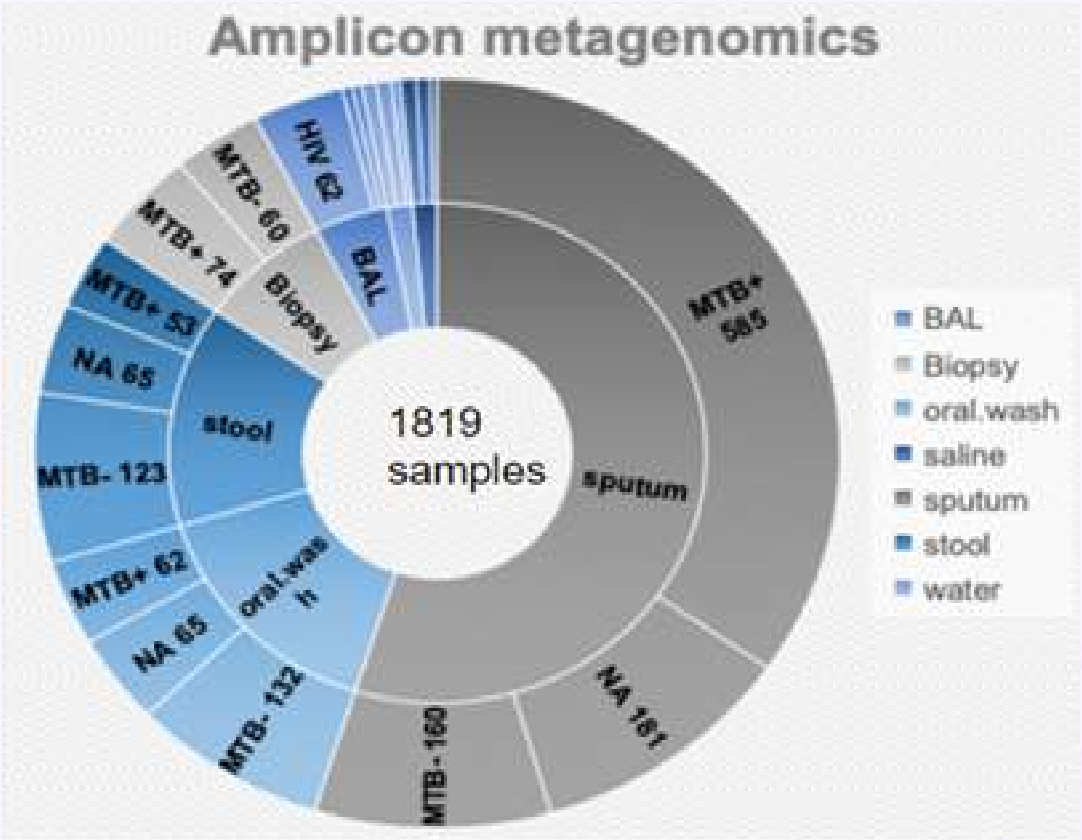
Mycobacterium: Sensu stricto Mycobacterium Tuberculosis Complex (MTBC) consists of nine human-adapted lineages that differ in their geographical distribution. Recent studies on genetic diversity strengthen the need for the inclusion of SNPs along with Region of Difference as additional biomarkers to understand the intra-lineage diversity of MTBC. In this study, a variant calling pipeline was utilized by using more than 20000 publicly available whole-genome sequences (WGS) of human-adapted Mycobacterium species to identify SNPs. This pipeline included aligning sequences to a reference genome (Mycobacterium tuberculosis H37rv) using BWA and variant calling with GATK. Logistic Regression and Decision Tree classifiers were employed to train and test the SNP datasets. A confusion matrix was used to compare actual and predicted MTBC lineages, yielding remarkable classification accuracy (>98%) at both lineage and sub-lineage levels.

Lineages	Nomenclature
Lineage 1	L1.1 - 1669, L1.2 - 726, L1.3 - 395
Lineage 2	L2 .2 - 6730
Lineage 3	L3.1 - 786
Lineage 4	L4.1 - 3889, L4.2 - 712, L4.3 - 4019, L4.4 - 1017, L4.6 - 493, I4.8 - 235, L4.9- 83
Lineage 5	L5.1 - 157 , L5.2 - 26
Lineage 6	L6.1 - 100 , L6.2 - 30 , L6.3 -97



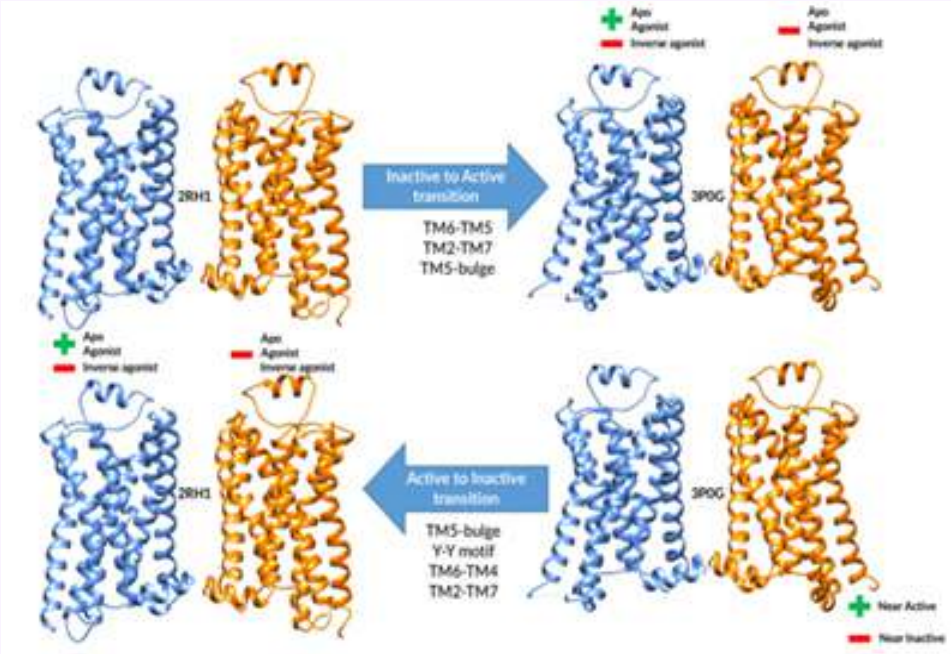
Number of MTBC samples used for the study and classification results obtained

Metagenomics studies in lung microbiome: A meta-analysis of 8 amplicon metagenomic studies on TB, comprising 1819 samples from different sources including sputum, bronchoalveolar lavage (BAL), biopsy, and stool was performed. The ASV abundance tables obtained for 1222 samples that passed the denoising step were merged together and agglomerated to collapse taxa at species level. Taxa with low abundance (<1) and mitochondrial and eukaryotic annotation were filtered out leaving behind a merged table of 3549 taxa and 1155 samples. Differentially abundant taxa (DAT) were used to train ML models for sample classification. The strong predictive capability suggests that these microbial signatures could be valuable biomarkers for diagnosis and treatment given sputum being the most accessible clinical sample.



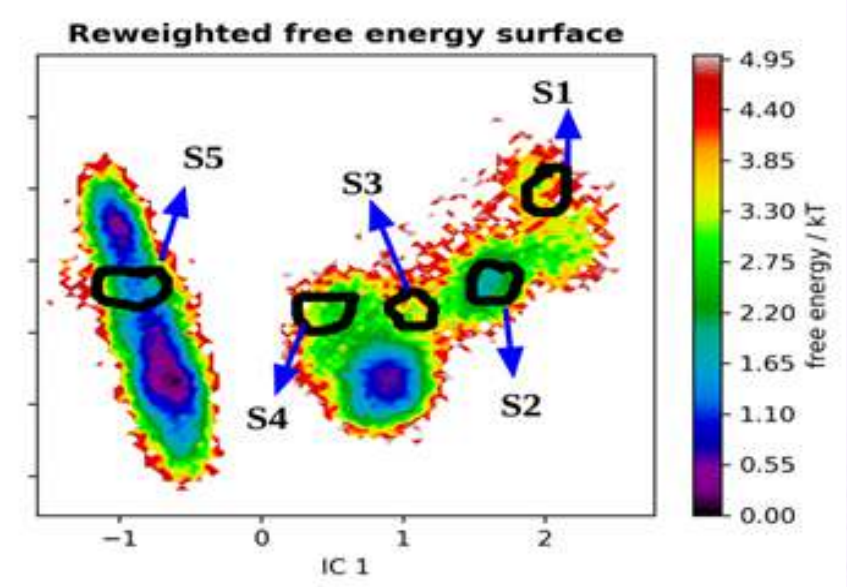
Samples used for the meta-analysis study of lung microbiome

G-Protein coupled receptor (GPCR)- β2AR molecular dynamics simulation studies: In the current study, molecular dynamics simulations have been performed to understand activation-related structural changes in β2AR at the dimer-level. The transition from inactive to active and vice versa has been studied by starting the simulations in the apo, agonist-bound and inverse agonist-bound β2AR dimers for PDB ID: 2RH1 and PDB ID: 3P0G, respectively. A cumulative total of around 21μs simulations were performed. The TM5 and TM6 helices within the two monomers were observed to be in significant variation in all the simulations. The dimeric interface between TM1 and helix 8 were observed to be well maintained in the apo and agonist-bound simulations. The presence of inverse agonists favored inactive features in both the monomers.



Graphical abstract

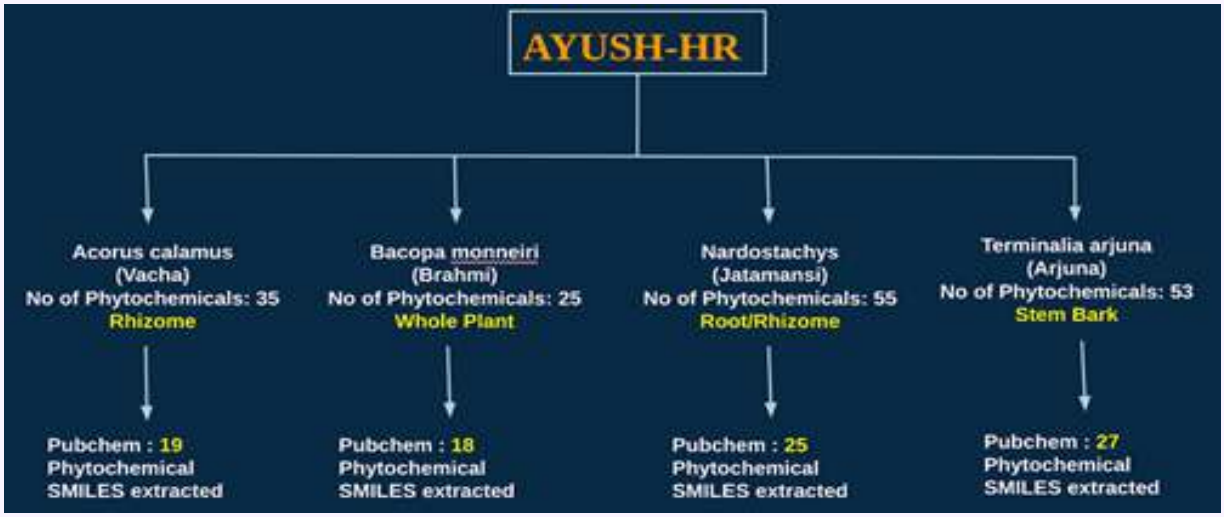
Markov state modeling (MSM) analysis of β2AR molecular dynamics simulation trajectories: To further explore the activation mechanism and transition pathway, adaptive sampling was done by extracting five different start structures based on 3.5 μs MSM analysis of 2RH1-APO and 3P0G-APO systems. Simulations were performed using a DGX machine with A100 GPU cards.



2RH1-APO system adaptive sampling

Computational Studies on cancer protein: KRAS protein is known to be frequently mutated in various cancers. The most common mutations being at position 12, 13 and 61. The positions 12 and 13 form part of the phosphate binding region (P-loop) of KRAS. The study revealed that the local structural changes at the site of mutations allosterically guide changes in distant regions of the protein through hydrogen bond and hydrophobic signaling network. The dynamic cross correlation analysis and the comparison of the correlated motions among different systems manifested those changes in SW-I, SW-II, 3 and the loop preceding 3 affects the interactions of GDP/GTP with different regions of the protein thereby affecting its hydrolysis. The Markov state modelling analysis confirmed that the mutations, especially G13D imparts rigidity to structure compared to wild type and thus limiting its conformational state in either intermediate state or active state. The study suggests that along with SW-I and SW-II regions, the loop region preceding the α3 helix and α3 helix are also involved in affecting the hydrolysis of nucleotides and may be considered while designing therapeutics against KRAS.

Network Pharmacology studies on AYUSH-HR: AYUSH-HR formulation studies on hypertension using four different plants [Vacha (Acorus calamus), Brahmi (Bacopa monneiri), Jatamansi (Nardostachys), Arjuna (Terminalia Arjuna)]. Web Scraping of Phytochemical information (SMILES, 3D mol2, targets information from IMPPAT database and pubchem database) was done.



AYUSH-HR plants and phytochemical information

Antisense Technology: Designing novel antisense modified nucleotides which can perform better and understanding their mechanism of action are critical challenges in antisense technology. The computational designing of antisense modifications and DFT calculations of existing and novel modifications have been carried out. Molecular dynamics simulations of antisense oligomers in duplex form and the RNase H bound form with the proposed novel modifications through more light in understanding the mechanism of action of these modifications.

NSM India Portal: NSM India portal (https://nsmindia.in) provides detailed information about NSM project and related ongoing activities, updates, training programs. It includes live chart of number of jobs submitted using API, derived from C-Chakshu monitoring platform.

International Association: ADAC (The Accelerated Data Analytics and Computing) institute was established to foster global collaboration among elite laboratories, focusing on system management. ADAC's objectives include adapting applications to hybrid accelerated architectures, partnering with HPC vendors, enabling collaborative scientific efforts, ensuring application sustainability, and sharing best practices in HPC management. C-DAC is now an affiliate member of ADAC as well as of High-Performance Software Foundation (HPSF) enabling and widening the international collaboration reach and technical know how's.

Quantum Computing

C-DAC is executing various projects in the areas of Quantum computing, Quantum communication, and Quantum sensing including development of the Quantum Reference Facility, Quantum Accelerator, FPGA-based quantum control hardware, etc. C-DAC is also working on Quantum Communication Controller, Secure Post Quantum Public Key Infrastructure. Various solutions developed by C-DAC in this area are as below.

Establishment of Superconducting-based Quantum Computing Reference Facility

The main objective of the project is the establishment of a Superconducting based Quantum Computer Reference Facility (50-100 qubits) at C-DAC, which will foster collaborations, advance quantum computing technology, and enable breakthroughs in a wide range of use cases across scientific and industrial applications. This is the first-of-its-kind reference facility in the country where a 50-100 qubit superconducting-based quantum computing ecosystem will be established including the installation of a dilution refrigerator, control electronics, wiring, Quantum Processing Units (QPUs) and software stack. Additionally, it involves the creation of dedicated infrastructure, training, capacity building and implementation of collaboration agreements with industry partners. The facility can be used for developing a vibrant quantum ecosystem within the country, leapfrogging towards the advancement of quantum technology research and development. The project has been initiated in August 2024 with the duration of 2 years.

Quantum Communication Controller Card (QCC)

QCC is FPGA Mezzanine Card (FMC) add-on card for generic FPGA development boards with QKD control interfaces. This is an indigenously developed Quantum Communication Controller (QCC) card, with hardcore multi-processor interfaced with programming logic, providing quantum communication control interfaces based on high-end Field Programmable System on Chip (FP-SoC). It provides High-Precision analog and comprehensive digital Interfaces enabling generation of RF signals with precise timing and synchronization. It also supports multiple interfaces for single photon detectors crucial for efficient quantum communication.

Quantum communication controller card (QCC)

Qniverse

Qniverse is a cutting-edge, unified development platform designed to support diverse quantum computing (QC) architectures and hardware platforms, making quantum computing accessible to individuals and organizations alike. It bridges the gap between the theoretical principles of quantum mechanics and the transformative practical applications of quantum technology. It is enabling users to discover the vast capabilities of quantum computing beyond the limitations of classical systems, contribute to ground breaking research and scientific discoveries and pioneer advancements in the evolving quantum era. It supports multiple QC architectures and hardware platforms, eliminating the need for multiple tools and provides seamless integration with leading quantum providers and simulators for hybrid classical-quantum workflows. It combines theoretical quantum mechanics with hands-on programming tutorials, enabling beginners and experts to upskill efficiently.

Circuit Composer of Qniverse

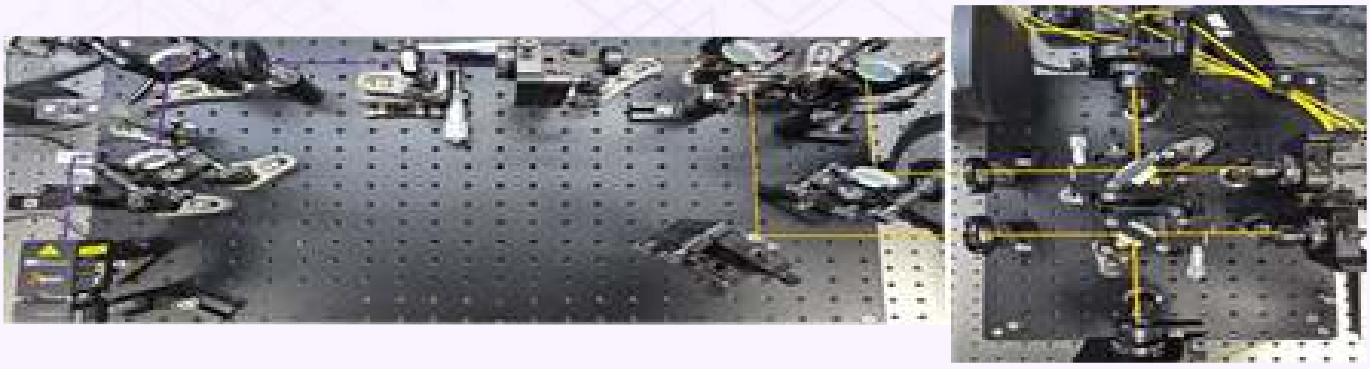
Quantum Computing for Neuro-Science Application

The main objective of the project is to design and develop a QML based solution for attention analysis by Brain Signal processing. The project is being executed amongst C-DAC Hyderabad, Noida, Mohali, Silchar and Delhi centre in collaboration with IIT Roorkee, IIT Ropar, IIT Gandhinagar and IIIT Hyderabad. It focusses on developing Indigenous quantum machine learning based solutions for Early Disease Detection, Mineral Prospectively Analysis, Image and Video Compression, Weather Forecast and Climate Modelling, Entity and Anomaly Detection, Escape/Evacuation Routing, Brain Activities Analysis, Malware/Ransomware Analysis, Analysis of Satellite Images, Algorithms for Behavioural Pattern Analysis, Simulation of Molecular Dynamic, Learning Physical Systems and Quantum States. The project also aims to enhance capacity building in India in quantum computing and its associated areas. The project has been initiated in August 2024 with the duration of 3 years.

Lab Demonstrations and Prototype

Quantum Random Number Generator based on entanglement

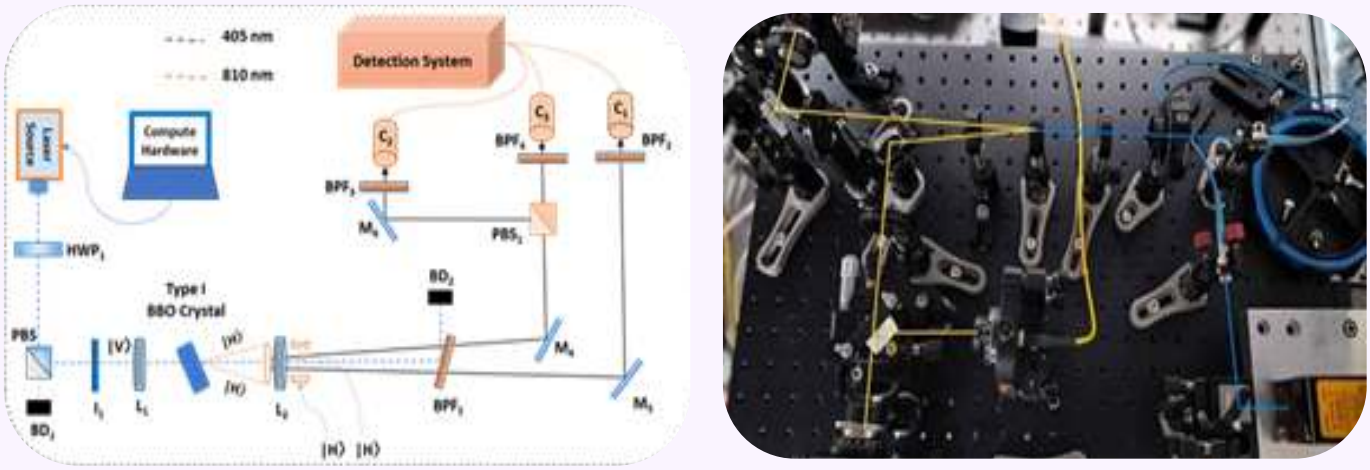
The randomness inherent in the quantum entanglement is utilized for generating random numbers, which is the most promising and secure way of generation. Further, the random numbers were tested in statistical test suites and application was demonstrated. Conditioned random number generation rate is 20 kbps.



Quantum Random Number Generator

Programmable 1-Photonic Qubit Quantum Computer

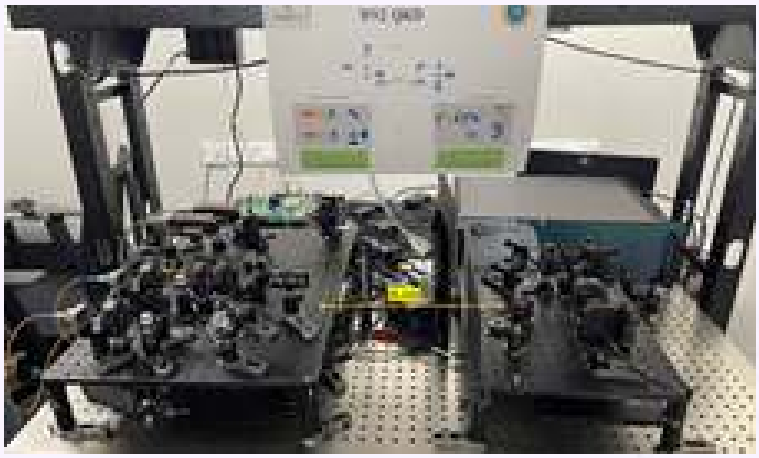
C-DAC has developed and demonstrated a prototype for a programmable 1-photonic qubit quantum computer for quantum education on web browser. Single qubit gates were implemented and results were executed on the web-based browser.



Prototype for Programmable 1-Photonic Qubit Quantum Computer

QKD based on free space

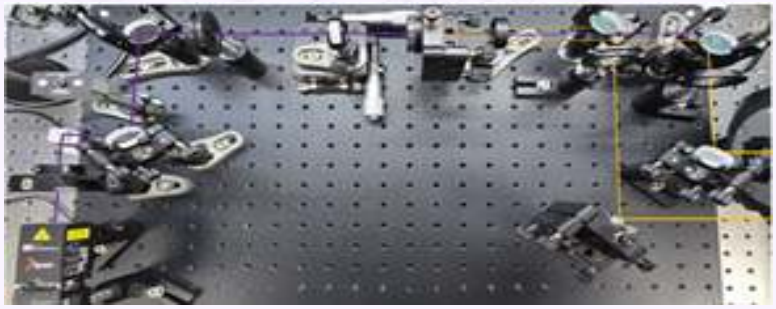
B92 QKD is based on two non-orthogonal states using polarization encoding. The Quantum Bit Error Rate (QBER) of 2% is reported and the system generates 4kbps Secure Key Rate. Secure real time video streaming was demonstrated to academia and industry.

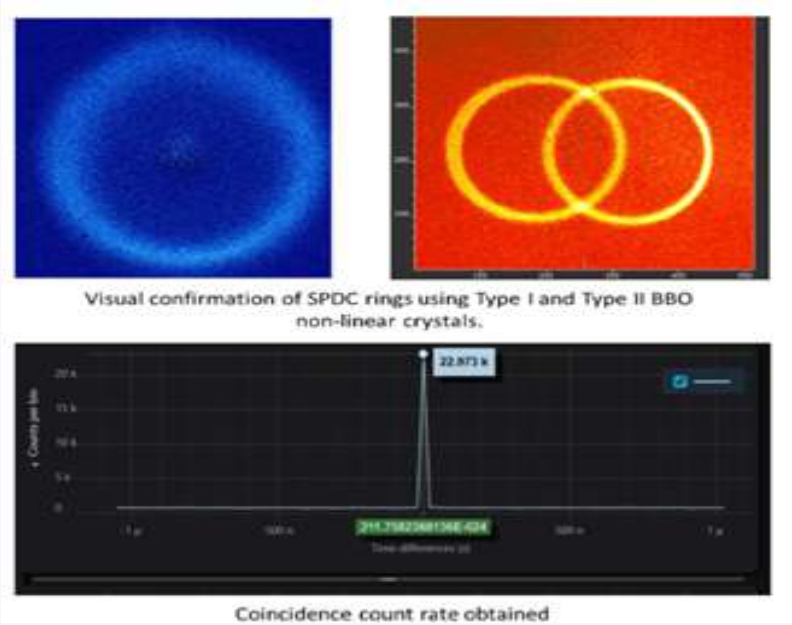


B92 QKD based on free space

Quantum Entanglement Source

Quantum entanglement was generated using Spontaneous parametric down conversion with Type 2 BBO crystal. The generation rate was 5kbps.





Quantum Entanglement Resource

QuBIT Studio Lab

C-DAC Bangalore has established the QuBIT Studio lab to advance the field of Quantum accelerated computing, under the MeitY funded initiative 'HPC based Quantum Accelerators for enabling Quantum Computing on Supercomputers'. The lab's main focus area is on developing systems that seamlessly integrate various quantum technologies, including photonic computation and communication systems, into traditional High-Performance Computing (HPC) architectures.

Visit of Hon'ble Secretary, MeitY to QuBIT Studio Lab

Quantum accelerated computing represents a major shift in the world of computation, combining the principles of quantum mechanics with classical computing architectures. From optimizing logistics and solving intricate mathematical problems to simulating quantum systems for scientific research, the speed and efficiency of quantum accelerated computing herald a new era in computational capabilities. Recognizing the significance of this technology, C-DAC has been actively working in this important scientific frontier.

The QuBIT studio laboratory is dedicated to concentrating on the advancement of control and system software stacks tailored for diverse quantum computing platforms, specifically, superconducting and photonic qubit platforms. The primary products under consideration encompass a unified software development environment that streamlines the full stack quantum application development and optimized libraries, presented in the form of SDKs, designed for various algorithms and applications across multiple quantum computing and simulation backend. The key application areas of research for the lab encompasses developing software technologies for integrating Quantum Photonic Processors with classical computing infrastructure and application research for reaping benefit from these architectures.

New Initiatives

Development of Secure Post Quantum Public Key Infrastructure

The project aims to develop Post Quantum Public Key Infrastructure using NIST's Post Quantum Cryptographic Algorithm. It proposes the development of two indigenous Post-Quantum Cryptographic Algorithms, one for the Key Encapsulation Mechanism and one for the Digital Signature Scheme. This activity is carried out in collaboration with IIT Madras, and IIITDM Kurnool. Initially, tweaks of the existing PQC algorithms will be attempted, and then design for the new algorithms will be taken up. The initial security evaluation of the newly developed algorithms will be performed by the experts. Also, the hardware implementations of PQC algorithms are analyzed for side channel vulnerabilities by SETS, Chennai.

FinTeQ-Quantum-Safe Financial Transaction Framework

The project tries to address the issues due to quantum threats on financial transactions. It proposes to build a Quantum-Safe Financial Transaction Framework that will secure financial transactions even in the presence of a quantum-enabled adversary. The project has a two-fold approach to solving this problem:

- **B2B:** Financial transactions between financial institutions: These transactions will leverage Fiber based Quantum Key Distribution (QKD) to exchange the symmetric keys securely. These keys will then be used to secure any transaction using symmetric-key cryptography (e.g., AES-256). It can be noted that in the Quantum world, AES-256 provides 128-bit security due to Grover's algorithm.

- **B2C, C2C:** Financial transactions between consumers or consumer and financial institutions: These transactions will be secured through indigenous secure USB dongles which will leverage Secure Application Framework based on both web and mobile platforms. They will act as an extra layer of security between the consumer and the bank/financial institution. Secure Dongles are physical devices used to gain access to an electronically restricted resource or to provide an additional feature to any existing system. It can be used to prove one's identity electronically. The Dongle may act like an electronic key to access something. Secure Dongle brings two-factor authentication to applications where security is critical.

HPC based Quantum Accelerators for enabling Quantum Computing on Supercomputers

This project focuses on simulating and accelerating quantum algorithms using classical hardware, mainly FPGAs. The aim is to compare the performance of quantum-enhanced machine learning algorithms like QNN, QCNN, QSVT, and QNDME with traditional algorithms when run on high-performance computing (HPC) systems. Using tools such as Qiskit, Cirq, and PennyLane, these quantum algorithms are implemented on CPUs first, and key metrics like runtime and accuracy are recorded. This helps to understand how hybrid quantum-classical models can be useful in real applications.

A key part of the project is hardware acceleration using FPGAs. The custom hardware blocks (IP cores) are generated using Vitis HLS, and deployed on the programmable logic (PL) part of the FPGA. These blocks run quantum circuits, and are connected to the FPGA's processor system (PS). The benchmark tests across CPU, GPU, and FPGA platforms are conducted with a focus on matrix multiplication tasks, to compare speed and efficiency of each architecture for simulating quantum algorithms.

Development of Quantum Machine Learning Use cases & Applications

This project investigates the potential of Quantum machine learning (QML) and hybrid quantum-classical models in addressing critical challenges in the weather and climate domain. It explores quantum image encoding techniques and their applicability to satellite and atmospheric data. A key focus is on developing efficient quantum encodings tailored to weather-related image and signal representations.

The project also includes simulating atmospheric dynamics using quantum algorithms. Quantum approaches to solve differential equations and other numerical methods are explored for climate modelling tasks. Error mitigation strategies are integrated to ensure noise-resilience and scalability.

C-DAC's participation in the National Quantum Mission

C-DAC has been selected as a key member institute in three major initiatives under the National Quantum Mission (NQM), reflecting its pivotal role in advancing India's quantum technology ecosystem. It is a core partner in two Technical Groups focused on the development of photonic quantum processors, in collaboration with IISc Bangalore, aimed at establishing indigenous capabilities in scalable quantum hardware. Additionally, C-DAC has been chosen as the lead technical institution in the Quila (Quantum Internet with Local Access) initiative, which envisions deploying a secure, over 2000 km-long, fiber-based Quantum Key Distribution (QKD) network across the country, laying the foundation for a future-ready quantum communication infrastructure.

Artificial Intelligence

C-DAC is at the forefront of research and development in Artificial Intelligence (AI), focusing on key technologies such as Natural Language Processing, Machine Learning, and Computer Vision. These AI initiatives are designed to address complex challenges across diverse domains, including healthcare, agriculture & environment, language computing and security, driving innovation and impactful solutions. Various solutions developed by C-DAC in this area are as below.

AI based Agri Solutions

RIGE Sense

RIGE Sense is a system developed for the estimation of the age of raw rice. This system automates the Mixed Indicator Method (MIM), which is a standard operating procedure (SOP) at Food Corporation of India (FCI) to determine the age of rice. The MIM method mixes a chemical working solution with rice and the generated colour represents the age of rice. In the RIGE-Sense system, the working solution is kept in a container, and raw rice is taken into a test tube. After insertion of a test tube into the "RIGE Sense" system, it dispenses 10 ml of working solution and mixes it for one minute. The generated colour is analysed using machine vision and AI/ML technologies to estimate the age of rice. 25 RIGE-Sense systems are deployed in 4 states of India i.e., Chhattisgarh, Uttar Pradesh, Punjab and Haryana.

RIGE Sense

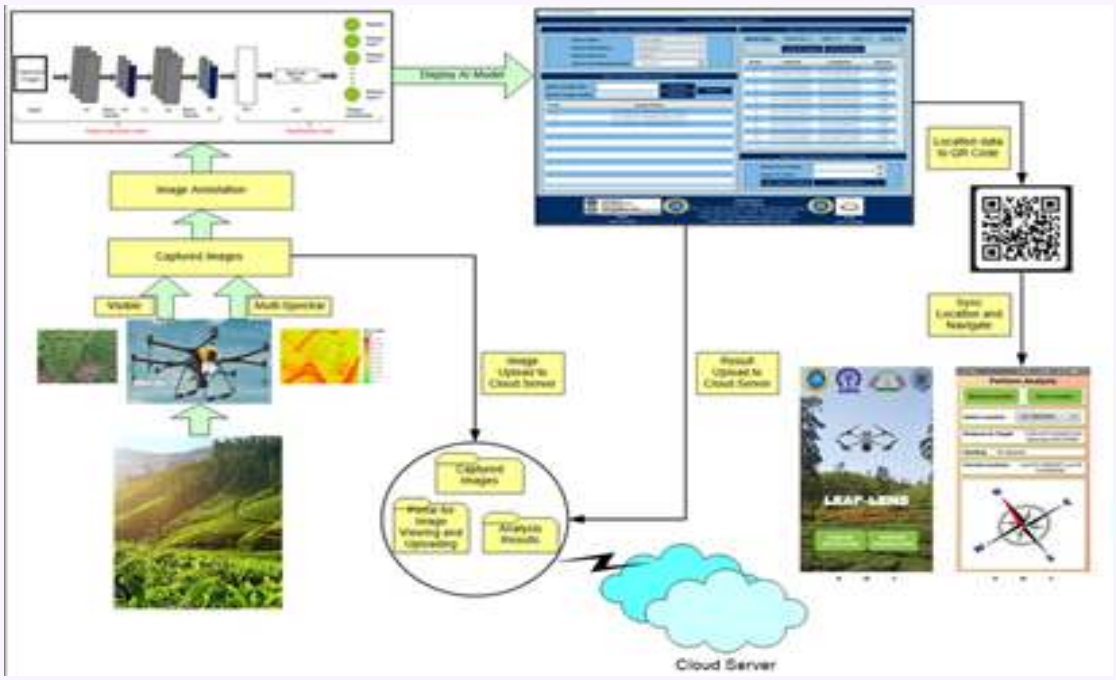
Smart Unified Framework for Automated Quality Assaying & Sorting System (SUFAL)

The tomato sorting system addresses the inefficiencies of manual sorting by automating the process with advanced technology. It features inclined and roller conveyor systems, which rotate tomatoes for 360-degree inspection, capturing every surface area. The system integrates a computerized image analysis system to identify, track, and label each tomato while avoiding redundant steps. By analysing multiple images from various angles, it ensures accurate defect detection. A classification mechanism based on colour and size is included, along with a solenoid valve-controlled swing bucket conveyor for precise sorting. Advanced imaging technologies, such as RGB cameras and visible spectrum imaging, further enhance defect identification accuracy. This scalable, automated solution enables real-time processing, reducing errors and improving sorting quality, while optimizing the handling and categorization of tomatoes and other produce.

SUFAL - Tomato Sorting System

PEST-TRACK - AI Based Imaging Solution for Detection of Pest attack in Tea Leaves

This project focuses on developing an aerial imaging solution to detect pest infestations, particularly Tea mosquito bug, at an early stage using visible and spectral signatures. The aim is to enable proactive measures to prevent crop losses. Additionally, a Decision Support System (DSS) will be created to provide field managers with timely and accurate information for effective pest and disease management, supporting sustainable tea yield. The project also involves conducting field trials to validate the proposed imaging solutions and sharing the outcomes through publications, training sessions, and workshops.



PEST TRACK

Mastitis Detector (MAST D)

The Mastitis Detector (MAST D) is a high-throughput, field-portable screening device designed to detect mastitis in cow milk using a biocompatible sensor. This technology plays a crucial role in safeguarding the dairy industry by reducing financial losses for farmers due to undetected milk quality issues. It offers a significant advantage over traditional methods by providing a lightweight, compact, and low-cost solution for quick and accurate detection without the need for chemicals or additives. MAST D allows for testing of a milk sample collected in a container, simplifying the process and making it more convenient for farmers and dairy workers. The device features a user-friendly digital O-LED display that provides clear, understandable output, indicating whether the milk is "Healthy" or shows signs of "Mastitis." It is also designed with minimal overhead for installation and maintenance, ensuring that it can be easily used in various settings, such as milk production companies, veterinary clinics, and milk testing centers. It is deployed at National Dairy Research Institute (NDRI), Kalyani, and is undergoing extensive field testing to validate its performance.

Mastitis Detector (MAST D)

AI based Solutions for other domains

AI in Oncology

iOncology.ai was jointly conceived by C-DAC and All India Institute of Medical Sciences, New Delhi. The objective was to establish a methodology for early detection of the India centric cancer by interrogating the medical and non-medical data sets using AI technology (e.g., Machine and Deep-learning). iOncology.ai is a platform which facilitates data collection, collation and analysis of clinical data powered by Supercomputing infrastructure. This platform is especially dedicated for capturing oncology related clinical data. This platform is equipped with Artificial Intelligence based models, which assist in cancer diagnostics and therapeutics. As a part of the same, a web-based data collection application was developed for doing live entry of survey form and case record form (Covering Breast Cancer, Ovarian Cancer) along with data entry of historical data. iOncology.ai was demonstrated in Global AI Summit at Bharat Mandapam, organized by MeitY on July 3, 2024. It is installed in 7 hospitals in North India.

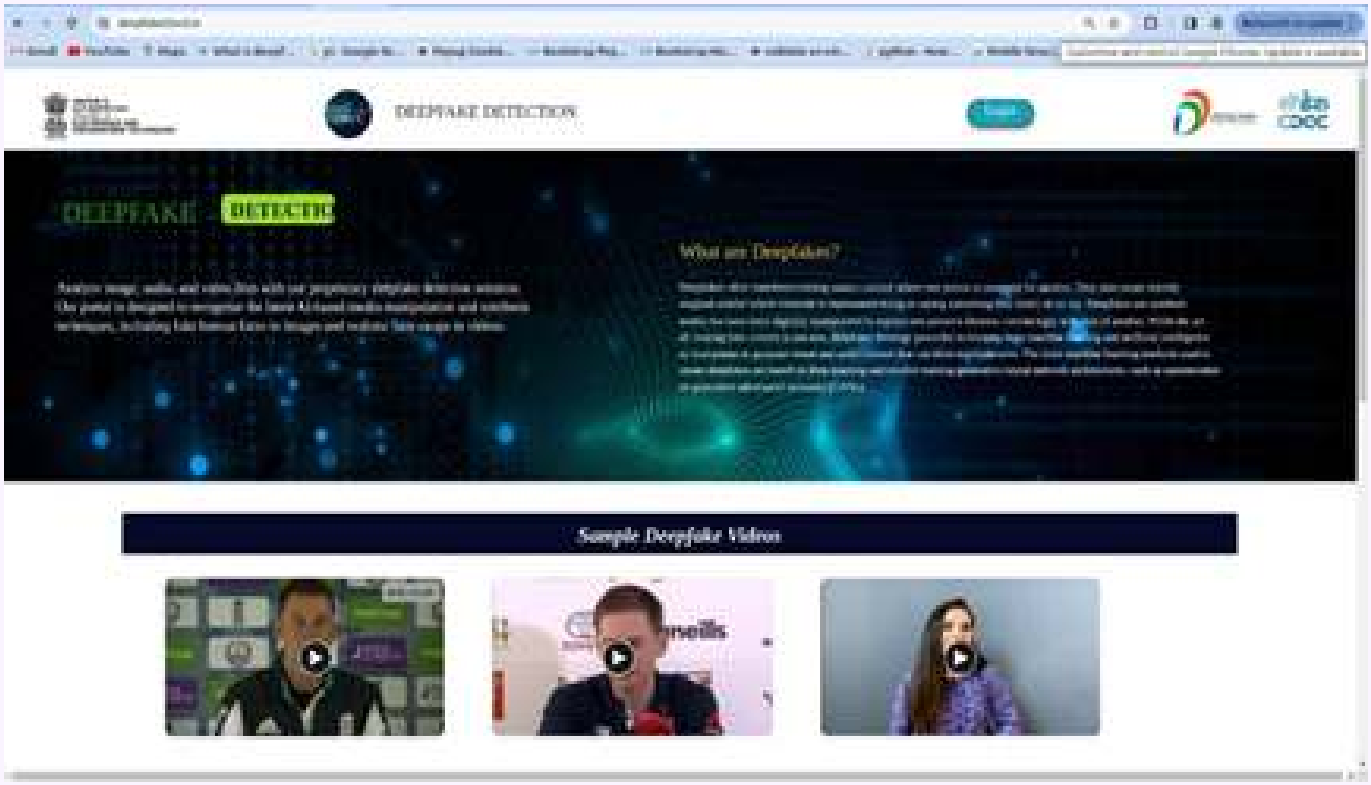
FakeAnalyzer - An advanced deepfake detection tool

FakeAnalyzer is an advanced deepfake detection tool designed to enhance the accuracy and reliability of identifying AI-generated fake images, videos, and audio. It leverages deep learning models and multi-modal analysis techniques to detect manipulations such as face swaps, voice synthesis, and synthetic content generation. FakeAnalyzer integrates forensic analysis, metadata verification, and AI-driven pattern recognition to provide robust detection capabilities, making it a valuable tool for forensic agencies, law enforcement, and organizations combating digital misinformation. FakeAnalyzer has been deployed to multiple forensic and law enforcement agencies for deepfake detection and forensic analysis. These agencies utilize FakeAnalyzer for forensic investigations, digital evidence analysis, and combating deepfake-related cybercrimes.

FakeAnalyzer

FakeCheck and Web portal for Deepfake Detection

C-DAC has developed a Deepfake Detection System which is a multi-platform solution designed to identify manipulated media across images, videos, and audio. It includes a desktop application: FakeCheck that functions entirely offline, allowing users to submit media and receive a fakeness score along with a detailed explanation of the detection results. For broader accessibility, a web portal is also available at https://deepfakecheck.in to registered Law Enforcement Agencies and Forensics personnel, enabling them to upload media online and obtain similar analysis and insights. Additionally, a mobile application is also developed which allow users to easily submit suspect media through their smartphones and receive results. This integrated approach ensures accessibility, usability, and security across different user groups and environments.



FakeCheck

New Initiatives

Marine Subsea Panoramic Imaging System with AI-based Solution for Species Identification

C-DAC has initiated this project to develop deep learning models for species detection and identification and establishment of species repository and Visualization. Computer vision, deep learning and big data analysis will be used to mine data and obtain inference from this large volume of data and apply the inference on the new captured data. This automatic analysis of the sensor data will enable the researchers and scientists to speed up their studies on ocean exploration. The project is being executed by C-DAC Chennai and Thiruvananthapuram centres and funded by Ministry of Earth Sciences (MoES), Govt. of India.

NIDAAN: Novel AI-enabled Intelligent Detection and Analysis Array for Nephrology

The project focuses on developing a portable biosensor system for real-time detection of key kidney health markers, enabling early diagnosis of kidney dysfunction, particularly in resource-limited settings. The device will be cost-effective, user-friendly, and AI-integrated, ensuring accurate interpretation of colorimetric data for timely medical intervention. Field validation and regulatory certification will establish reliability and compliance, facilitating widespread adoption in low-resource healthcare systems. The project is being executed in collaboration with IIT, Kharagpur and NIT, Jamshedpur and funded by Indian Council of Medical Research (ICMR).

Development of Indigenous AI based Oral Cavity Imaging Device

The overall objective of the project is to develop a portable handheld Oral cavity imaging device powered by AI-based algorithm for screening of oral cancer. The device will be able to classify and identify the suspicious oral lesions and provide oral cancer diagnosis from the captured images. The use of a point-of-care device for oral cancer detection using AI has the potential to revolutionize the current standard of care and significantly improve patient outcomes. The project is being executed in collaboration with Government Medical College and Hospital (GMCH), Chandigarh and funded by Indian Council of Medical Research (ICMR).

AI/Deep Learning based models for prediction of recurrence for tongue cancer

Deep learning-based risk prediction models have a potential to detect oral cancer, predict lymph node metastasis, differentiate between precancerous and cancerous lesions, and automate diagnosis, ultimately leading to higher patient survival rates through personalized and precise treatment planning. Considering this, C-DAC aims to develop a decision support system for predicting risk of disease recurrence in patients treated for Tongue cancer using preoperative MRI, improve the radiologists risk prediction and region of interest definitions and develop an accurate tool for early detection and improved management of tongue cancer. The project is being executed in collaboration with Christian Medical College, Vellore and funded by Indian Council of Medical Research (ICMR).

Strategic Technology (Including emergency/Disaster Management)

C-DAC has been a flag bearer of the Atmanirbhar Bharat initiative, having developed strategically significant indigenous systems and solutions across Defence, Space, Emergency Response, Disaster Management, and Internal Security. These solutions are distinguished by their interoperability, resilience, scalability, modularity, and robustness. Various solutions developed by C-DAC in this area are as below.

Multichannel Precision Instrumentation Amplifier (PRIAMP)

PRIAMP is a high accuracy instrumentation amplifier for measurement of critical parameters like thrust, pressure, displacement, firing current among other parameters. PRIAMP is a mission critical equipment for Static Firing Testing of rockets, which was designed and developed based on the requirements provided by ISRO. C-DAC, Thiruvananthapuram signed an MoU with Satish Dhawan Space Centre, ISRO, Sriharikota (SDSC SHAR) for design, development and supply of 100 units of multichannel precision amplifier system, on April 17, 2024, at SDSC SHAR, Sriharikota and first unit has been deployed during January 2025.

Multichannel Precision Instrumentation Amplifier (PRIAMP)

MoU with SDSC SHAR, ISRO for Multichannel PRIAMP

Sonic Ultrasonic Non-Destructive Test System (SoUNDS)

SoUNDS is a Non-Destructive Test (NDT) and Evaluation system, optimized for porous and composite materials where conventional high frequency ultrasonic NDT systems will not be useful. SoUNDS can be used for study and analysis of certain material properties and for detecting flaws in the material by measuring the propagation of sound waves in the material. The low frequency operation of SoUNDS makes it useful in situations where a common high frequency NDT system cannot be used. In the year 2024, four units of SoUNDS Systems were successfully delivered to various organizations, marking a significant milestone in its deployment. Among these, the SoUNDS Mk2R5 stood out as the first portable variant in the series, equipped with an intuitive touchscreen interface. Compact and lightweight, SoUNDS Mk2R5 is designed to be carried in a standard backpack, making it highly suitable for field inspections. This innovative version was delivered to organizations- ISRO Propulsion Complex (IPRC), Mahendragiri, Vikram Sarabhai Space Centre (VSSC) Thiruvananthapuram and Larsen & Toubro Coimbatore. In addition, a rugged, fire-retardant variant of SoUNDS System - SoUNDS Mk2R4 engineered for enhanced durability and safe operation in harsh or high-risk conditions-was delivered to CAS-DRDO Hyderabad, demonstrating the system's adaptability to diverse operational needs.

SoUNDS MK2R4

SoUNDS MK2R5

Speed Switch for Garrett Engine of Dornier Aircraft

A highly reliable airborne Speed Switch, designed for Garrett engines, ensures precise RPM threshold detection and robust engine protection. It is designed for critical performance in demanding aerospace environments. As a unit to sense the engine RPM using an engine mounted tachometer and generate two switched outputs corresponding to 10% and 50% RPM. The tachometer provides an approximate sine wave signal in an approximate frequency range of 5 Hz to 100 Hz. The speed switch will activate two relays "10% relay" and "50 % relay"'. The normally open contact of the "10% relay" is closed when the engine reaches 10% of its maximum speed which is sensed when an input sine wave of frequency range 6.06Hz to 6.9Hz is obtained at the input. It in turn feeds the aircraft electrical power to energize the high energy ignition units, portion of the fuel shut-of valve and anti-ice lockout valve. The normally closed contact of the "50% relay" is opened when the engine reaches 50% of its maximum speed, which is sensed when an input sine wave of frequency range 37.3Hz to 41.0Hz is obtained at the input.

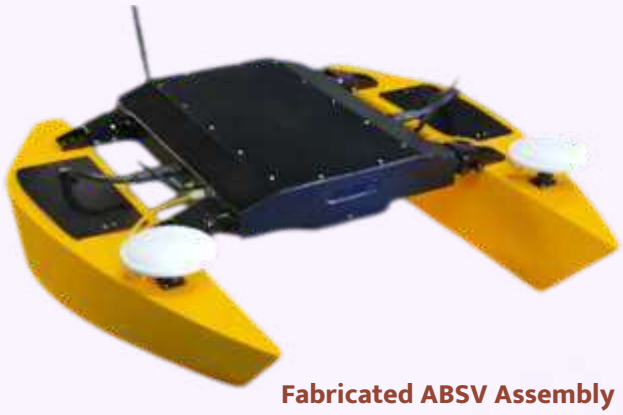
Speed Switch for Garrett Engine of Dornier Aircraft

In Aero India 2025, Asia's largest Airshow organized by the Ministry of Defence, Govt. of India, C-DAC signed five MoUs with Hindustan Aeronautics Limited (HAL) for collaboration in the defence and aerospace sectors on February 12, 2025. This marks a significant step toward achieving indigenization through cutting-edge innovation in the sector, reinforcing C-DAC's commitment to developing next-generation defence technologies.

MoU signing ceremony during AeroIndia 2025

Autonomous Bathymetric Survey Vessel (ABSV)

Autonomous Bathymetric Survey Vessel (ABSV) is an advanced and autonomous system which carries various payloads like echo sounder, positioning system, water quality sensor suite, data communication and navigation control system. The ABSV is equipped with auto pilot functionality that aids in precise surveying, positioning and fail-safe operation by returning to pre-set home points in case of poor connectivity or insufficient battery. The real-time video transmission feature can also help surveyors monitor the craft from the river bank, remotely. Radar and Optical based systems are employed for obstacle detection and mitigation. Mission planner software can help the user to plan the run and data analytic software to visualize the data. It is deployed at Baspa Glacial Lake, Sangla, Himachal Pradesh (15,400 feet /4710 m) and Vasuki Lake, Kasol, Himachal Pradesh (14,700 feet/ 4500m). C-DAC has completed the bathymetry survey of two glacial lakes, 4800-meter ASL in Himachal Pradesh braving hard trekking and climatic conditions, using indigenously developed Autonomous Bathymetric Survey Vessel (ABSV).



Fabricated ABSV Assembly

CEMILAC-certified indigenous engine controller

C-DAC developed, CEMILAC-certified indigenous engine controller is installed in Chetak helicopters operated by the Indian Army, Navy, and Air Force. These helicopters are being operating successfully in various weather conditions throughout the nation. This accomplishment led to collaborative projects with HAL for Dornier & Jaguar aircrafts and Heron UAVs.

Simulators of the Navigational Suite for the Indian NAVY

C-DAC has designed and developed MIL-qualified simulators of the Navigational Suite for the Indian NAVY as part of the Integrated Combat Suite project for submarines through DRDO labs Research Center Imarat (RCI) and NPOL. C-DAC has successfully designed and developed simulators for Echo sounders, Electromagnetic Logs (EMLOG), and Doppler Velocity Logs (DVL). These were supplied to RCI, DRDO, Hyderabad, and are now part of the Integrated Combat Suite (ICS) for Submarines program. The ICS is DRDO's first indigenization attempt, with NPOL serving as the nodal laboratory. A unique facility, the Submarine Integration Facility (SIF), is being established at NPOL's technical campus to integrate all ICS sub-systems developed by various DRDO laboratories, including NPOL, DEAL, IRDE, DLRL, LRDE, NSTL, and RCI. C-DAC's supply of three navigational sensor simulators to RCI has made it integral to the program.

Integrated Combat Suite (ICS) for Submarines

The Electromagnetic Log Transducer with analog output has been successfully indigenized, effectively replacing the imported EM300 transducer currently used in naval ships. In addition, a next-generation Electromagnetic Log Transducer with digital output has been developed, resulting in a compact, cost-effective, and high-performance solution tailored for naval applications. Both transducers have demonstrated compliance with the required standards and specifications, and have successfully completed acceptance field trials and User Evaluation Trials (UET) by the Indian Navy. This indigenization effort represents a significant step towards enhancing national defense capability, promoting economic self-reliance, and strengthening overall security by reducing dependence on foreign technologies.

Induction Trial of EMLog Transducer (Analog)

Induction Trial of EMLog Transducer (Digital)

Ultrasonic Solid-propellant Burn Rate Measurement System (USBRMS)

C-DAC has installed and commissioned Ultrasonic Solid-propellant Burn Rate Measurement System (USBRMS) at SF Complex, DRDO, Jagdalpur, Chhattisgarh in September 2024. A Letter of Appreciation and 100% Customer Satisfaction Index rating has been received from SF Complex, DRDO, Jagdalpur for the project USBRMS.

Installation and Commissioning of USBRMS at SF Complex, DRDO, Jagdalpur

New Initiatives

- C-DAC has initiated the project for the development of Deep Dive Underwater Drone 1000m, from MeitY, under the PUSHPAK National mission on Drone Technology-Towards Drone Excellence

- The Memorandum of Understanding (MoU) has been signed with the Hydrographic Survey Wing (HSW), Department of Ports, Government of Kerala, on January 28, 2025. The collaboration aims to develop indigenous hydrographic survey equipment in alignment with the Government of India's Make in India and Atmanirbhar Bharat initiatives, with a focus on self-reliance. The partnership will work towards developing reliable, modular, and cost-effective navigation equipment and bathymetric survey solutions for strategic and commercial applications.

- MoU has been signed with I4 Marine Technologies Pvt. Ltd., Pune, marking a significant step towards advancing indigenous marine technology commercialization. As an industry partner in C-DAC's technology developments, this collaboration also aims at joint development of a shallow water coastal bathymetry survey system, exploring avenues for technology transfer of C-DAC's Acoustic Gunshot Detection System, and leveraging I4MT's in-house manufacturing capabilities for FRP, fiberglass, and carbon fiber-based marine components.

Digital India RISC–V (DIR-V)

C-DAC is executing the Microprocessor Development Programme (MDP), initiated and funded by the Ministry of Electronics and Information Technology (MeitY). The primary mission of this programme is to design and develop a family of indigenous microprocessors, associated Intellectual Properties (IPs), and a comprehensive ecosystem to support fully indigenous product development. This initiative is aimed at catering to the diverse needs of the strategic, industrial, and commercial sectors. In addition, C-DAC is actively involved in the implementation of the Chips to Start-up (C2S) Programme and the Design Linked Incentive (DLI) Scheme, further contributing to the advancement of India's semiconductor and electronics design ecosystem. Following are the major activities carried out in these areas during the period.

THEJAS64 SoC & Development Board

THEJAS64 is a 64-bit VEGA processor based fully indigenous SoC ASIC fabricated in SCL 180nm process capable of booting Linux and executing several applications including Motor control smart sensors and actuators, IoT devices, Embedded system development boards, etc. THEJAS64 also integrates 128KB SRAM, Four UARTs, One SPIs, Eight TIMERs, One I2C interface, 16 GPIOs etc.

THEJAS64 SoC

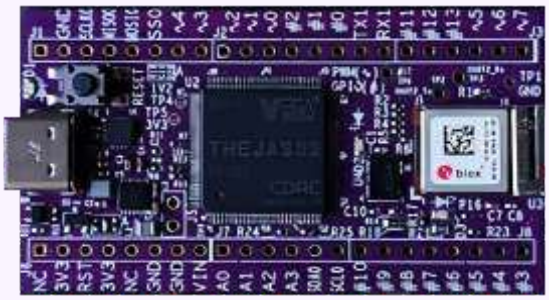
THEJAS64 -Development Board

ARIES Eco Board

ARIES ECO is a development platform based on the indigenous THEAJS32 ASIC which operates at a frequency of 100MHz. THEJAS32 SoC includes VEGA ET1031 Microprocessor, 256 KB internal SRAM, Three UARTs, Four SPIs, Three TIMERs, Eight PWMs, Three I2C interfaces, 32 GPIOs, etc. This board contains everything needed to support standalone operation which includes a 4-channel on-board ADC and 16 MB Flash memory.

ARIES Nova Board

THEJAS64 SoC ASIC, ARIES Eco and ARIES Nova Boards were launched by Shri Ashwini Vaishnaw, Union Minister of Electronics and Information Technology, Govt. of India on January 11, 2025 at C-DAC Pune. C-DAC has also licensed the 64-bit Single Core VEGA Processor and other peripheral IPs to M/s. TrueChip Pvt. Ltd, M/s. Calligo Technologies and M/s. IndieSemic Pvt. Ltd. The 32-bit Single Core processor has also been licensed to four academic institutions for the development of SoCs for different applications. 2600+ fully indigenous VEGA processor-based ARIES development boards were sold to industry and academia. This includes distribution of 500 ARIES boards to schools in Karnataka and 1000 ARIES boards to schools in Odisha in association with VLSI Society of India. The VEGA microprocessor (RISC-V) based Design & Verification challenge was successfully organised in collaboration with DVCON2024 which involved about 150 registrants competing in development & implementation of a hardware accelerator for vision transformation-based malware detection using a and 64-bit VEGA Processor based SoC. Around 1,500 engineering students have been trained through 26 VEGA Processor workshops held nationwide.



ARIES Nova Boards

Launch of THEJAS64 SoC ASIC, ARIES Eco and ARIES Nova Boards

Chips to Start (C2S) Programme

Chips to Start-up (C2S) Programme was initiated by MeitY from January, 2022 onwards with an aim to train about 85,000 specialized manpower over a period of 5 years in VLSI and embedded system design and leapfrog in ESDM space by way of inculcating the culture of System-on-Chip (SoC)/Reusable hardware IPs/System-level design at bachelors, masters and research-level and act as a catalyst for growth of start-ups involved in fabless design.

C-DAC Bangalore is Programme Coordination Institution for overall implementation of the programme. 100 Institutes, 13 Start-ups /MSMEs have been selected for financial support based on Call-For-Proposals.

Various activities carried out under C2S programme during the period are as below:

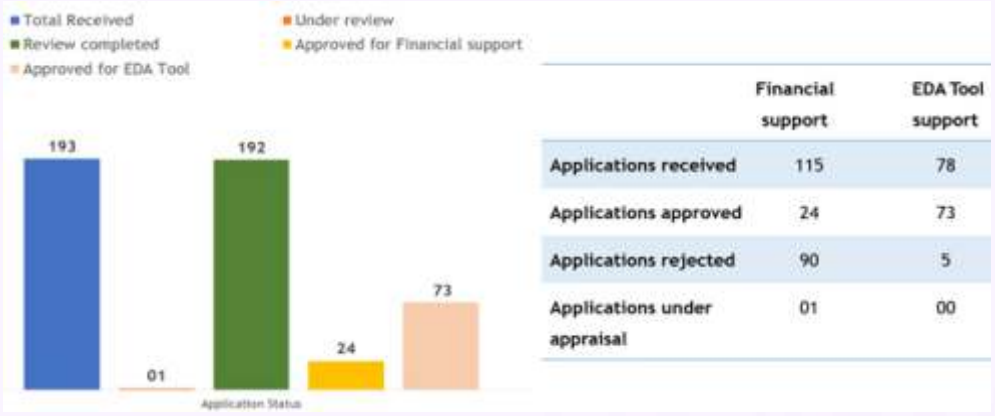
- Various FPGA boards identified and recommended by the CEPC were procured and distributed to one hundred participating institutes under C2S Programme.
- 285+ organizations are supported for the EDA tool support including institutes supported for funds.
- A total of over 201 EDA tool technical training sessions have been organized for all participating institutions so far.
- All vendor interactive technical EDA Tool training sessions recordings, documentation was shared to the C2S

institutions through ChipIN Cloud.

- ChipIN Support Center Web-Portal (https://chipin.cdacb.in/) has been enabled for Participating Institutions. So far over 4,000 support tickets raised by participating institutions under the C2S Programme were successfully resolved.
- Conducted 5-day IEP on Digital ASIC Design using 180nm PDK in Hybrid mode with the participation of 86 (In person) members from various C2S participating institutes.
- Conducted 5-day IEP on Analog ASIC Design using 180nm PDK in Hybrid mode with the participation of 74 (In person) members from various C2S participating institutes.
- Shri Ashwini Vaishnaw, Union Minister of Electronics and Information Technology, remotely announced the winners of Analog and Digital Design hackathons on March 20, 2025.
- The indigenous development of the 'BLDC Controller Chip' was awarded to M/s Vervesemi Microelectronics Pvt. Ltd under C2S Programme.
- The launch of 'Digital India RISC-V Processor' Grand Challenge under C2S Programme was announced by Hon'ble Minister. The 'Digital India RISC-V Processor' will use VEGA Processor by C-DAC & SHAKTI Processor by IIT Madras with support from Renesas, LTSCT, CoreEL Technologies and Bharat Electronics.

Design Linked Incentive Scheme

Ministry of Electronics and Information technology has announced the Design Linked Incentive (DLI) Scheme to offset the disabilities in the domestic industry involved in semiconductor design in order to not only move up in value-chain but also strengthen the semiconductor chip design ecosystem in the country. C-DAC is responsible for implementation of the DLI Scheme as Nodal Agency. The Design Linked Incentive (DLI) Scheme aims to offer financial incentives as well as design infrastructure support across various stages of development and deployment of semiconductor design(s) for Integrated Circuits (ICs), Chipsets, System on Chips (SoCs), Systems & IP Cores and semiconductor linked design(s) over a period of 5 years. The online portal has been developed to accept applications online along with payment. It is a workflow enabled system which provides role-based accesses to its users for technical and financial evaluations of the applications. The portal allows the firms to apply for and obtain the required approval electronically, track the status of requests through email notifications, respond to queries, and print the approved certificates online. It also reduces the amount of time it takes for a firm to apply for and receive approvals; simplifies the process for applying for multiple approval requests; and enables faster processing.



	Financial support	EDA Tool support
Applications received	115	78
Applications approved	24	73
Applications rejected	90	5
Applications under appraisal	01	00

DLI Dashboard

DLI Quantitative Outcomes

Software Technology (including Cloud and BOSS)

C-DAC has made significant advancements and contributions in software technology, focusing on R&D, product development, and service provision, particularly in Cloud and FOSS. Its R&D initiatives have addressed numerous challenges using state-of-the-art methods, covering key areas. Additionally, C-DAC has developed integrated software solutions, raised awareness, and offered services to support various technology projects. Various solutions developed by C-DAC in this area are as below.

AI based Software Solutions

ChatDB

ChatDB is an AI-driven Natural Language Query Chatbot that simplifies database interaction by enabling users to communicate with their database in plain English. With ChatDB, SQL expertise becomes unnecessary, thereby lowering entry barriers for database access and management.

ChatDB: AI-driven Natural Language Query Chatbot

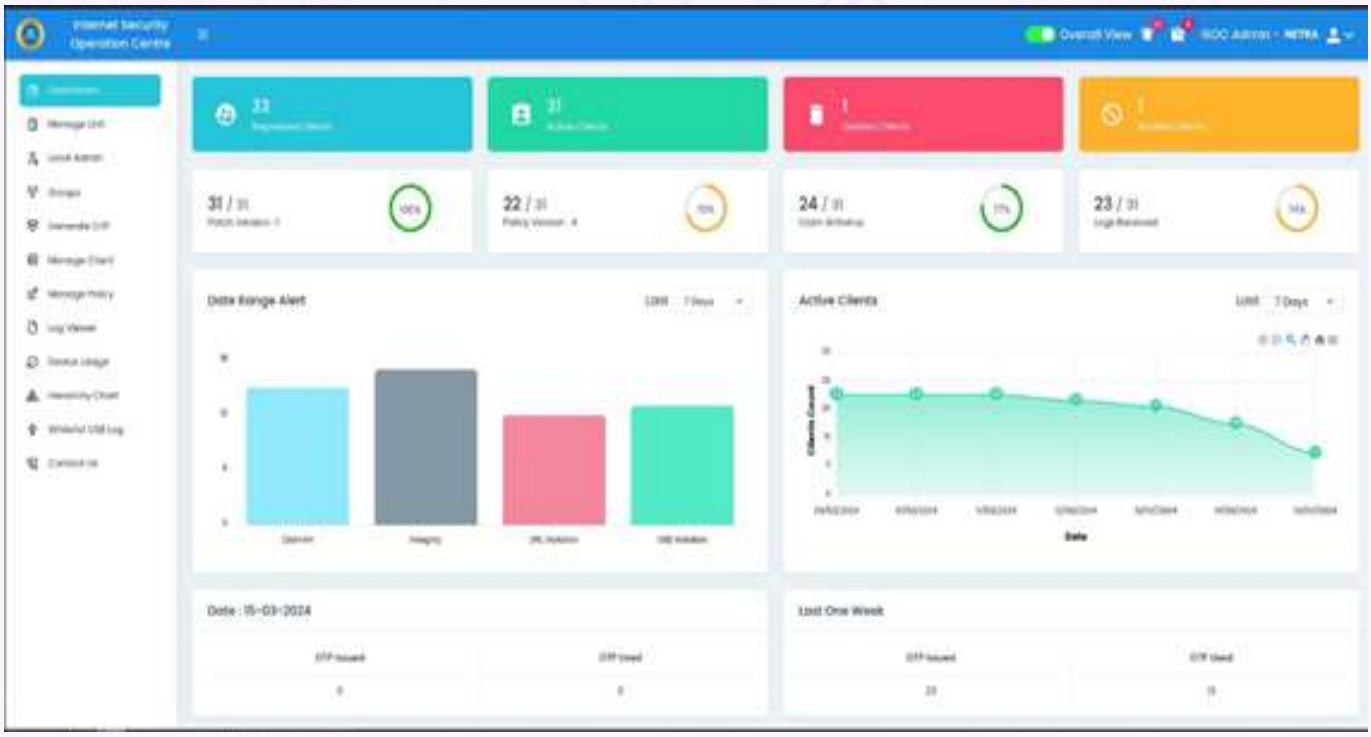
FileQAExpert

FileQAExpert is an AI-Driven Natural Language Chatbot for Efficient and Precise Document Question Answering and Knowledge Extraction from uploaded files (PDF, DOCX, TXT, MD, JPG, PNG). It Supports free-flowing text queries for easy interaction and ensures data privacy with encryption mechanisms

System Software

Secure BOSS Linux OS

A customized Secure BOSS Operating System for Nuclear Power Corporation of India (NPCIL) is being developed for their laboratories. The client machines are pre-configured in compliance to policy and NIST standard. The client machines communicate with the Intranet Security Operations Centre (ISOC) for log and policy management.



Secure BOSS Linux OS

Sanchar

Sanchar is a secure mail client application developed for the Indian Navy. Sanchar ensures confidentiality, integrity, and availability of sensitive information, making it a reliable platform for naval communication. Key features include secure email communication with Microsoft Exchange Server integration, attachment management with download options, advanced filtering and search functionality, role-based access control for enhanced security and data export and backup support.

BHARATDB

A project funded by MeitY has been initiated to design and develop a secured database deployable in on-premises and cloud platforms with Enterprise support in collaboration with Indian Institute of Technology, Madras. This will be used across commercial and government enterprises covering the identified critical features.

Development of a secure BOSS Mail Server

A project has been awarded recently by Director General of Naval Projects (DGNP) for development of a secure BOSS Mail Server with enhanced security features for safe and reliable communication.

Digital Transformation for Good Governance

Digital DGQA ERP

The Digital DGQA Project is a digital transformation initiative aimed at digitizing the processes of the Directorate General of Quality Assurance (DGQA). This project focuses on enhancing efficiency, transparency, and data accessibility by implementing various modules, including the Procurement Portal, Conformance Check, Defect Investigation, Defence Testing Portal (DTP), LIMS (Laboratory Information Management System), Configuration Management, and a Dashboard & Alerting System. These modules collectively support DGQA in streamlining quality assurance, procurement, and defect investigation processes within the defence sector.

During the Aero India event held in February 2025, Shri Rajnath Singh, Union Defence Minister, inaugurated the

'Defence Testing Portal (DTP)' and released a booklet on 'Defence Testing Capabilities' of the Directorate General of Quality Assurance (DGQA). The portal is designed to enhance the ease of doing business in defence testing by improving the visibility of defence testing infrastructure and improved transparency and accountability in conduct of defence test. The booklet serves as a guiding document for defence manufacturers and acts as a ready reckoner during important stages of defence procurement and delivery processes.

Digital DGQA BOSS

The Directorate General of Quality Assurance (DGQA) is spread across the entire country, with machines often using the Internet for unclassified communications, interactions with civilian agencies, and general browsing. These machines are connected to the public internet through various service providers and typically operate as standalone units in offices, without being connected to any internal network through a local firewall or other security measures. Despite this, these machines present a significant security risk, as they can potentially bridge the air gap of the DGQA network through malware specifically designed for this purpose. Under Digital DGQA BOSS project, the migration of internet-facing machines to a customized BOSS Linux variant is carried out, incorporating hardening and security features as per DGQA requirements. It also involves the development of a Secure BOSS OS tailored for standalone systems, ensuring enhanced security and compliance with organizational standards.

Digital DGQA-Defence Testing Portal

NavIOS

NavIOS is a highly secure, Linux-based OS designed for high-security environments. It features a user-friendly desktop environment with an intuitive interface for seamless operations. The operating system comes with essential productivity tools, including a comprehensive office suite and a secure web browser for safe browsing.

NavIOS

GIS based Development

GeoSadak

GeoSadak is a tailored Web-GIS product based on C-DAC's GeoSevak framework. It is based on FOSS technology, utilizing fully indigenous GIS data layers and ISRO Bhuvan satellite imagery services and aligned with 'AtmanirbharBharat'. GeoSadak is a kind of enterprise GIS product that democratizes the use of GIS in decision-making, analysis, data creation, data sharing and integration, quality control, reporting, audit, various planning and more. This product bridge seamless integration of various GeoAI models, analytics, and results through a single interface. It is deployed at National Informatics Centre (NIC) data centre, Delhi on behalf of National Rural Infrastructure Development Agency (NRIDA), Ministry of Rural Development (MoRD). GeoSadak is utilized for Government of India National missions such as PMGSY, PM-JANMAN and PM JUGA by National Rural Infrastructure Development Agency (NRIDA), Ministry of Rural Development (MORD), Delhi.

GeoSevak Dashboard

GeoSevak Field-GIS

GeoSevak Field-GIS is a specialized Android and WEB based GIS mobile app designed for efficient field data collection, navigation, tracking, and geotagging of photos and videos. It enables users to capture and manage geospatial data seamlessly, even in remote areas, as it functions both online and offline. This makes it a reliable tool for field surveys, mapping, and real-time decision-making. Product (apk) is available to authorized users through GeoSadak.

Implementation, Supervision and Monitoring of GIS based Asset Management Information System (AMIS)

A project has been awarded by Oil India Limited (OIL) to develop and deploy 'GIS based Asset Management Information System' comprising a suite of applications, modules, and databases in an integrated manner.

e-Governance

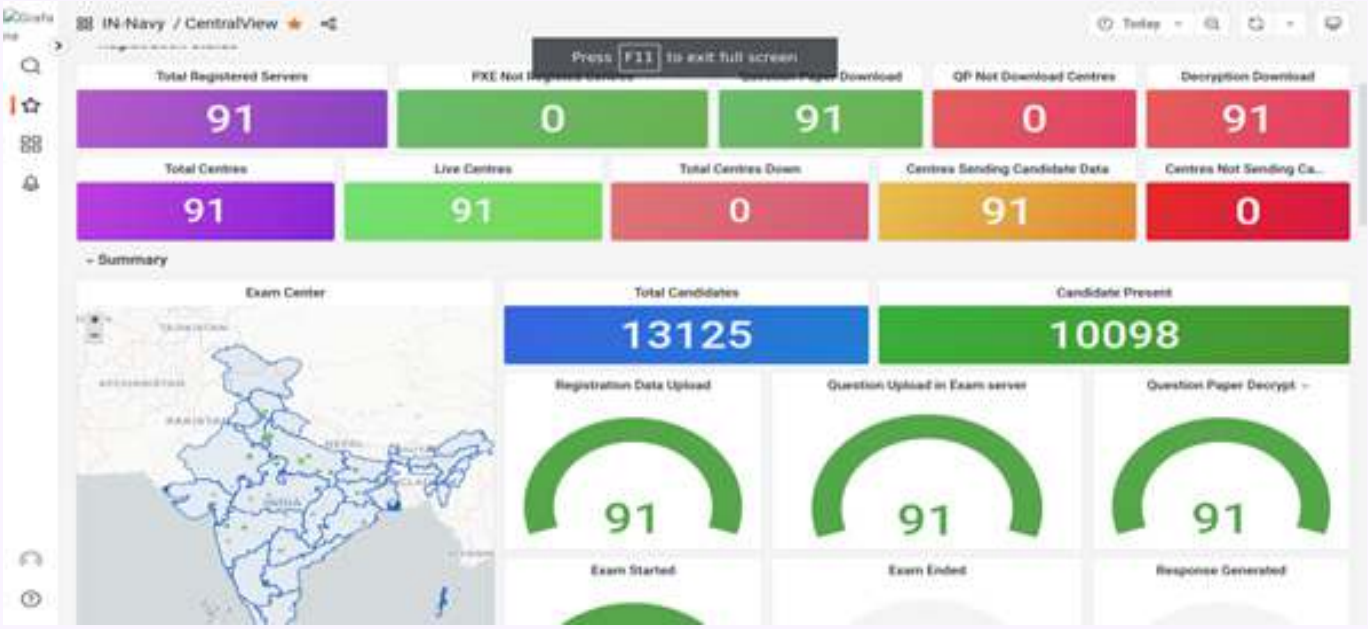
Tamizh Megam Cloud Initiative

Under the Tamizh Megam Cloud initiative funded by Electronics Corporation of Tamil Nadu Limited (ELCOT), Government of Tamil Nadu, C-DAC has deployed the Meghdoot Openstack Cloud for management, operation, maintenance, and support at the Tamil Nadu State Data Centre (TNDSC) in Chennai and the Tamil Nadu Disaster

Recovery Centre (TNDRC) in Tiruchirappalli. The entire TNDSC and TNDRC Cloud infrastructure has been made operational with the Meghdoot Cloud Suite, hosting 200 applications across 600 virtual machines.

Online CBT Examination Conduction

C-DAC has conducted comprehensive Computer Based Test examinations for various clients, handling overall process using various technologies and platforms, from candidate registration to result processing, as well as creating and generating question banks. The clients include the Directorate of Civilian Manpower Planning & Recruitment, the Indian Navy, Rajasthan Police, and the Indian Council of Medical Research (ICMR).



Online CBT Examination

RESS

RESS v2, a comprehensive solution ready for service-wide deployment as a standard indigenous test equipment is being envisaged. RESS v2 has emerged as the way ahead for supporting ES in the service. The extremely critical requirement of supporting ECs of weapons onboard, so as to maintain the war-worthiness of platforms, necessitates immediate provisioning and deployment of the projected numbers of the indigenous RESS v2 test equipment. Once deployed in remote mode, the Aggregator of the onboard setup is connected to Renderer at Base-Support via SATCOM. Rendered at Base-Support in turn provides seamless access to the connected Onboard system and ES maintenance Workstation to domain specialists at Base-Support on a convenient data-wall as if the two were local. Special tools and ESS backups in a centralized repository at Base-Support can also be seamlessly applied Onboard via the combination of Renderer, Aggregator and Workstation. The memory media of the Onboard system can be accessed via the Workstation and the local repository can be securely accessed via the Aggregator or Workstation for backup, restoration, and other tasks. In a nutshell, most of the maintenance functions related to ES and RESS can be undertaken remotely using RESS v2.

Digital Preservation Systems

KoshaSHRI - Sanskrit Dictionary Article Authoring Tool (AAT)

Digital Preservation and Online Portal for Encyclopaedic Sanskrit Dictionary is a project funded by Department of Science & Technology (DST) under Science and Heritage Research Initiative (SHRI). C-DAC has collaborated with Deccan College Post-graduate and Research Institute (Deemed to be University), Pune for the domain knowledge about 'An Encyclopaedic Dictionary of Sanskrit on Historical Principles' of which 35 volumes have already been

published since 1976. The objective of this project is to provide technological solutions to preserve, digitize existing dictionary volumes, create new dictionary volumes, build the Sanskrit dictionary database, and make it available through online search portal. The existing database consists of 15 lakh vocables with more than 1 Crore (10 million) reference slips documented by Deccan College. KoshaSHRI - Sanskrit Dictionary Article Authoring Tool (AAT) powered by crowd sourcing framework is developed for creation of new articles in a collaborative manner.

Launch of KoshaSHRI - Sanskrit Dictionary Article Authoring Tool

Hon'ble Minister of Science and Technology, Dr. Jitendra Singh has launched KoshaSHRI - Sanskrit Dictionary Article Authoring Tool (AAT) on December 16, 2024, on the occasion of the 5th Anniversary Celebration of the Science and Heritage Research Initiative (SHRI), organized by the Department of Science and Technology (DST) at New Delhi. Prof. Abhay Karandikar, Secretary, Department of Science and Technology (DST), Vaidya Rajesh Kotecha, Secretary Ministry of AYUSH, Dr Ravichandran, Secretary Ministry of Earth Sciences (MoES), DR. Rashmi Shukla, Head-SHRI Cell DST graced the occasion. It is deployed at Deccan College, Pune on the ERNET cloud made available.

Design and development of Judicial Digital Preservation System (JDPS)

A project funded by eCommitee, Supreme Court of India through Ministry of Law & Justice (Department of Justice) has been initiated for design and development of Judicial Digital Preservation System (JDPS) focussed towards the digital preservation requirements of the Judicial establishments in India. Digital Preservation Resource Centre (DPRC) is envisaged to emerge as a resource of technology solutions, standards, and best practices for the Indian Judiciary under this project.

New Initiatives

Development of Glacial Lake Outburst Flood Early Warning System (GLOF EWS) for Himalayan States & Uts

National Disaster Management Authority (NDMA), Government of India has awarded an R&D project to C-DAC for design, development and deployment of indigenous Glacial Lake Outburst Floods Early Warning System (GLOF-EWS) in collaboration with Space Applications Centre (ISRO), Ahmedabad.

A Finishing School Program on 3D Printing & Additive Manufacturing Technology for Engineering Students

A project funded by MeitY has been initiated with the objective to groom students through counselling classes, technical skills development by corporate trainers, communication skill development, group discussion & personal interview by professional for career development. The high-end Centre of Excellence (CoEs) /incubation centres with modern hardware and software will be developed for proliferation of digital manufacturing and prototyping. This project will also help to enhance the skills of weavers & artisans with the modern technologies.

e-Governance

e-Governance plays a crucial role in modernizing public administration, enhancing the efficiency and transparency of government services, and ensuring better citizen engagement. By leveraging technology, e-Governance initiatives aim to streamline processes and provide timely and accessible services to the public. The importance of e-Governance lies in its potential to transform the way governments interact with citizens, businesses, and other stakeholders, leading to more responsive and accountable governance. Various solutions developed by C-DAC in this area are as below.

Platforms and Solutions for Authentication

e-Pramaan

e-Pramaan is an initiative conceptualized and funded by the Ministry of Electronics and Information Technology (MeitY), Government of India, for enabling Single Sign On (SSO) and e-Authentication for users of various government. It is a comprehensive framework to authenticate users of various government services in a safe and secure manner for accessing services through both desktop and mobile platforms. e-Pramaan supports both Open ID Connect (OIDC) and Security Assertion Markup Language (SAML 2.0) standards. Departments can choose various multi-factor authentication techniques and ID proof verification options to secure their applications through e-Pramaan. e-Pramaan enables Identity Verification of users using the KYC APIs of Aadhaar, Driving License and PAN. It also offers additional features comprising fraud management, flexible chaining of authentication factors, and role-based access to the services.

Offline e-Pramaan

QR code-based Offline e-Pramaan can be used similar to a person carrying his ID proof, like Aadhaar, PAN, Ration card, etc., in his wallet for physical verification. Instead of carrying his ID document, a user can download the QR code on his mobile phone. The QR code will contain information such as Name, masked Aadhaar Number, PAN number, Driving License number, the verification status of these ID's and the photo of the registered e-Pramaan user. A substantial population of our country still prefers to visit the centres physically to avail themselves of the services. To provide access to these services without internet, QR code based Offline e-Pramaan can be of great value.

National Single Sign On (NSSO) MeriPehchaan

National Single Sign On MeriPehchaan is a platform that authenticates citizens easily and securely. It aims at eliminating the need to repeatedly prove user identity to different applications and hold different credentials for each application. It is an extensive collaboration of the three mainstream SSO platforms e-Pramaan, Jan Parichay and DigiLocker. MeriPehchaan enables standardized registration which means users need to provide information once for accessing different services. MeriPehchaan authenticates the user based on multiple authentication parameters like username, mobile number, Aadhaar, PAN, etc. NSSO caters to more than 11800 services and has completed more

than 100 crore transactions. Key services include COWIN, DigiLocker, eShram, Mizoram DICT, Service Plus, mSevanam, MyGov, S3Waas, Bihar State Services, Rajasthan SSO, Assam Sewasetu, Digishakti, ISRO, Jansugam, MP Single Sign On, Kerala Excise, etc.

Aadhaar Data Vault (ADV) as a service, Aadhaar Authentication and e-KYC Platform

The Aadhaar Data Vault (ADV) is a national service developed by C-DAC for the secure storage and management of Aadhaar numbers. ADV currently supports over 53 services and has facilitated over 95 crore transactions in the year 2024-25 and has surpassed the milestone of 300 crore+ transactions since its inception. The ADV solution has added new functionality to cater other Personal Identifiable Information (PII) data such as PAN, Voter-ID, and passports, enhancing its utility. Indian Oil Corporation Limited (IOCL) utilizes the AUA and ASA solution framework developed by C-DAC to provide an Aadhaar Authentication and e-KYC platform for LPG beneficiaries, facilitating over 6 crore authentications in the year 2024-25. The framework deployed at IOCL Data Center also includes Aadhaar Data Vault (ADV) solution for secure management of Aadhaar Numbers as per UIDAI guidelines. The Centre for e-Governance (CeG) – Karnataka Resident Data Hub (KRDH) also implements this solution for Aadhaar authentication and e-KYC of the residents availing beneficiary schemes in Karnataka, facilitating over 29.5 crore transactions in the year 2024-25. C-DAC has received work orders from the Madhya Pradesh State Electronics Development Corporation (MPSEDC) for the ASA solution and Tripura State Cooperative Bank for the implementation of the ADV solution.

Aadhaar Data Vault (ADV) as a service

User Consent Management System (e-Sammati)

User consent management system (UCMS) is being built in accordance with the Digital Personal Data Protection (DPDP) bill 2023 and allows a user to give explicit permission to let applications use his/her data for a specific purpose. Features for customizing User Consent Management and granular selection of consent for data sharing has been developed. A minified as well as descriptive version of the consent format can be configured by the department who wants to use e-Pramaan's UCMS. Departments can login and configure how they wish the consent page should be shown to its user on its application. A total of 409 services have been integrated and around 104.19 crore transactions have been carried out as part of this initiative. e-Pramaan SSO can be availed as solution as well as service. Various services like OTP, Biometric, DSC verification etc can also be availed separately on a commercial basis.

Document Verification System (DOVE)

Document Verification System (DOVE) provides a secure, transparent and tamper-proof method for storing and verifying the authenticity and integrity of domicile certificates. This system leverages the intrinsic characteristics of blockchain technology to address various challenges associated with traditional domicile verification processes. This system will help the citizens/departments to verify the domicile certificates received by them for authenticity. The DOVE service will be available on the NBF platform. To avail DOVE service, the state department needs to get registered with DOVE. The beneficiaries of this service are departments and citizens of India. Registered departments can upload and verify domicile certificates, whereas citizens can only verify certificates. Registered departments can use either DOVE portal or API for availing service.

Domicile Verification (DoVE)

Domain specific Solutions

CMPFO's Centralized Claim Processing & Settlement System 1.0 (C-CARES 1.0)

C-CARES 1.0 has digitally revolutionized the working of Coal India Limited (CIL) subsidiaries and Coal Mines Provident Fund Organization (CMPFO) by digitalizing and automating the claim settlement processes at the respective organizations. Phase III of C-CARES 1.0 was launched on June 29, 2024, marking another milestone in the platform's progressive rollout. It has been deployed as an online web application and is accessible via the internet to all subscribers of CMPFO, as well as to officers of Coal India Limited (CIL) and its subsidiaries, and the officers of all Regional Offices of CMPFO.

SUGAM Portal 4.0

SUGAM is an e-Governance system to discharge various functions performed by CDSCO under Drugs and Cosmetics Act, 1940. The software system developed is an online web portal where applicants can apply for NoCs, licenses, registration certificates, permissions & approvals. It provides an online interface for applicants to track their applications, respond to queries and download the permission issues by CDSCO. It also enables CDSCO officials to process the applications, generate the permissions and MIS reports online. Other than support and maintenance of the SUGAM 4.0 nearly 103 activities are to made online which are covered under the Portal.

Online National Drugs licensing system (ONDLS) portal

Online National Drugs licensing system (ONDLS) portal is developed by C-DAC in coordination with Central Drugs Standard Control Organisation (CDSCO) and State/UT Drugs Regulatory Authorities. ONDLS portal is a single window platform for online processing of various applications submitted by the applicants for issuance of manufacturing and sales licenses including Blood Banks, and other certificates like COPP, GMP, WHO-GMP, Market Standing certificate etc., and post approval changes. The ONDLS portal also facilitates enforcement activities carried out by State Drug Controller Officers and provides a management information system (MIS) and analytical platform for data analysis and reporting. This digital platform benefits the drug industry, regulatory authorities, and the general public by promoting the safe, effective, and quality use of pharmaceuticals in the country.

Web Based Data Repository, Retrieval and Analytics Platform for Food Borne Disease for Northeast India

C-DAC in partnership with Indian Council of Medical Research (ICMR) and leading medical and veterinary institutes in the North Eastern states, is developing a Centralized Foodborne Surveillance Digital Platform. This ICT-based initiative will serve as a real-time repository of foodborne and zoonotic disease data across the eight NE states, enabling early detection, rapid response, and coordinated public health action. A Digital Platform and real-time repository for the North Eastern Districts of Assam, Arunachal Pradesh, Sikkim, Tripura has been completed.

Web Based Data Repository, Retrieval and Analytics Platform

Wood Based Industries Licensing System (eSolution for Forest Department)

Wood Based Industries Licensing System is a web-based solution which automates the process of issuance of WBI license to establish a WBI unit. A WBI license is a document / certificate that gives permission to the applicant (person seeking to open a WBI unit) to commence business in a particular area/location. The system can help to manage the applications related to the New Unit License, Renewal of License of the Existing Unit, Change of Ownership and Relocation of Unit. Applicants seeking a new WBI License can utilize the online platform to submit their application, accompanied by all requisite documentation, to the State Level Committee. The utilization of this platform facilitates the management process, while providing applicants with convenient access to real-time updates on their application status through the portal. The application is highly customizable and flexible. The web solution also provides features viz-a-viz online storage and security of data with report generation features. It also facilitates & addresses the entire gamut of activities without time and cost overruns and with the best contemporary technology and possible quality.

eRERA Solution (Regulatory Framework for Real Estate Authority)

An e-RERA Solution is a web based, unified & cross functional solution that supports all the state level automation of real estate regulatory authority and provides an effective analysis of real estate project data as well as other information so as to make the process of decision making effortless. It addresses the automation of all the activities including, real estate projects, real estate agents, e-courts, complaints and authority and others with various tools for analyzing data related to registered projects, complaints, registrations, etc. It can generate reports and insights to monitor trends and ensure compliance with regulations. The RERA authorities are responsible for implementing and enforcing the provisions of the RERA Act within its jurisdiction. It also maintains the online portals where developers can register their projects, buyers can access project details, and complaints can be lodged and resolved. About 1250 projects and 3200 agents registered and 3500 complaints resolved by Real Estate Regulatory Authority, Punjab.

Mobile app for monitoring quality of infrastructure projects

A generic mobile application which enables independent quality monitors (National /State level) to assess the quality of the works being executed and submit grading feedback, along with geo-tagged photographs, directly from the inspection site to the corresponding application portal. Inspections are carried out using the mobile app, with reports being generated through the application portal. This mobile app is integrated with OMMAS application for monitoring quality of works being executed under PMGSY scheme. Approximately, 3,600+ inspections are being submitted monthly through this app. This app is also Integrated with WOMS, MMGSY application for Rural Development Department, Government of Maharashtra. Monthly around 800+ inspections are being submitted through this app. The Integration of this mobile app with WAMIS application as per state specific requirements is ongoing.

Gram Sadak Survey (GSS) Mobile App for PMGSY-IV

Gram Sadak Survey (GSS) mobile app, developed for the Pradhan Mantri Gram Sadak Yojana-IV, is an innovative tool designed to enhance rural road development through evidence-based data. It provides detailed insights into the condition of rural habitations and household facilities, enabling informed decision-making. By adopting a data-driven approach, the app facilitates precise planning, ensuring efficient resource allocation and tailoring road networks to the specific needs of rural communities. More than 61,000 habitations have been surveyed by states till date to provide all-weather road connectivity to these unconnected areas, either through the PMGSY-IV, DHARTI AABA or PM AJAY schemes.

Portals for various Domains

System for Managing credit Insurance for Leveraging Exports (SMILE)

SMILE is a modernized state-of-the-art microservices architecture-based enterprise-wide access-driven workflow-based online Digital Insurance Platform designed to streamline credit insurance processes, benefiting both exporters and banks. By reducing paperwork and improving efficiency, SMILE aims to enhance faceless service delivery and minimize environmental impact in the long-term. It covers and integrates not only all types of business processes related to policy underwriting, country underwriting, buyer underwriting, claim processing etc., but also all applicable administrative and support functions falling under accounts, HRD, admin, etc. ECGC ERP Portal was unveiled by Shri Piyush Goyal, Union Minister for Commerce and Industry, Government of India at Mumbai on September 13, 2024. The portal is a part of portal ECGC's Enterprise Resource Planning (ERP) system, SMILE, developed by C-DAC.

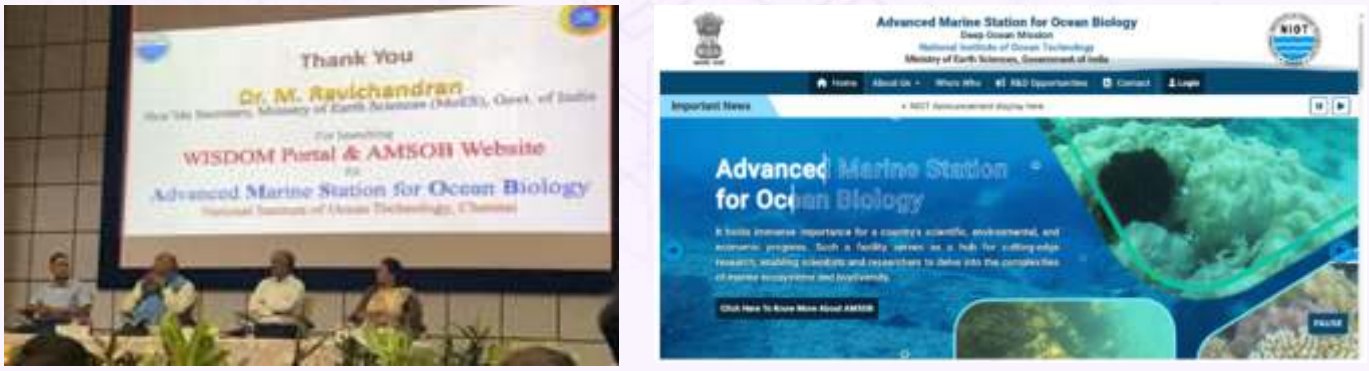
Launch of ECGC ERP Portal

Electronic Project Proposal Management System for Defence Research and Development Organization (DRDO)

DRDO is responsible for the development of technology for use by the military, headquartered in New Delhi with a network of 52 laboratories, which are engaged in developing defense technologies in fields, like aeronautics, armaments, electronics, land combat engineering, life sciences, materials, missiles, and naval systems. A number of research proposals in all these areas are received from the scientists in academic institutions under its 4 boards and ER&IPR directorate. The developed system automates the complete life cycle of funding of these R&D projects, starting with submission by investigator, technical evaluation, peer review, administrative approval, financial sanction, subsequent technical and financial monitoring and project closure.

Workgroups Interaction System for Deep Ocean Mission (WISDOM) Portal

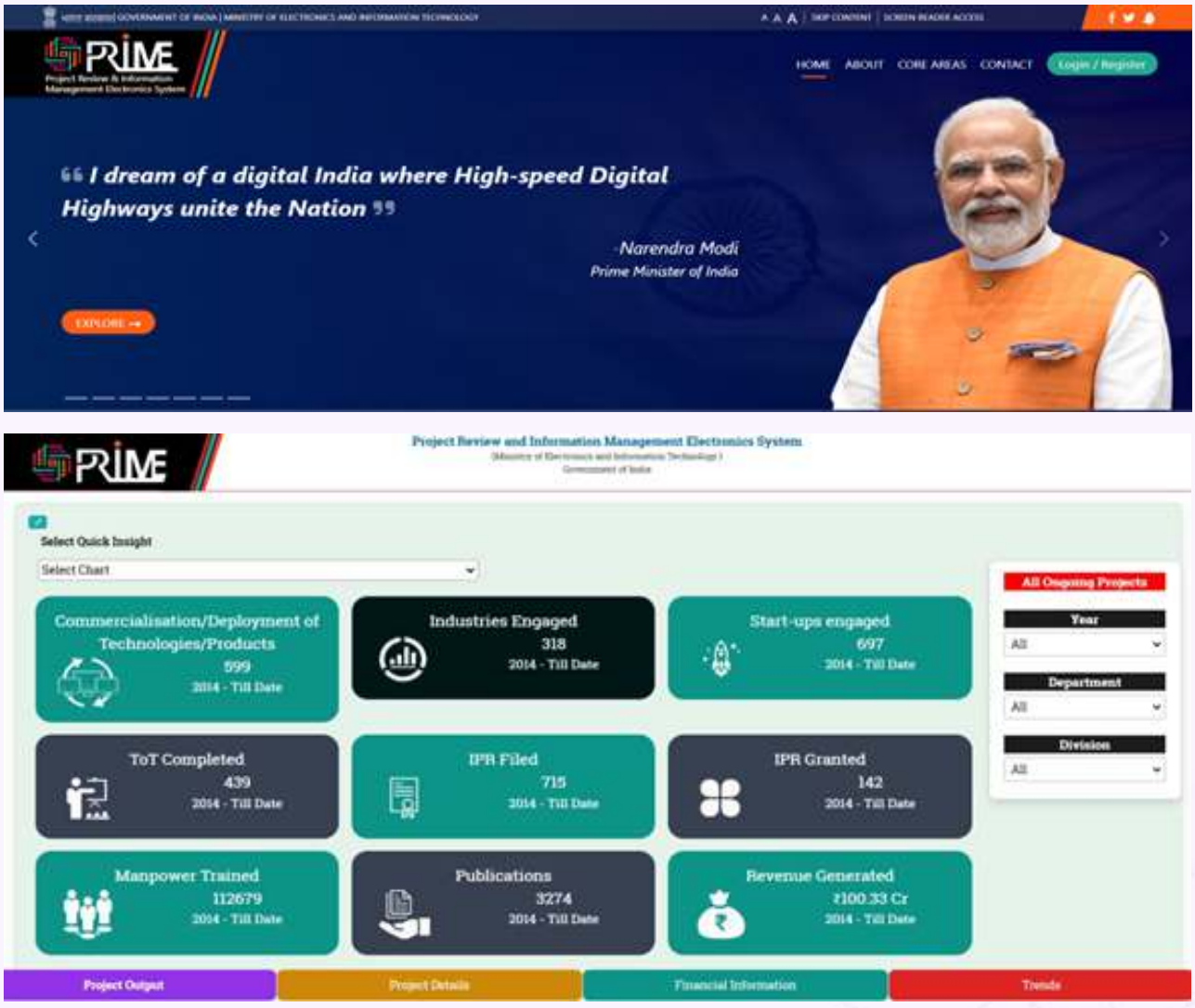
This portal encompasses the complete life cycle of funding of R&D projects under various funding schemes of Advanced Marine Station for Ocean Biology (AMSOB) of National Institute of Ocean Technology (NIOT), Chennai under Deep Ocean Mission (DOM) of Ministry of Earth Sciences. Dr. M. Ravichandaran, Hon'ble Secretary, Ministry of Earth Sciences, Govt. of India has launched WISDOM (Workgroups Interaction System for Deep Ocean Mission) Portal on November 9, 2024 in National Institute of Ocean Technology, Chennai, on its 31st Foundation Day.



Launch of WISDOM (Workgroups Interaction System for Deep Ocean Mission) Portal

PRIME for MeitY

PRIME is a holistic life cycle management system that simplifies the entire process of proposal submission and project management. It comprises five key components, each tailored to serve our needs best. The Proposal Submission Management System, the Scrutiny and Meeting Management System, the Recommendations, Approvals, Sanctions, and Release Management System, and the Project Monitoring and Closure System, all come together to form a system that is intuitive, efficient, and powerful. Adding to this, the interactive and insightful Analytical Dashboards enable real-time tracking and provide valuable insights for our various stakeholders. It is deployed at C-DAC Data Centre for use by MeitY.



PRIME Portal

NOC Approvals for New Drugs and Inoculation System (NANDI)

NANDI portal stands for NOC Approval for New Drugs & Inoculation System developed for Department of Animal Husbandry & Dairying. NANDI is a powerful software portal advancing Digital India and promoting the well-being of livestock and the livestock industry. Developed by C-DAC, to pave the way to a resilient animal health sector in India by streamlining and digitizing the regulatory approval process. It aims to speed up the process to assess and examine the safety, efficacy, and essentiality/desirability of veterinary product proposals received in Animal Husbandry Department to achieve the goal of developing a global manufacturing hub for veterinary products in the country and stimulating research and development focused on improving animal health. The portal allows the firms to apply for and obtain the required approval electronically, track the status of requests through email notifications, respond to queries, and print the approved certificates online. It also reduces the amount of time it takes for a firm to apply for and receive No Objection Certificate and other approvals from Department of Animal Husbandry & Dairying; simplifies the process for applying for multiple approval requests; and enables faster processing.

NANDI Portal

Portal for submission and evaluation of applications received for Design Linked Incentive Scheme of MeitY

Ministry of Electronics and Information technology has announced the Design Linked Incentive (DLI) scheme to offset the disabilities in the domestic industry involved in semiconductor design in order to not only move up in value-chain but also strengthen the semiconductor chip design ecosystem in the country. C-DAC is responsible for implementation of the DLI Scheme as Nodal Agency. The Design Linked Incentive (DLI) Scheme aims to offer financial incentives as well as design infrastructure support across various stages of development and deployment of semiconductor design(s) for Integrated Circuits (ICs), Chipsets, System on Chips (SoCs), Systems & IP Cores and semiconductor linked design(s) over a period of 5 years. The online portal has been developed to accept applications online along with payment. It is a workflow enabled system which provides role-based accesses to its users for technical and financial evaluations of the applications. The portal allows the firms to apply for and obtain the required approval electronically, track the status of requests through email notifications, respond to queries, and print the approved certificates online. It also reduces the amount of time it takes for a firm to apply for and receive approvals; simplifies the process for applying for multiple approval requests; and enables faster processing.

Online MSIPS 2.0 (e-MSIPS)

The electronic MSIPS (e-MSIPS) Application System enables online submission and scrutiny of applications submitted to the Ministry of Electronics and Information Technology (MeitY) under the Modified Special Incentive Package

Scheme (MSIPS) and Electronics Manufacturing Cluster (EMC) schemes. The e-MSIPS system is operational and being extensively used by stakeholders which is evident by the increased number of submissions during the year. The system's robustness and transparency have improved administrative efficiency and reduced administrative corruption. Proper implementation of services makes it possible for people to get their work done online thereby sparing themselves of unnecessary hassles of travelling to the respective offices. Considering that the portal offers real time tracking of application, it helps the top management in forecasting and analysing the trends. This has resulted into increased the outreach thereby making the transactions paperless.

New Initiatives

Design, Development, Deployment & Maintenance of Web & Mobile Applications for ensuing Digital Census of India

The project has been awarded and funded by Office of the Registrar General & Census Commissioner, India, Ministry of Home Affairs, Government of India for design, develop, deploy and maintain the Web & Mobile Applications for ensuing Digital Census of India by C-DAC. The manual processes of various phases of overall Census Work will be converted into a dynamic database-driven system. The automated system will increase efficiency and save time.

Internet Governance – Structured Implementation Module (IG-SIM) – Phase-II

The project is funded by Ministry of Electronics and Information Technology (MeitY), Government of India to provide technical, policy and administrative support. This will also facilitate the implementation of IG-SIM by MeitY, such as conduct of research, training, workshops and preparation of position paper, technology reports, etc. This will include providing ongoing support to IG-SIM activities of the Ministry of Electronics and Information Technology (MeitY), Government of India.

Vikaspedia 2.0

The Ministry of Electronics and Information Technology (MeitY) has approved Vikaspedia 2.0, an initiative aimed at fostering an AI-augmented digital ecosystem to enhance the availability of electronic information in regional languages. This initiative is designed to empower citizens and drive digital transformation by maximizing the utility of ongoing government programmes. It seeks to provide universally accessible digital information resources in Indian languages, developed and disseminated through a collaborative, multi-stakeholder ecosystem. This ecosystem will be catalyzed by advanced technologies, capacity-building efforts, and knowledge enablers to ensure inclusive and effective information dissemination.

eBIS 2.0

Under this project, C-DAC will design and develop eBIS 2.0 portal for Bureau of Indian Standards (BIS) along with many new modules and processes, integrating them into the existing eBIS system. These modules include Scheme-X, OSA for desk work, enhance communication with LIMS, amendments to Indian Standards, Lot Inspection Phase II and several enhancements to the Manak Online Portal. This will streamline processes, improve operational efficiency, enhance user experience, and provide better management and communication across various departments and systems within BIS.

Design, Development & Maintenance of Web Portal for STQC Lab Automation

Web Portal for STQC Lab Automation (LAP) will enhance service delivery by improving efficiency, transparency, and reliability for all stakeholders through an integrated platform. It will streamline processes, ensures reliable services. Outcomes include a web portal and mobile application for STQC Lab Automation (iOS & Android), along with secure hosting, internal security audits, accessibility testing, and ongoing maintenance. This also covers data center services, backup management, and performance optimization.

Design and Development of school Management system, office ERP and Integrated content Management Portal

Eklavya Schools, established by the National Education Society for Tribal Students (NESTS), aim to provide quality modern education to talented tribal children from rural areas, regardless of their socio-economic backgrounds. With 405 operational schools managed by 28 state societies and a head office, NESTS seeks to automate its manual processes to minimize errors and reduce the heavy paperwork burden on staff, who often juggle multiple roles. The proposed computerized system will streamline various functions, including a School Management System, Hostel & Mess Management System, Office ERP, Payroll, and an integrated web portal to enhance information dissemination across the schools.

Development of Software for NPF Indian Air Force

Every Unit of Air Force has Non-Public Funds or Regimental Funds of which Service Institute is a part. The regimental funds are used for the welfare of the Air Force officers and staff. Managing the activities, processes and data of Regimental funds is very pertinent to Indian Air Force. Currently the data is being captured manually, which reduces the efficiency in data capturing and information retrieval. Hence an easy-to-use software for efficient processing was envisaged by Indian Air Force. The objective of this software is to automate the entire working of the Service Institutes across all units in the country. C-DAC will develop a solution to manage the accounting, inventory and personnel information for NPF of Air Force.

Generation of Dam Break Rapid Risk Assessment (Level-1) Report and Development of Tool for Automatic Rapid Risk Assessment (Level-1) for Dams in India

This project will develop a system for rapid risk assessment of dam failures in India. Using HEC-HMS and ANUGA Hydro, the system will generate dam breach hydrographs and simulate resulting flood inundation, analyzing impacts on population, transport, and infrastructure. This analysis will produce a Level-1 risk assessment report for all dams in India. Finally, a GIS-based tool will be developed to automate this process. National Dam Safety Authority (NDSA) has approved this project.

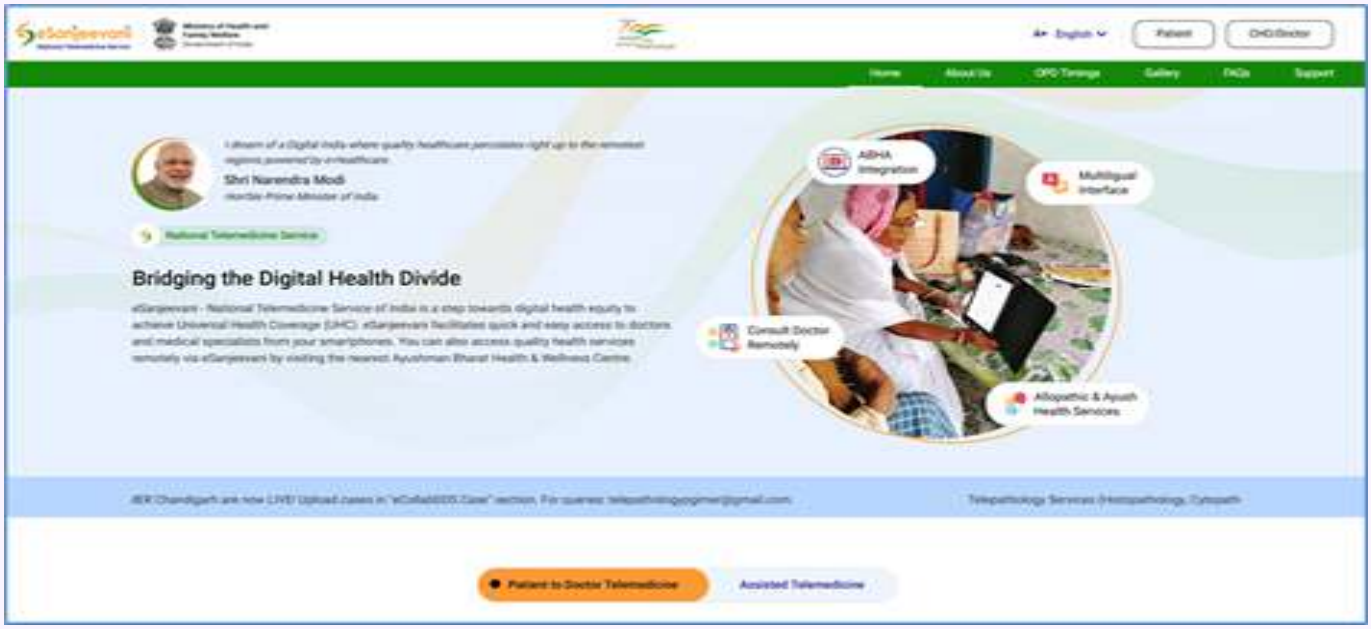
Healthcare Technologies

Healthcare technologies have significantly enhanced the quality of life across society in recent ye. C-DAC's Healthcare Solutions, encompassing applied healthcare innovations and informatics, have made a substantial contribution toward making affordable, high-quality healthcare accessible to the citizens. The availability of quick and easy access to these solutions on smart devices has accelerated adoption among doctors and medical specialists. The wide spread use of these solutions has, in turn, driven the development of standards and best practices across various healthcare technologies. Various initiatives carried out by C-DAC in this area are as given below.

Healthcare Solutions

eSanjeevani

eSanjeevani, India's National Telemedicine Service, continues to revolutionize digital healthcare by providing accessible, cost-effective, and high-quality remote consultations. With the transition to a microservices architecture, the platform has improved efficiency, scalability, and interoperability, ensuring seamless healthcare delivery. The focus on Quality, Value, and Impact has strengthened trust between patients and providers while enhancing operational efficiency. eSanjeevani-National Telemedicine Service is operational in all states and UTs across India. Several enhancements were implemented to improve service delivery, including AI-driven analytics, integration of diagnostic devices, multilingual support, and interoperability with key healthcare systems. These upgrades have streamlined telemedicine consultations, making healthcare more inclusive and efficient. During the FY (24-25), eSanjeevani has provided more than 112 million consultations at over 123,332 spokes through 15,757 hubs serviced by 127,664 providers, and 36,192 practitioners.



eSanjeevani National Telemedicine Service

Mercury™ Nimbus Neo

Mercury™ Nimbus Neo suite is an enterprise-grade 5G & cloud-enabled comprehensive Telehealth suite that includes Mercury™ Web, Mercury™ Remote, Mercury™ CollabMedImaging, Mercury™ for Android, Mercury™ Central Repository, Mercury™ Virtual Reality Education & Training platforms and solutions. The developed solution is highly scalable and secure with user-friendly interface to carry out day-to-day clinical record keeping and telehealth interactions between doctor-patient, doctor-doctor and specialist-doctor-patient. The solution offers a variety of features such as Electronic Health Record management and exchange, TeleICU monitoring, Medical Imaging, Device Interfacing, Appointment booking, Integrated Audio-Video Conferencing, Standard Compliance, multilingual

support etc. to the healthcare-deprived citizens dwelling in remote areas.Mercury™ Solution is deployed and operational under turnkey projects covering Statewide Odisha TeleICU & Telemedicine Network, NTPC Telemedicine Network across India and TeleICU services for Pediatric Center of Excellence (COE) at Government SMGS Hospital, Jammu.

Mercury™ Nimbus Neo suite

Aakanksha- Radiation Treatment planning system for Brachytherapy Machines

Aakanksha Radiation Treatment Planning system (HDR Brachytherapy machines) is a radiation surgery planning system that is designed and developed in collaboration with the Tata Memorial Centre, Mumbai. The system allows surgery planning on different imaging modalities such as CT, PET, MRI, and X-Ray. The system provides a comprehensive end-to-end surgery planning for Brachytherapy using different types of applicators. The system allows interfacing with PACS systems, allows contouring of regions, co-registration of images, and other operations on imaging. The treatment planning Station provides tools for reconstructing the applicators and source travel positions within the applicators. The system provides faster and accurate doses with an option to optimize doses using DVH, graphical optimization, and isodose curves. The web-based admin portal provides a user-friendly dashboard for reporting, user and role management, and treatment machine and radiation source management. The solution comes as a package of a client application, a PACS server, a TPS serve,r and an admin portal. It can be deployed in hospitals to perform end-to-end brachytherapy treatment planning and delivery.

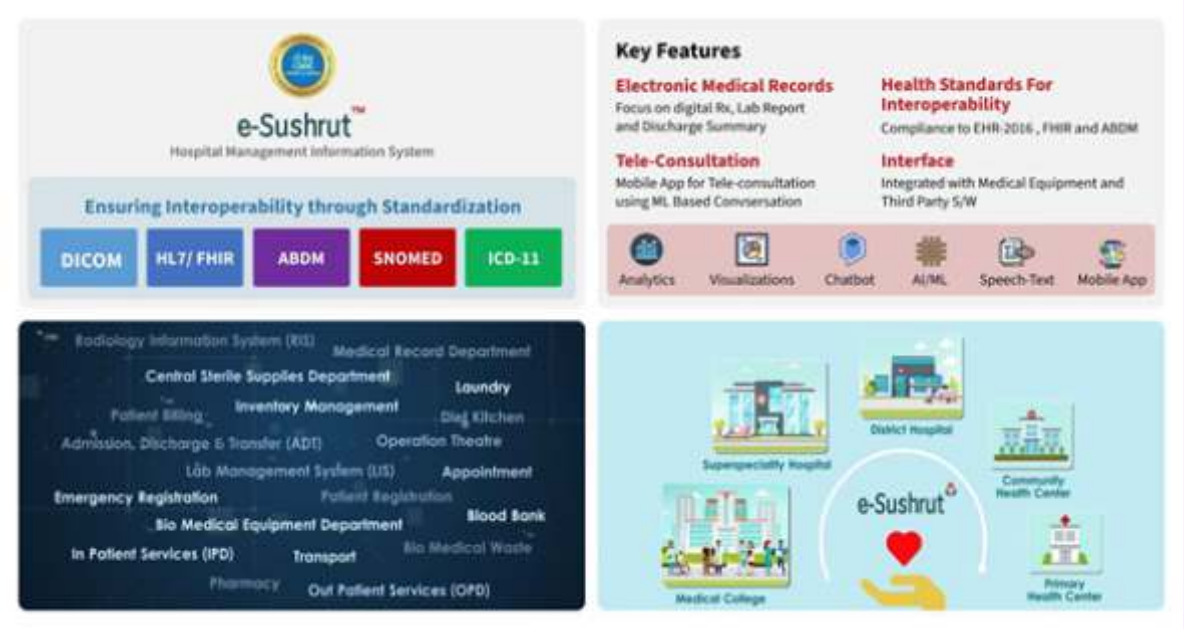
e-RaktKosh: A Centralized Blood Bank Management System

e-RaktKosh is a comprehensive IT solution to connect, digitize and streamline the workflow of blood centres. e-RaktKosh is ABDM MI compliance and also on-boarded on ABDM UHI (Unified Health Interface). The system allows coordination among various blood banks, hospitals, and healthcare organizations to ensure the smooth exchange of blood. It aims to ensure that blood is available in a timely manner, reducing shortages and improving the quality and transparency of blood donations and transfusions in the healthcare system. More than 4271 blood centres across the country are publishing the blood stock daily on this platform to provide benefits to citizens. The e-RaktKosh application has also been integrated with Umang, PayTM, and Arogya Setu for Blood Stock enquiry. e-Raktkosh has more than 90 lakh registered blood donors.

e-Sushrut: Hospital Management Information System

e-Sushrut (Hospital Management Information System – HMIS)

e-Sushrut, an Advanced Hospital Management Information System is a major step towards adapting technology to improve healthcare. HMIS incorporates an integrated computerized clinical information system for improved hospital administration and patient healthcare. It also provides an accurate, electronically stored medical record of the patient. A data warehouse of such records can be utilized for statistical requirements and for research. It is integrated with ABDM – Federated Health Record Framework of Ayushman Bharat Digital Health Mission. It is implemented in super speciality hospitals including 17 AIIMS hospitals, IGIMS Patna, NIMS Hyderabad and PGIMER Chandigarh. It is also implemented across 10 states and PSUs including SAIL, NHPC and 700 + Railway hospitals.



e-Sushrut: Hospital Management Information System

eAushadhi, Drugs and Vaccine Distribution Management System (DVDMS)

e-Aushadhi is a major step towards adapting technology to improve distribution of drugs, vaccines and sutures by leveraging computing power at low cost. The main aim of e-Aushadhi-DVDMS is to ascertain the pharmaceutical needs of various district drug warehouses such that all the required materials/drugs are constantly available to be

supplied to the user district drug warehouses without delay and finally issuing drugs to the patients, who is the final consumer in the chain. Currently, 18 States, 06 UTs, 05 Central Programs, 01 Program under Ministry of Defence and 02 Programs under Insurance Medical Services (Andhra Pradesh and Telangana) are using this application.

A Brain Machine Interface enabled Assistive System for children with special needs

The project "A Brain Machine Interface enabled Assistive Communication System for special needs", funded by the MeitY, Government of India is being executed in collaboration with the Child Neurology Division, Department of Pediatrics, AIIMS Delhi. Brain-Computer Interface (BCI) technology enables direct communication between the human brain and external devices by interpreting neural signals Vivan-BCI supports multiple paradigms, including SSVEP, P300, and motor imagery, making it adaptable to varied cognitive profiles. The interface is multilingual—supporting English, Hindi, and Malayalam—and functions across web, mobile, and standalone platforms. An interactive dashboard allows caregivers and clinicians to monitor usage, adjust configurations, and access logs. Furthermore, the system has been ethically validated with expert review and is backed by a curated brain signal repository consisting of data from 123 children with neurodevelopmental conditions and 21 control adults. Field testing has demonstrated high accuracy and usability across multiple populations. At AIIMS Delhi, the system was tested on 107 children with 64.25% accuracy on different conditions: ADHD (64.5%), ASD (49.43%), Cerebral Palsy (59.43%), Intellectual Disability (64.59%), and Specific Learning Disability (83.33%), with an overall performance of 64.25%. At NIEPID Noida, trials on 128 sessions showed 89.84% correct predictions. In tests involving normal healthy adults, results were highly promising, with 95% accuracy at field sites like BJ Medical College Pune, IIIT Delhi, and IIT Gandhinagar, and 98.33% accuracy (59 out of 60 trials) during internal testing at C-DAC Delhi.

BCI Testing in AIIMS Delhi and NIEPID by Children with Special Needs

MiMEmindme: Brain Machine Interface based Inner Speech Decoding enabled Assistive Communications System for people with motor neuron disabilities

C-DAC in collaboration with Government Medical College, Thiruvananthapuram has developed MiMEmindme - an advanced application designed to decode inner speech from EEG signals. MiME aims to empower individuals with motor neuron disabilities (MND) by interpreting brain signals associated with attempted speech, enabling communication of essential needs such as food, water, posture adjustments, or personal care. This AI-powered platform seamlessly interfaces with EEG acquisition devices and supports both real-time and offline analysis of neural signals. It is equipped with a comprehensive suite of EEG signal processing tools and advanced AI-based analytics to enable accurate and meaningful interpretation of brain activity. MiME further enhances user interaction through integrated audio and text outputs, offering a multimodal interface tailored for assistive communication. The MiME system is designed to serve as a cutting-edge assistive communication interface for patients with Motor Neuron Diseases (MND) who experience severe speech and movement impairments.

MiMEmindme

SenSiz: Seizure Detection and Prediction System

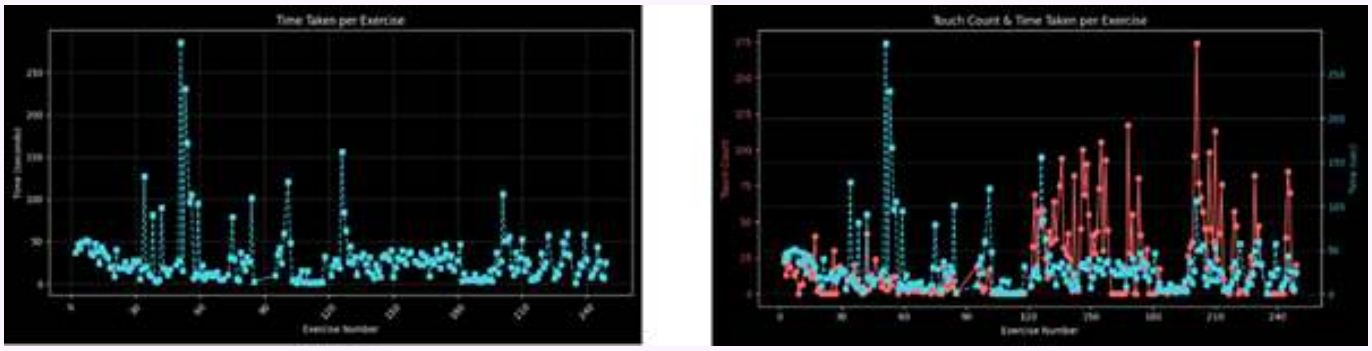
The SenSiz software is an intelligent assistive system developed to analyze EEG signals for the prediction and detection of epileptic seizures. The system is designed with a focus on individuals affected by epilepsy and other seizure-related neurological conditions, SENSIZ continuously monitors brain activity and identifies abnormal patterns associated with pre-ictal and ictal states. By leveraging advanced artificial intelligence and EEG signal processing techniques, the platform offers both real-time and offline analysis capabilities, making it suitable for continuous home-based or clinical monitoring. The system is compatible with standard EEG acquisition devices and is equipped with robust tools to pre-process, extract features, and classify EEG data for accurate detection of seizure onset and prediction of impending seizures. SenSiz also provides timely alerts through visual, text, and audio outputs, allowing patients, caregivers, or medical personnel to take preventive action, thus reducing the risk of injury or complications.

SMRITI: Fine motor skill assessment and enhancement system

SMRITI products are particularly effective for children with ADHD, autism spectrum disorders, and learning disabilities. The tool improves hand-eye coordination and fine motor control through interactive, engaging exercises. This tool will be helpful for people having difficulties in Motor Dexterity, Verbal Working Memory, Attention and Concentration in Children With ADHD. SMRITI tools are useful for elderly people with Mild Cognitive Impairment, stroke and Memory dysfunction. SMRITI directly addresses this need by enabling both clinical-grade testing and home-based motor and cognitive enhancement. It is a digital platform designed for fine motor skill assessment and enhancement. It is available in two models:

- SMRITI FM-T (Fine Motor – Testing): A clinical version with image processing, SpO_2, and pulse monitoring, ideal for hospitals and rehabilitation centers.
- SMRITI FM-E (Fine Motor – Exercise): A simplified, home-friendly version for daily neuro-motor training, suitable for families, therapy groups, and special education programs.

Both models track user performance across multiple sessions, store data for trend analysis, and provide instant visual, auditory, and tactile feedback, motivating users to improve steadily. SMRITI FM - E & SMRITI FM - T products are provided to M/s. Coexin Healthcare Technologies Pvt. Ltd for evaluation and field trails.



SMRITI

Digitally Connected Tribal Colonies

The project is funded jointly by Ministry of Electronics and Information Technology (MeitY), Govt. of India and Scheduled Tribes Development Department (STDD), Govt. of Kerala for the upliftment of tribal population by making use of Information and Communication Technologies (ICT) for improving the healthcare and education infrastructure and facilities in the tribal settlements at Wayanad District, Kerala. The program aims to reduce the incidence of cervical and oral cancer, as well as diabetic retinopathy, among tribes. This innovative initiative lies in the seamless integration of Information & Communication Technology and leveraging cutting-edge AI technology as a decision support system for cancer screening. The program establishes a robust disease screening hub equipped with a suite of indigenously developed medical devices by C-DAC for smear preparation, processing, staining, digital imaging and digital pathology services. The programme has successfully completed the development and deployment of these devices and designed an effective workflow that has enabled the screening of more than 70,000 individuals from the tribal community. This includes door to door health awareness and NCD screening camps conducted at PHCs/FHCs.

Digitally Connected Tribal Colonies

This innovative and scalable model can be replicated across the country to uplift underserved communities. The initiative was recognized with the 2024 Award from the UN Inter-Agency Task Force on Non-Communicable Diseases for its contribution to Assistive Systems and Community Health.

2024 Award from the UN Inter-Agency Task Force on Non-Communicable Diseases

USHA: Urine Sense towards Health Analysis of kidney

This project helps to detect Albumin and Creatinine in urea Bromocresol Green (BCG) method. Jaffe method was used simultaneously for colorimetric sensing and data collection. The colour change based on concentration of the targeted analytes was measured by commercial spectrophotometer. An image analysis-based hand-held prototype has been developed with an image capturing and analysis module, i.e., a single board computer, special arrangement of LEDs for optimum lighting, a sample holder 9 well microchip for assaying 9 samples at a time. The prototype was accompanied by a mobile based software for operation such as image capturing, image analysis and result dissemination. The algorithm behind the image analysis was made simplistic with only image feature acquisition such as R, G, B etc., and regression of the image features against different concentrations of the targeted analyte. The prototype has been lab validated with spiked samples of albumin and creatinine, which represented good correlation with commercial spectrophotometer-based analysis of the same. The project is funded by Indian Council for Medical Research (ICMR).

ABDM FHIR Connector

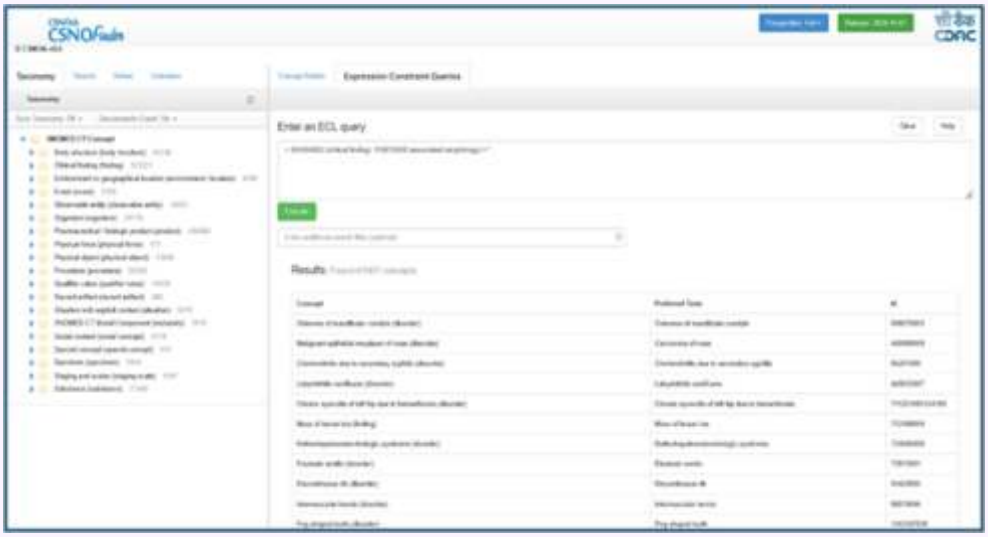
Ayushman Bharat Digital Mission (ABDM) strives towards creating a national digital health ecosystem that supports universal health coverage in an efficient, accessible, inclusive, affordable, timely and safe manner, that provides a wide-range of data, information and infrastructure services, duly leveraging open, interoperable, standards based digital systems, and ensures the security, confidentiality and privacy of health-related personal information. For making it successful, it is required that each and every Health information management system associated with the Health care facilities are boarded onto the ABDM Ecosystem and compliance to ABDM milestones to generate ABHAID (Ayushman Bharat Health account) and exchange the health records among hospitals on the basis of patient consent. In the view above, ABDM FHIR Connector based on the FHIR interoperability standard integrated with the ABDM echo system is developed. It also enables the legacy / other systems to onboard on ABDM for various building blocks i.e., Unique Health Identifier, facility linkage as Health Information Provider / Health Information Users and Consent Management. This solution can be plugged into any existing application (legacy/Non FHIR Compliant) to onboard the application at ABDM platform. API Implementation is abstracted into an integration layer providing robustness to the entire architecture and hides the complexity from the end user to enable easy on boarding. A distinct integration layer enables adoption of current/future ABDM features. The platform can be used to address any interoperability needs of the facility in standard format.

Exchange Engine services to onboard over ABDM Ecosystem

Standardization activities

C-DAC's Toolkit for SNOMED CT (CSNOtk)

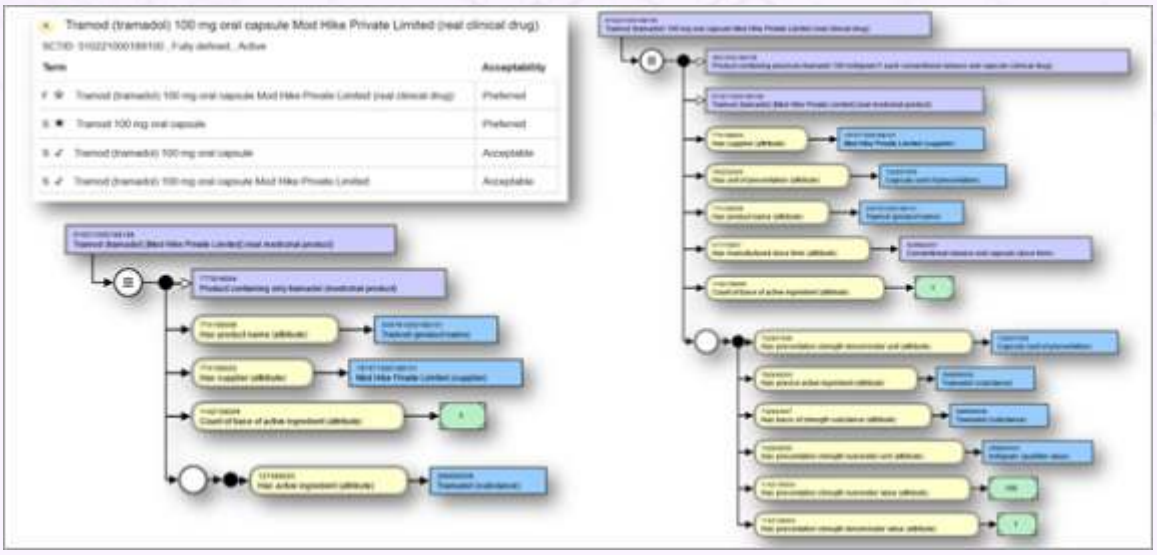
CSNOtk is a specially designed toolkit for easy access and integration of SNOMED CT in healthcare applications. SNOMED CT is a comprehensive clinical healthcare terminology provided by SNOMED International. With 03 releases of the toolkit for SNOMED CT during this period, the latest of CSNOtk v8.6 was released on November 21, 2024. CSNOtk is distributed as free and open-source software under the Apache v2.0 license and is available for download on the C-DAC website.



C-DAC's Toolkit for SNOMED CT (CSNOtk)

Common Drug Codes for India (CDCI)

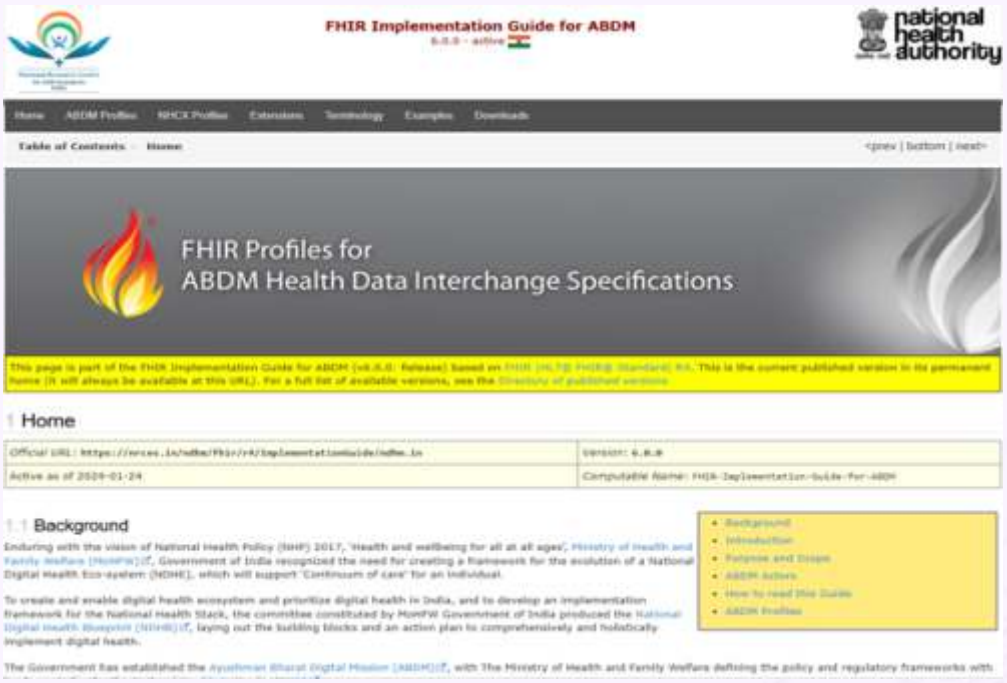
Common Drug Codes for India is a set of files that integrates with SNOMED CT Global Medical Terminology files and content for use in any data entry, analysis, or record exchange in healthcare systems/applications. The release covers generic medicines, suppliers, and branded medicine concepts, which, when used along with SNOMED CT International Release, cover all medicines, except devices, surgical implants, and combi packs from major government programs and medicines used in major health organizations/institutes from India. The CDCI - March 2025 version was released on March 28, 2025 and is synchronous with the March 2025 SNOMED CT International Edition offers a total of 9442+ Generic and 80503+ Branded Medicines. The package is available in two different formats, the Terminology Integrated Package and Flat Files Package, for use across healthcare records, supply, and pharmacy systems. The National Health Authority (NHA) of India has envisaged CDCI to be used in listing Drugs over the Drug Registry (ABDM Building Block) and drug information exchange in health records. The Terminology Integrated Package is freely available to all the SNOMED CT Affiliates in India.



Common Drug Codes for India (CDCI)

FHIR Implementation Guide for ABDM

The Fast Healthcare Interoperability Resources (FHIR) Implementation Guide (IG) provides standardized rules and guidelines to ensure consistency and compatibility in implementing FHIR standards across healthcare applications and systems. It establishes a structured framework for developing, sharing, and managing healthcare information exchange protocols, facilitating interoperability by defining data structures and exchange mechanisms. The FHIR Implementation Guide for ABDM, based on FHIR Version R4, outlines the minimum conformance requirements for health record artifacts exchanged within ABDM, in accordance with the Health Data Interchange Specifications 1.0, to ensure continuity of care in the Indian context. Additionally, it defines the data structure for the National Health Claim Exchange (NHCX), a digital health claims platform developed by the National Health Authority (NHA). NHCX aims to automate the exchange of health claim-related information among insurers, healthcare providers, beneficiaries, and other stakeholders. During this period, work is being done to upgrade the development technology stack of IG with FHIR Shorthand (FSH). The FHIR Standard Definitions (Profiles) and Value Sets have been updated as per the requirements of ABDM implementors. Additionally, FHIR Usage Samples from ABDM and NHCX have been updated.



FHIR Implementation Guide for ABDM

NRCeS Website

Under the National Resource Centre for EHR Standards (NRCeS) CoE, set up by the MoHFW, Govt of India at C-DAC Pune, a one-stop information portal has been developed and maintained covering all the aspects of EHR Standards, including information, implementation, and adherence to standards. It provides a one-stop information portal regarding all aspects of EHR Standards information implementation and adherence. The NRCeS website is hosted on C-DAC's server to ensure continuous updates and fulfill its maintenance requirements. With over 24 release cycles, the website had over 1,00,400+ visits from 27,900+ unique users from the health IT community in 2024-2025.

National Resource Centre for EHR Standards (NRCeS)

New Initiatives

NIDAAN: Novel AI-enabled Intelligent Detection and Analysis Array for Nephrology in resource-limited settings

The project focuses on developing a portable biosensor system for real-time detection of key kidney health markers, enabling early diagnosis of kidney dysfunction, particularly in resource-limited settings. The device will be cost-effective, user-friendly, and AI-integrated, ensuring accurate interpretation of colorimetric data for timely medical intervention. Field validation and regulatory certification will establish reliability and compliance, facilitating widespread adoption in low-resource healthcare systems. The project is being executed in collaboration with IIT, Kharagpur Budget, NIT, Jamshedpur and funded by Indian Council for Medical Research (ICMR).

"Sight-Beyond-Sight": ICT-based Revolutionary Empowerment for the Visually Challenged Population of Odisha

Sight-Beyond-Sight is an ICT-based revolutionary empowerment initiative aimed at enhancing education, digital literacy, and skill development for the visually challenged population of Odisha. Developed by C-DAC Kolkata in collaboration with the Government of Odisha, this project integrates AI-ML-driven assistive technologies, including Text-to-Braille, OCR, Speech-to-Text (STT), and Phonetic Keyboard solutions. It focuses on making learning materials, digital content, and communication more accessible for visually impaired students and professionals. The initiative includes specialized training programs, lab setups, and large-scale deployment to ensure long-term impact. The project is funded by SSEPD, Govt of Odisha.

Design & Development of National NCD Portal

The National Non-Communicable Disease (NP-NCD) Portal project aims to develop and enhance a digital platform for the prevention, screening, management, and control of major non-communicable diseases (NCDs) such as cancer, diabetes, cardiovascular diseases, and stroke across India. C-DAC will take over the development and enhancement of the portal from National Health Systems Resource Centre (NHSRC). This initiative will ensure seamless digital health service delivery, data-driven decision-making, and improved health outcomes, supporting India's National NCD Program. The project is funded by MoHFW.

e-Pratyaropan

C-DAC has been awarded the prestigious e-Pratyaropan project by the National Organ and Tissue Transplant Organization (NOTTO), operating under the Directorate General of Health Services, Ministry of Health and Family

Welfare (MoHFW), Government of India. This initiative empowers C-DAC to develop a comprehensive digital solution for organ and tissue transplantation, strengthening the national ecosystem and benefiting citizens across India and beyond. At the core of e-Pratyaropan is its intelligent, automated organ allocation system, ensuring fair, transparent, and rule-based organ distribution based on predefined medical criteria, urgency, and ethical considerations.

Health Management Information System for CGHS, New Delhi

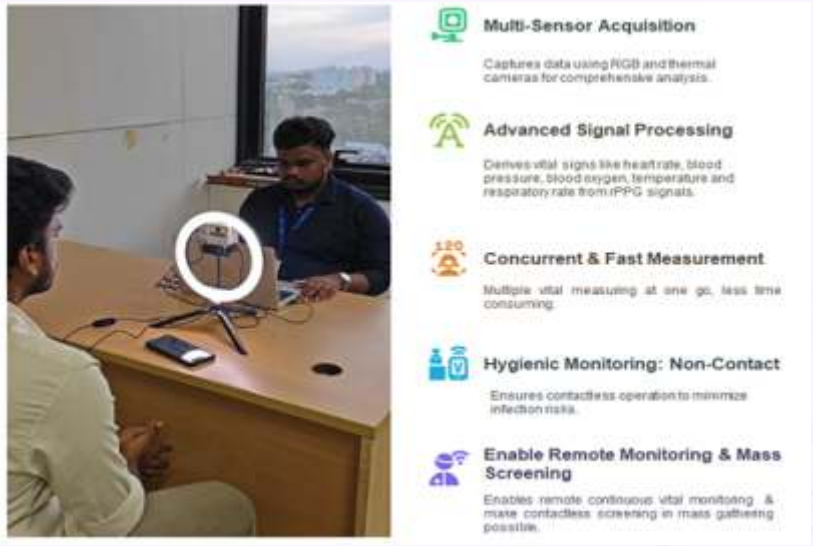
The Central Government Health Scheme (CGHS) has achieved a landmark digital transformation through the rollout of a robust, ABHA-integrated Health Management Information System (HMIS), redefining how healthcare is delivered to over 45 lakh beneficiaries and their dependents across India. This future-ready platform has a mission to bring precision, transparency, and ease into every layer of CGHS service. Through real-time mobile and web access, the system will empower beneficiaries with appointment scheduling, digital prescriptions, refill alerts, and seamless access to their complete medical history. Elderly and chronic patients will receive timely care with reduced waiting, fewer queues, and proactive notifications—strengthening compliance and outcomes.

Central Monitoring System For DVDMS

The project aims to monitor the performance of all Indian states and Union Territories in implementing the Free Drugs Service Initiative. The new MoU also includes provisions for incorporating Indian Public Health Standards (IPHS) for drugs, monitoring of reagents and kits, tracking of Non-Communicable Disease (NCD) drugs, developing a generalized DVDMS for central procurements, and inclusion of Free Diagnostic Service an important MoHFW initiative. This initiative ensures the availability of essential medicines, regents and diagnostic kits at public health facilities at no cost to patients. It supports not only the procurement of medicines but also the strengthening of associated components such as quality assurance, warehousing, prescription audits, grievance redressal mechanisms, and IT-enabled supply chain management systems like DVDMS. The project is funded by Statistics Division, MoHFW.

Nireekshak- An Autonomous, Rapid, Non-Contact Vital Screening System

Nireekshak is an Autonomous, rapid, non-contact, vital measurement system. It leverages RGB and thermal cameras to measure vital signs such as Heart rate, Respiratory rate, SpO2, Blood Pressure, and Body Temperature in a complete non-contact manner. By integrating RGB and thermal cameras, Nireekshak is capable of capturing live data from individuals and processing it in real time using advanced signal and image processing, along with machine learning algorithms. This intelligent system may be a handy tool for vital-based screening in a mass gathering during a pandemic-like situation.



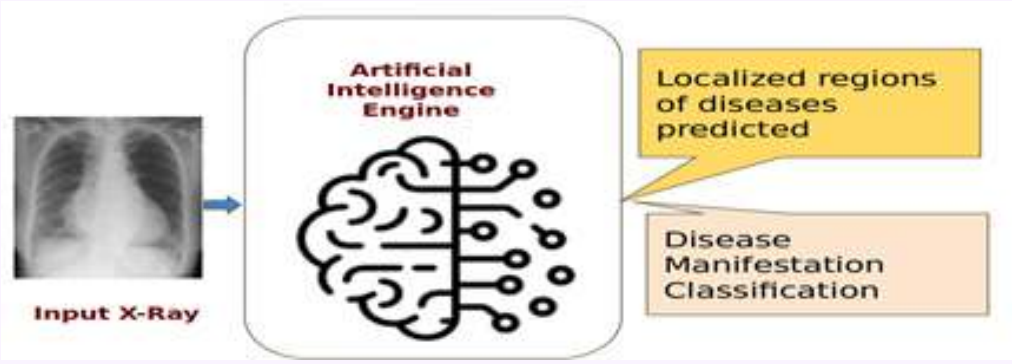
Nireekshak TestBed

XRAYCAD

CHEST X-RAY Computer Aided Detection Software Solution (XRAYCAD) is a Web Application Portal to assist doctors in diagnosis of chest X-Rays. The proposed solution is an Artificial Intelligence Engine that helps in detecting disease manifestations from the input Chest X-Ray Image. The functionality provided by the XRAYCAD tool includes:

- Chest X-Ray Disease Manifestation Classification
- Visualization of disease affected region

The solution can perform Normal, Abnormal X-Ray classification. The solution can analyze X-RAY and support doctors with crucial information for deciding on medication for TB and is developed in collaboration with ICMR-NIRT.



XRAYCAD

Web Based Data Repository, Retrieval and Analytics Platform for Foodborne Diseases

Safe food and water are essential for health, yet foodborne diseases remain a major cause of illness and death, especially in vulnerable populations like India. Often underreported due to their self-limiting nature, these diseases—especially diarrheal outbreaks in children—demand urgent action. To address this, C-DAC and ICMR have developed a Centralized Foodborne Surveillance Digital Platform for the eight North Eastern states. The platform serves as a digital repository for disease data, enabling timely interventions by health authorities. It strengthens public health management through rapid data access, improved surveillance, and proactive responses.

Centralized Foodborne Surveillance Digital Platform

Educational Technologies

Educational technologies play a pivotal role in enhancing the learning experience by offering diverse, flexible, and inclusive learning opportunities. These tools enable interactive and engaging instruction that caters to various learning styles, thereby improving educational outcomes and accessibility. The integration of digital technologies empowers educators to deliver personalized learning experiences, promote collaboration, and support continuous learning beyond traditional classroom boundaries. To maximize the impact of these technologies, it is essential to provide adequate training for both educators and learners. Ongoing professional development and structured support are critical to staying abreast of the latest advancements and best practices in the field of educational technology. C-DAC has developed various solutions in this area which are as below.

OLabs NextG: Next Generation Online Labs (OLabs) for schools

Considering the excellent and consistent response to OLabs, and the encouraging feedback from teachers, OLabs NextG was proposed to take this activity further. The focus is mainly to expand the base to benefit more students and enrich the overall lab experience for the students for effective learning of related concepts. OLabs NextG is mapped with NCERT lab manuals and it has interactive 2D/3D Simulations which model real life environment and behavior. It includes features such as recording observations, plotting graphs, calculations, etc. which enhance the overall learning experiment.

- 50 Online labs developed and hosted on OLabs portal. 20 Online labs are integrated on Diksha Platform.
- OLabs mobile app (version-3) is hosted on Mobile Seva app store and Google Play Store and OLabs Android app is available on the mSeva App store.
- OLabsThon - OLabs hackathon conducted. 65 teams registered across India.
- OLabs offline version is deployed in 5 schools of Maharashtra and Gujarat.
- OLabs shared with EMRS schools for deployment of Olabs in 175 EMRS schools.
- 1822 teachers trained across India.

Olabs

Structured Assessment for Analysing Learning (SAFAL)

Under the new National Education Policy (NEP), the Central Board of Secondary Education (CBSE) is proposing to conduct a nation-wide test SAFAL for numeracy and literacy of students in classes 3, 5 and 8. C-DAC has developed and deployed secure, scalable and reliable software solutions for SAFAL. The main system functions include online school enrolment, student enrolment, question banking, exam blueprint management, online and offline exam conduction, automated grading, reporting and analytics. It consists of two main components: the SAFAL Portal and the School Server. The SAFAL Portal is hosted on the C-DAC Noida Cloud platform. The School Server is installed on a computer at each participating school. The framework has been developed and delivered to CBSE enabling successful conduction of SAFAL 2024-25 diagnostic assessments at 8,801 CBSE schools across India and 154 CBSE schools abroad.

Structured Assessment for Analysing Learning (SAFAL)

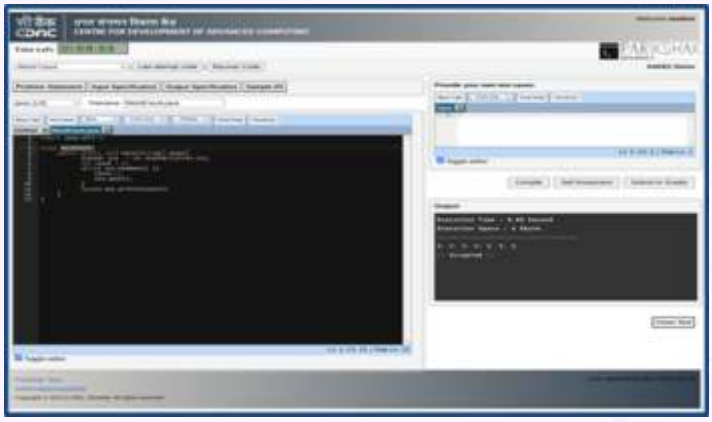
OBjective Response Image Based Capture (OBRIC)

OBjective Responses Image based Capture (OBRIC) is a web-based system for processing of objective type tests conducted using specially designed answer sheets. OBRIC can process scanned images of response sheets (and does not require a special OMR scanner) and display processed output as per user requirement. It uses image processing to identify ovals and shading within the oval. It is a fast and effective solution for multiple choice-based exams and data collection. The system has also been used for conducting Indian Coast Guard and Central Bank of India for recruitment examinations.

Objective Responses Image based Capture (OBRIC)

Parikshak - an automated program grading tool

Parikshak facilitates automated evaluation of software programs which is otherwise tedious and time-consuming to evaluate manually. It provides support for programs written in Java, C, C++, Perl, PHP and Python and plagiarism detection in student submissions. It has a facility for live monitoring of exams and assignments. It is deployed at IT Goa, Shah & Anchor Kutchhi Engineering College. The system has also been used for conducting SEBI and Central Bank of India for recruitment examinations.



Parikshak - an automated program grading tool

MeghSikshak Learning Management System (LMS)

Maharashtra University of Health Science (MUHS), Nashik being a state Government University is mandated to offer credit based online courses in the health care domain to the students studying in the university and in the affiliated colleges. For offering these courses, C-DAC has designed, developed and implemented MeghSikshak LMS as per the requirements of Maharashtra University of Health Sciences, Nashik.

- Trained 5,000 medical interns across Maharashtra.
- Hosted 12 certificate courses in digital health for interns and in-service doctors.
- 3,500+ interns completed all course components and received credit-bearing certificates.
- Recently launched a 6-month blended course titled "Certificate Course in Digital Health (CCDH)"

Shaala Darpan for Navodaya Vidyalaya Samiti (NVS)

ShaalaDarpan is an end-to-end e-Governance solution for school and office automation. The system has been implemented in Navodaya Vidyalaya Samiti. Jawahar Navodaya Vidyalayas (JNV) managed by Navodaya Vidyalaya Samiti (NVS) are premier residential schools that bring out the best of rural talent. ShaalaDarpan covers all the 661 Vidyalayas, 8 Regional Offices and 8 National Learning institutes and head quarter of the Samiti. It is a single integrated platform for information sharing and knowledge dissemination; catering to 22000+ employees and over 2 lakh students of the Samiti.

This software developed for NVS has helped in increased transparency, Unified, Dynamically Integrated, maintained view of data, Improvised & Controlled information dissemination and increased inter school collaboration.

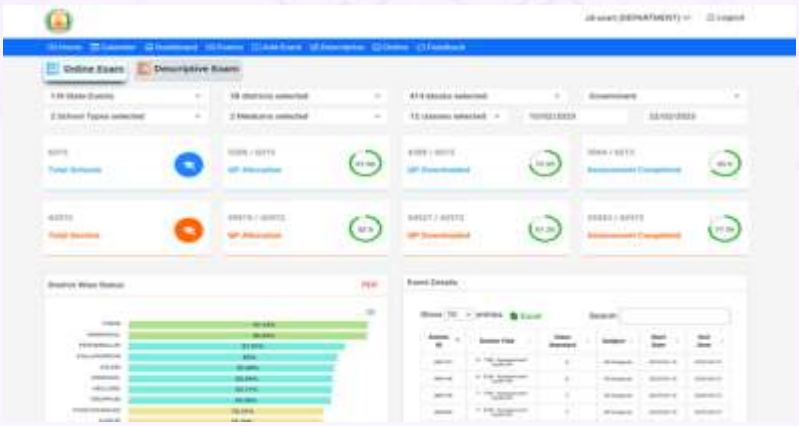
e-Akadamik Solution

An online counselling & admission system "e-Akadamik Solution" is a digital web-based platform or software designed to streamline the process of counselling and admissions in educational institutions and also support services to students. This type of solution is commonly used by schools, colleges, universities, and other educational organizations to manage the entire admission lifecycle, from initial inquiry to enrolment. It offers a comprehensive platform for educational institutions to manage student enrolment processes efficiently while providing accessible and supportive counselling services to students. This web solution enhances the efficiency, transparency, and accessibility of the admission process, providing a convenient and user-friendly experience for both applicants and educational institutions.

e-Akadamik Solution is deployed at Punjab State Board of Technical Education & Industrial Training (PSBTE), Punjab, Himachal Pradesh Takniki Shiksha Board, Dharamshala (HPTSB), Himachal Pradesh, Directorate of Technical Education Vocational and Industrial Training (ITI), Sundernagar, Himachal Pradesh and Sardar Patel University, Mandi, Himachal Pradesh.

BOSS Based Student Assessment & Management System

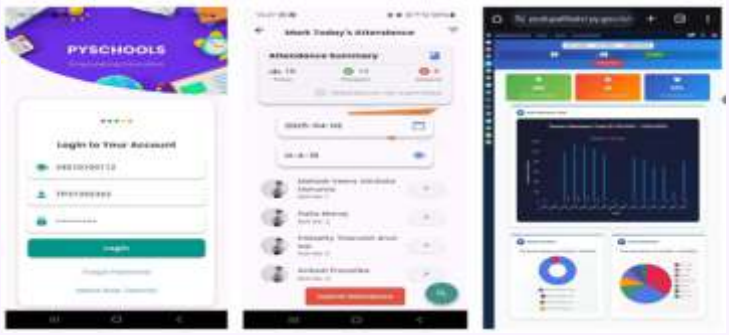
The BOSS-Based Student Assessment Solution, is an integral part of the Samagra Shiksha initiative in Tamil Nadu. This advanced assessment platform is designed to evaluate student proficiency and learning outcomes for students from 6th to 12th grade. The solution aids the School Education Department in achieving its goal of improving educational quality by providing a robust, scalable, and secure digital assessment system. It has features like Flexible Event Creation, Online Exam Module, Operational Dashboard, etc. It provides support for Descriptive PDF-Based Exam Conduction.



Application dashboard

School Management System (ERP)

It is a central system for monitoring and assessing school, teacher and student data, providing not just high level but granular view into the schools. It has features like Mobile Application for Student Attendance Marking, Teacher Leave Marking, Dashboard to Visualize Attendance Statistics, Student Assessment, Report Card and Examination Data Monitoring, etc. It is deployed for usage by Directorate of School Education (DoSE), Pondicherry and all schools under DoSE, Puducherry in Union Territory.



School Management System (ERP)

New Initiatives

Design and Development of school Management system, office ERP and Integrated content Management Portal

Eklavya Schools setup by NESTS are model residential schools that are spread all over the country with the aim to provide quality modern education to the talented tribal children predominantly from the rural areas. Currently 405 schools are operational and managed by 28 state societies and 1 Head Quarter. National Education Society for Tribal Students (NESTS) desire to automate its manual system of processes followed in the Eklavya Schools, where the chances for error are substantial. The amount of paper work done is very bulky to handle with the current number of available staff who consequently plays multiple roles. The developed system will be integrated with Bhashini and Digilocker. Roll-out of the system will be implemented in the schools.

Electronics & ICT Academy Phase II

Major objective of this project is to design, develop and deliver specialized FDPs on emerging technologies/niche areas/specialized modules, besides multi-disciplinary areas on digital hybrid domains/ ICT tools & technologies for engineering, non-engineering colleges, ITIs, polytechnics, etc. It will help to promote synergy and collaboration with industry, academia, universities & other institutions of learning, especially in emerging technology areas and support positioning India as a global hub for ESDM, including MeitY Schemes/policies.

Cyber Security

C-DAC has established itself as a trusted provider of cybersecurity products and services, particularly within the government sector. C-DAC addresses the full spectrum of cybersecurity domains, including application security, cloud security, critical infrastructure protection, data security, endpoint protection, IoT security, mobile security, network security, and cyber forensics.

As a CERT-IN empanelled agency, C-DAC plays an active role in conducting audits and assessments to bolster national cyber resilience. C-DAC is continuously evolving its technologies, products, and services - integrating Artificial Intelligence (AI) and Machine Learning (ML) to enhance existing solutions and meet the rapidly changing cybersecurity needs of the nation. Various solutions developed by C-DAC in this area are as below.

Cyber Security Solutions

InTrust

Zero trust is a cyber security paradigm focused on resource protection and the premise that trust is never granted implicitly but must be continually evaluated. The Zero trust model moves away from the traditional perimeter approach and instead assumes that none of the internal and external network entities are trustworthy.

InTrust is an indigenous asset, traffic and automatic vulnerability assessment system for Zero Trust Network developed by C-DAC based on the support and funding from MeitY. InTrust can cater to all enterprise and e-governance networks where security and transparency of the assets are critical to the organization such as Defence, LEA, Govt., etc. InTrust automatically keeps track of the list of assets, operating system, services and brings out the security posture. Based on the inputs collected from the host and network, Intrust detects and notifies the attacks and anomalies targeting the network. It can also detect and track the activities from new and rogue devices that are connected to the network. Communication from a host to a blacklisted IP, URL and anonymous IPs are also detected and notified by Intrust.

InTrust

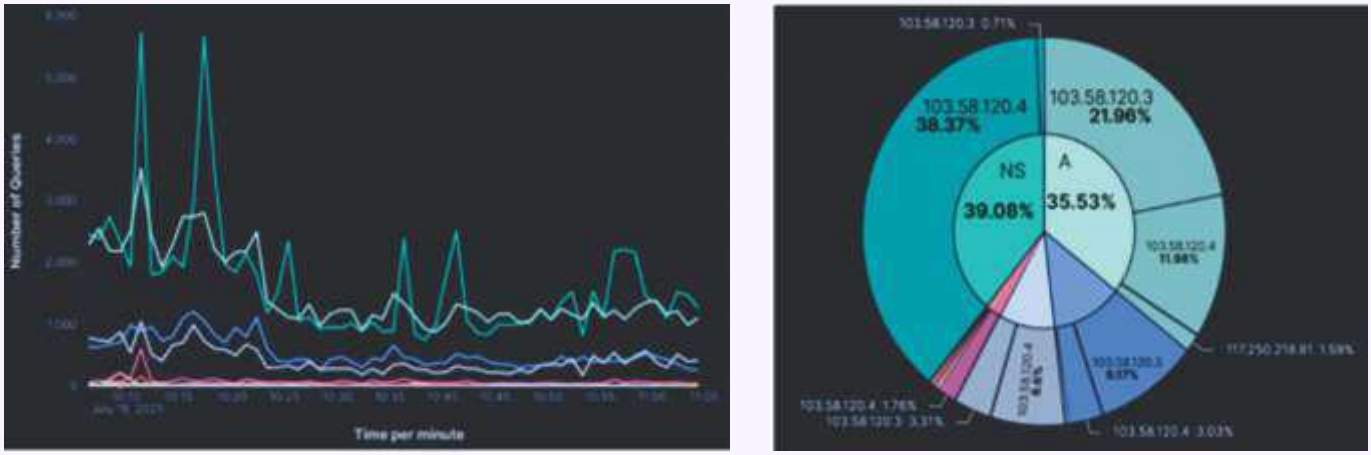
Rakshak DNS

DNS service is a mission-critical network component, a fact which has not gone unnoticed to hackers. In recent years, a high pace of attacks targeting DNS servers has been observed. The nature of DNS threats is quickly evolving, and attacks have become highly sophisticated based on distributed, multi-vector and multi-stage assault models. Traditional DNS security solutions have to be improved on their insufficiencies. As a result, a new and continuously improving approach to security is required for preventing network outages and potential data theft that could significantly impact a business. DNS monitoring has to be part of the security strategy and is key to keeping track of

DNS activity for forensic purposes. One of the key ways organizations and individuals can bolster their defenses is through enhancing security measures at the DNS (Domain Name System) level.

Rakshak DNS is a safe, secure and protective DNS strengthening cyber security posture at its level. Rakshak DNS integrates AI-powered built-in threat intelligence into DNS services offering a powerful advantage, enabling a near real-time analysis and response to a wide range of cyber threats. The system is capable of detecting malicious domains automatically, allowing for swift prevention of access to malware-laden links, phishing websites and other malicious domains. By identifying harmful sites before they can cause damage, this intelligent solution significantly reduces the risk of breaches and data loss.

The Rakshak DNS comes with the following threat indicators to help Network Administrators prevent attacks by proactively identifying threats.



Rakshak DNS Dashboard

Together, these features create a comprehensive DNS threat intelligence that addresses both the prevention and detection of cyber threats at the DNS level while safeguarding user privacy. By adopting such multifaceted DNS security solution, organizations can stay one step ahead of attackers and maintain trust in their digital infrastructure.

Establishment of a National Facility for Security Testing, Evaluation and Certification of IoT Devices and Embedded Systems

The project envisages the development of capabilities and capacities for evaluating the security of Consumer IoT devices by testing its hardware, firmware and communication aspects in compliance with Industry standards. As a part of the same, Security Testing and Evaluation Lab for the Internet of Things (STEaLTh) is established at C-DAC Hyderabad and STQC New Delhi, comprising essential tools and techniques for undertaking comprehensive IoT Device Security Testing. Grading scheme for IoT Device Evaluation is conceived and framework for scoring IoT devices is developed. Protection Profile for Smart Surveillance camera is developed and submitted to STQC for review and certification. Handbook on IoT Device Security Evaluation has been launched which is a comprehensive guide containing security evaluation procedures for IoT Devices targeting hardware evaluation, firmware evaluation and wireless communication evaluation with case studies and associated security evaluation tool manuals.

CDACSIEM

CDACSIEM is a comprehensive security solution having a data aggregator which gathers immense amounts of log data from the entire networked environment, normalizes and applies analytics, as well as provides complete visibility of security to the SOC analyst. It is a centralized solution that enables detection and allows for investigation while

providing insight visibility. This solution enables security analysts to be more effective and efficient in their job of protecting the organizational digital assets and IT systems.

The primary function of the CDACSIEM is to analyse the logs coming from various sources and detect any kind of malicious activity that communicates over HTTP/ HTTPS, including websites, API endpoints, network, and server less functions. Patterns are analysed which are obtained from different logs and the information is provided to the security concerned. These will be standardized in the STIX/TAXII format so that the information can be shared over with the other security devices /organizations /frameworks.

CDACSIEM has been successfully deployed at various organisations including C-DAC Noida Data Centre, JNPT Mumbai, NSDCL New Delhi, Madhya Pradesh Vidyut Vitaran Company Ltd., ITPO Delhi, MHA Agency – Project 22, Mormugao Port Trust, Goa, RCI, Hyderabad, Panjab University, Chandigarh, NPA, Hyderabad and C-DAC Centres.

CDACSIEM Dashboard

Tools for Conformance Testing of SCADA communication protocols for security

C-DAC has developed tool for conformance and interoperability testing of SCADA communication protocols to ensure their security, aligning with the relevant standards: IEC 62351-5, IEC 62351-3, and IEC 60870-5-104, adhering to their corresponding conformance testing standards (IEC 62351-100-1, IEC 62351-100-3, and IEC 60870-5-604) with features of report generation and pass/fail status.

Critical Infrastructure Protection framework

Critical infrastructure is the key asset in the development of a nation. In order to achieve efficiency and improvements, connectivity with the internet has also increased. With increase in connectivity and convergence of utility industries to the internet, the scopes of attacks are also increasing. In recognition of these trends and potential threats, this project is focused on developing a framework for critical infrastructure protection (CIP) consisting of two modules, namely Asset Management Tool and Security Operations Centre.

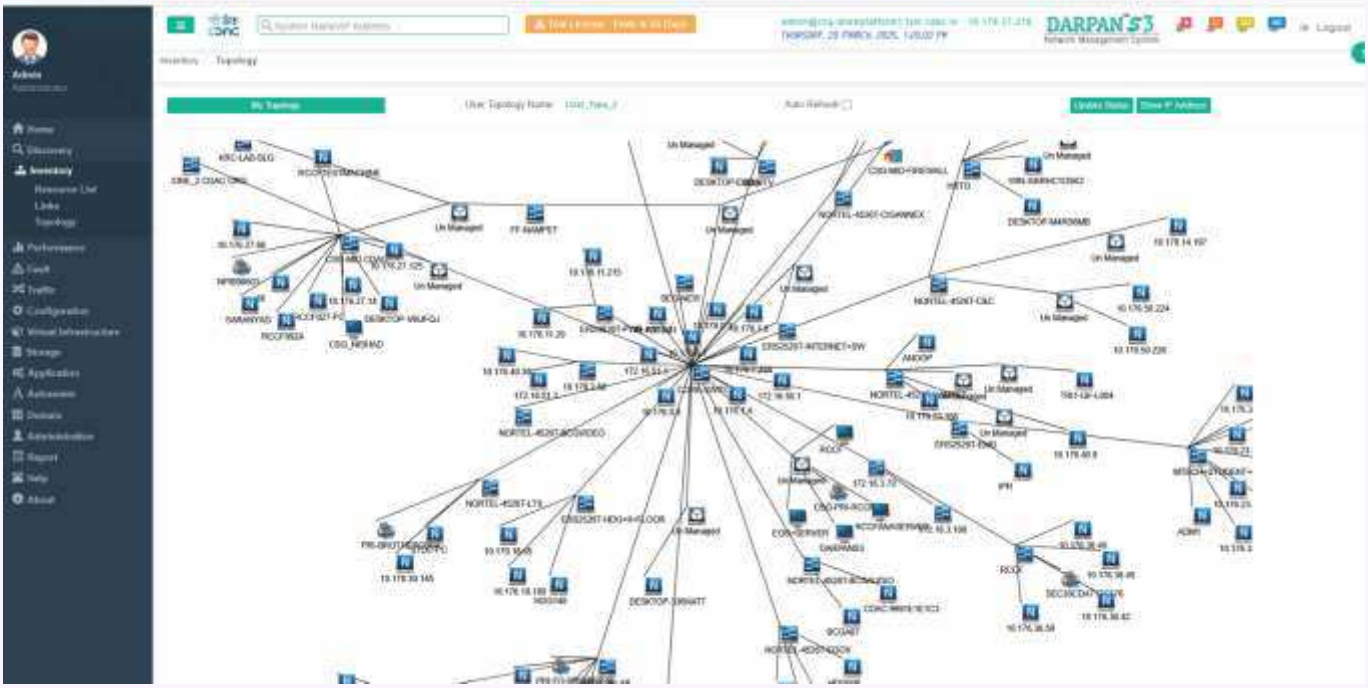
Asset management tool for inventory and monitoring in Industrial Control System networks works in non-intrusive and real time provides asset owners the ability to leverage their existing ICS and network infrastructure and investments to gain operational, compliance, asset inventory, network, and cyber security benefits.

Security Operations Centre (SOC) incorporates the incident detection and security incident response process by finding the anomalies in the environment and reducing response time of security incidents from initial finding to tracking to reporting.

DARPAN Network Management System

DARPAN NMS is a comprehensive vendor-agnostic Network Management solution with its state of art features covering Fault, Configuration, Accounting, Performance and Security management. DARPAN's out-of-the-box policy-based solution allows autonomic network management through its Self-Configuration, Self-Healing, Self-Optimisation and Self-Protection functions. The feature rich report engine of the solution supports a wide variety of near real time statistical and historical reports. DARPAN NMS also have a variant that is specifically designed for Data Centre Management. It is deployed in many nationwide & state-wide networks including data centres.

Major Features are Network and Topology Discovery, Configuration and Performance Management, Traffic Analysis, Event and Log Management, SLA Management, Server and Hypervisor management, Application, and Database management.



DARPAN NMS

DARPAN -V (Virtual Network Solution)

DARPAN V is a secure and agile SDN-enabled Virtual Network Function (VNF) solution that combines SD-WAN functionality with centralized orchestration and advanced network management.

The solution comprises SDN-enabled network edge platforms managed by a centralized service orchestrator. The edge platform supports the deployment of software-based network functions and can be dynamically configured through the orchestrator. This flexibility allows the edge device to function as a router, switch, firewall, or any combination thereof. Such adaptability eliminates the need for multiple specialized network devices, thereby reducing both capital expenditures and ongoing maintenance costs.

DARPAN V supports the dynamic use of multiple transport types—including Internet, MPLS, and mobile broadband—simultaneously. It also enables High Availability (HA) and High Throughput (HT) configurations, ensuring reliable and scalable WAN connectivity.

SARAN Service Desk Platform

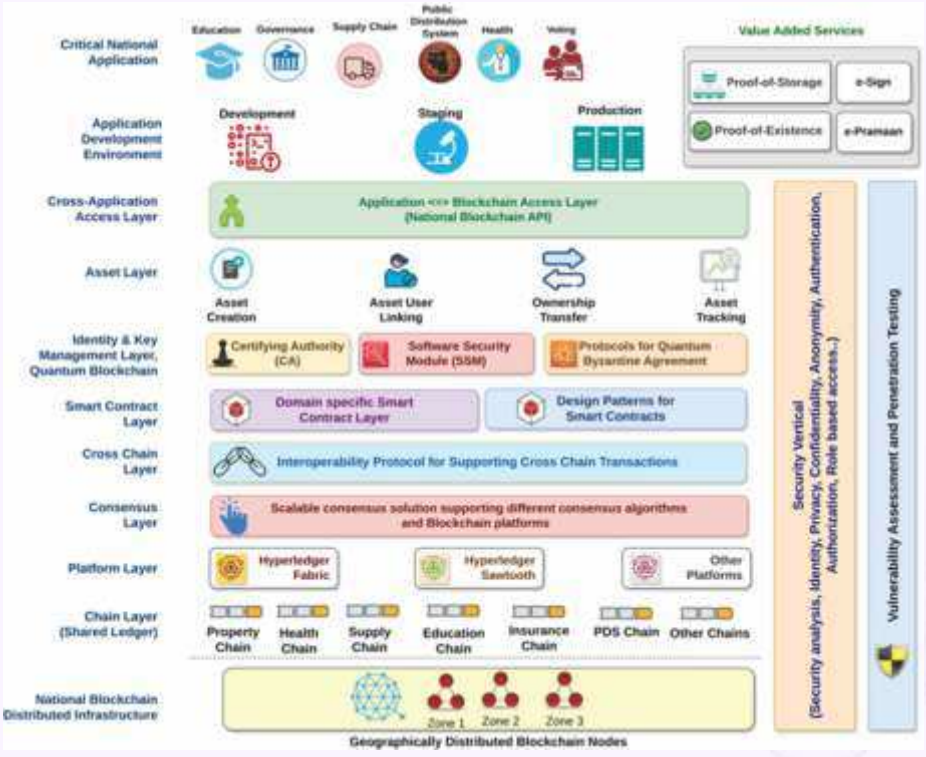
SARAN Service Desk Platform is a service desk solution, designed to be user-friendly, cost-effective, and efficient. It is well-suited for both enterprises and government departments. Featuring an intuitive web-based interface, the system enables centralized control and automation of service desk functions, significantly improving IT support and service delivery efficiency.

Major Features are that the SARAN Service Desk System supports multiple profiles such as Incident Management, Problem Management, Configuration Management, Asset Management and Change Management. Also, it has features such as Multi-tenant Architecture, Customizable and Automated Workflow, Customizable ticket templates for different types of service requests, Multiple level authentication, Ticket Prioritization, Rule-based Service Level Agreements (SLA), Automatic escalations, Knowledge base, Feature rich dashboard for quick insight, Extensive search and filtering capabilities, Comprehensive Analysis and Reporting, Email/SMS Notifications, and LDAP Support.

Blockchain based Solutions

Vishvasya - National Blockchain Framework (NBF) Technology Stack

Vishvasya, NBF Technology Stack has been designed and developed for deployment with several components such as dashboard for automated network setup, generic smart contract layer (templates and design patterns), authentication and authorization functions, certifying authority and enabling the same through Open APIs. The technology stack of NBF has Smart Contract Library for different application domains such as Supply chain, Insurance, Asset Management and Drug Track & Trace. Security Vulnerability assessment test suites for auditing smart contracts is included. It was launched by the Hon'ble Secretary, MeitY, Shri. S Krishnan on September 4, 2024 for large scale adoption of Blockchain application development. It is deployed on geographically distributed Infrastructure at NIC data centres and being utilized in developing Blockchain applications for various Government departments across the country.



Vishvasya – NBF Technology Stack

Launch of Vishvasya – NBF Technology Stack by Shri. S Krishnan, Hon'ble Secretary, MeitY

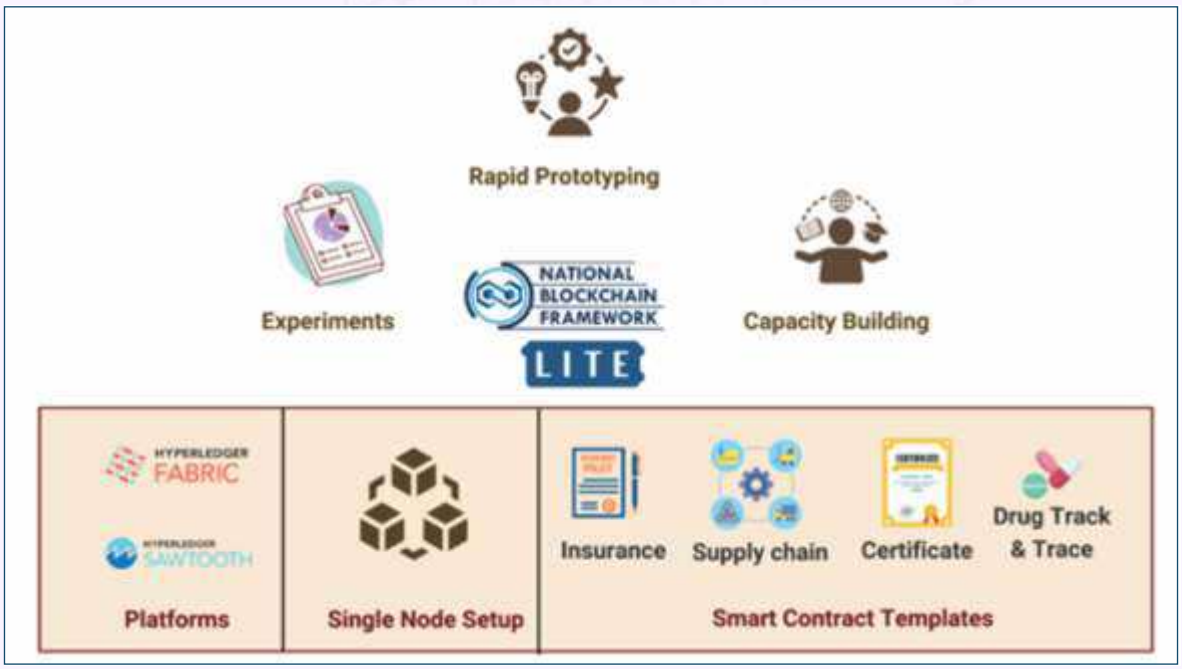
Praamaanik

Praamaanik is powered by Blockchain technology to verify app origins, promptly alerting users about apps from unknown sources and ensure enhanced security and mitigate app origin-related concerns. It has features like immutable ledger of mobile app fingerprints, single source of truth for mobile app authenticity, etc. It was launched by the Hon'ble Secretary, MeitY, Shri. S Krishnan on September 4, 2024 for large scale adoption of Blockchain application development. It is deployed on Geographically distributed Infrastructure.

Praamaanik

NBFLite

It is a lightweight National Blockchain Framework bundled & offered for rapid prototyping of Blockchain applications, carrying out research and learning. It was launched by the Hon'ble Secretary, MeitY, Shri. S Krishnan on September 4, 2024 for large scale adoption of Blockchain application development.



NBFLite

Blockchain based service level training record solution

Blockchain based solution to have an immutable record of all the documents and certificates issued during various training programs conducted at Sardar Vallabhbhai Patel National Police Academy (SVPNPA) for a particular IPS officer. Authorized officials can access the training details of the IPS fraternity from this solution. It has features like tamper-evident storage of certificates by SVPNPA and available for future verification by IPS Fraternity and Authorized officials. It was launched by Union Home Secretary, Shri Govind Mohan on February 8, 2025 at SVPNPA, Hyderabad.

Blockchain based service level training record solution

New Initiatives

Design and Development of Common API for DSC Tokens & Methods

Crypto token or DSCs are increasingly being used nowadays for ascertaining certain important security aspects. In addition to this, the user must also not be overwhelmed by the complexity of all this. The users of Crypto tokens must also be abstracted from these complexities and concerns. The ecosystem of the crypto token validation and usage must be seamless and easy for development and use.

Towards the same, C-DAC is executing the project for design and development of Common API for DSC Tokens & Methods to fetch the number of Digital Signatures Signed through DSC. The major objective of the project is to develop a Generic System/Platform. The expected outcome will be Generic Device Manger software that can be accessed by control function.

Cyber-Forensic Framework for User-Centric Human Threat Intelligence Analysis – Threat Identification

Bridging the gap between human-centric analysis and computational social science, it provides deeper understanding of human thread by Behaviour Analysis, Forensic Psychological Analysis, Anomaly Detection, Adaptive Systems, Human-Centric Approaches and Privacy Considerations. C-DAC has initiated this project in collaboration with NFSU Gandhinagar and RLA Collage Delhi University. The expected major outcome of the project will be a comprehensive cyber-forensic framework for user-centric profiling as well as Forensic-Psychological design and study on criminal profiling. As a part of the same, integrated web-based dashboard as a data analytics will be developed for event-reporting and monitoring.

A Comprehensive IoT Security Ecosystem and Sandbox

It is critical to ensure security of IoT ecosystem addressing the security requirements at different devices, protocols and network technologies. As IoT based solutions continue to evolve and going to bring lot of benefits to human lives, there is a need to enable end-to-end security addressing the continuously evolving security threats. This project will culminate in a sandboxed environment where multiple devices can be brought in for testing and evaluation, leading to development of capacities, capabilities and indigenous tools for security and functionality evaluation of IoT devices. An operational IoT Sandbox facility will be developed for functional and security evaluation of IoT devices, targeting multiple application domains and containing a suite of indigenous security testing tools. The project will be executed in collaboration with IIT Madras, IIT Bombay, IIIT Bangalore, SETS Chennai, Amrita Vishwa Vidyapeetham and ERNET, Chennai.

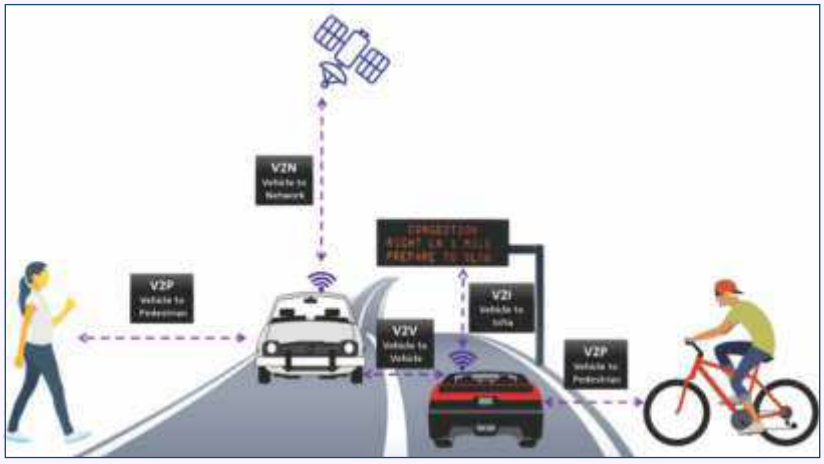
Automotive and Communication Technology

C-DAC is actively contributing to the advancement of automotive technologies, with a strong emphasis on autonomous systems and intelligent transportation solutions. These technologies are designed to enhance vehicle-to-infrastructure (V2I) communication and support the broader vision of connected and autonomous mobility. Through these efforts, C-DAC aims to enable safer, smarter, and more efficient transportation ecosystems. Some of the notable automotive technology solutions developed by C-DAC are as given below:

Automotive Technology

Indigenous C-V2X Platform for Connected Vehicles and V2X Applications

C-DAC has indigenously developed a C-V2X (Cellular Vehicle-to-Everything) communication platform that enables direct, low-latency communication between vehicles, infrastructure, and pedestrians enhancing road safety, traffic efficiency, and the overall transportation experience. At the core of this platform are the indigenously developed On Board Units (OBUs) and Road Side Units (RSUs), along with complete software stacks compliant with both IEEE 1609.x and ETSI V2X standards. OBUs, installed in vehicles, enable real-time data exchange with other vehicles and infrastructure, while RSUs, strategically deployed along roadways, facilitate seamless interaction with the surrounding environment. The standards compliant architecture ensures interoperability and robust performance across a wide range of Intelligent Transportation System (ITS) applications.



C-V2X Ecosystem

C-DAC On Board Unit (OBU)

C-DAC Road Side Unit (RSU)

CV2X Hardware Adapter for Traffic Signal controller (CV2X HAT)

C-V2X (Cellular Vehicle-to-Everything) enables real-time communication between vehicles, infrastructure, pedestrians, and networks through cellular and direct links. When integrated with traffic signal controllers, it improves road safety, traffic efficiency, and urban mobility. CDAC has developed a hardware adapter to upgrade existing traffic signal controllers for C-V2X compatibility. This solution enables seamless communication between traffic infrastructure and vehicles, supporting use cases like real-time signal status dissemination, emergency vehicle pre-emption, bus priority, pedestrian safety, Green Light Optimum Speed Advisory (GLOSA), and collision avoidance at intersections. Currently, the product is installed in three junctions in Bengaluru to provide signal pre-emption for emergency service vehicle.

Traffic Signal Controller (CUTE-NG)

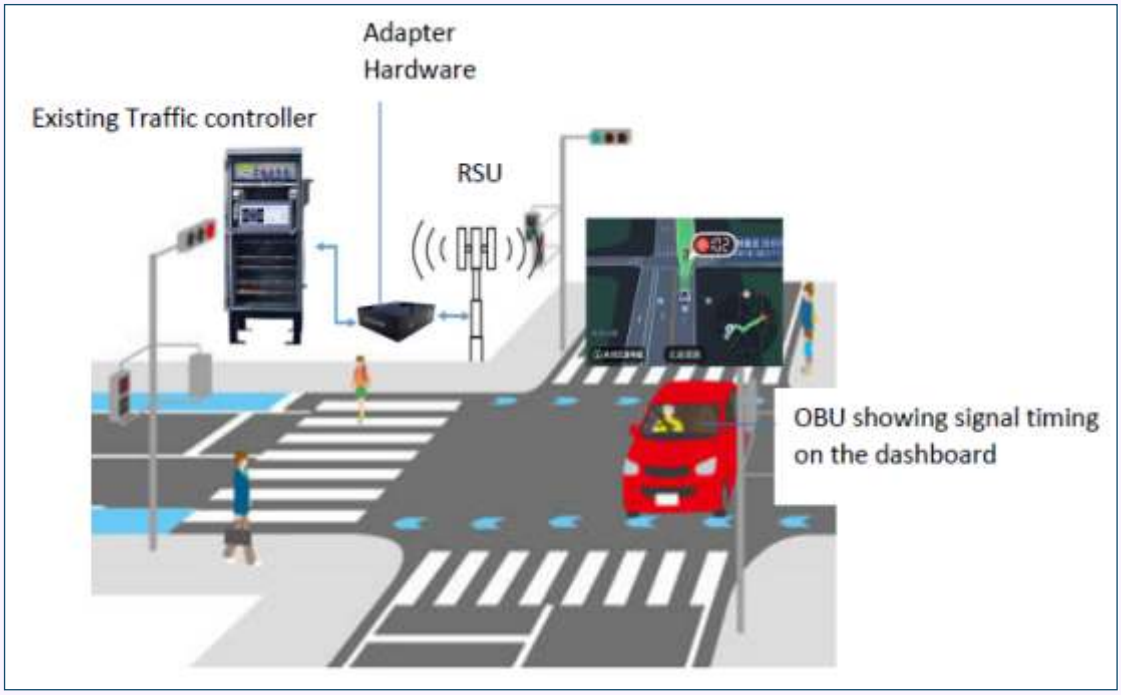
CUTE-NG is a 64-bit stand-alone, demand-actuated traffic signal controller designed for real-time traffic analysis and adaptive signal control using AI/ML algorithms. Built on SMARC architecture, it allows seamless processor upgrades for future enhancements. It supports key features such as emergency vehicle pre-emption, transit signal priority, and crowd sourced data driven traffic signalling. The controller connects to central server software for signal coordination and city-wide traffic management. CUTE-NG is currently being used in smart cities for dynamic traffic control, emergency corridor management, public transport prioritization, and real-time data-driven traffic signal optimization, significantly improving road safety and reducing congestion.

Traffic Signal Controller (CUTE-NG)

Enhancing Road Safety with an Edge-integrated Driver Drowsiness Detection System

Next Generation Driver Assistance Systems (NG-DAS) are developed to enhance road safety through advanced technologies such as computer vision and edge computing. As part of this integrated platform, the Driver Drowsiness Detection System (DDDS) module is designed to continuously monitor the driver's level of alertness in real-time, helping to prevent accidents caused by drowsiness. The developed system takes input from a camera feed which is focused on the driver, upon those accurate detections are performed. Built with a user-centric and adaptable architecture, the system includes a custom dataset tailored for this task. Using this dataset, an end-to-end deep learning-based object detection model was trained and subsequently deployed on an edge device. The edge-based implementation ensures low latency, improved reliability and makes critical safety decisions independent of outward connectivity. With the edge-computed design, the DDDS module can be seamlessly integrated across various vehicle

platforms. The system can detect drowsy and awake state of driver. By detecting early signs of fatigue, the system enables proactive intervention to enhance driver awareness and promote safer driving conditions.



Next Generation Driver Assistance Systems (NG-DAS)

PKI Based Security for Automotive Electronic Components

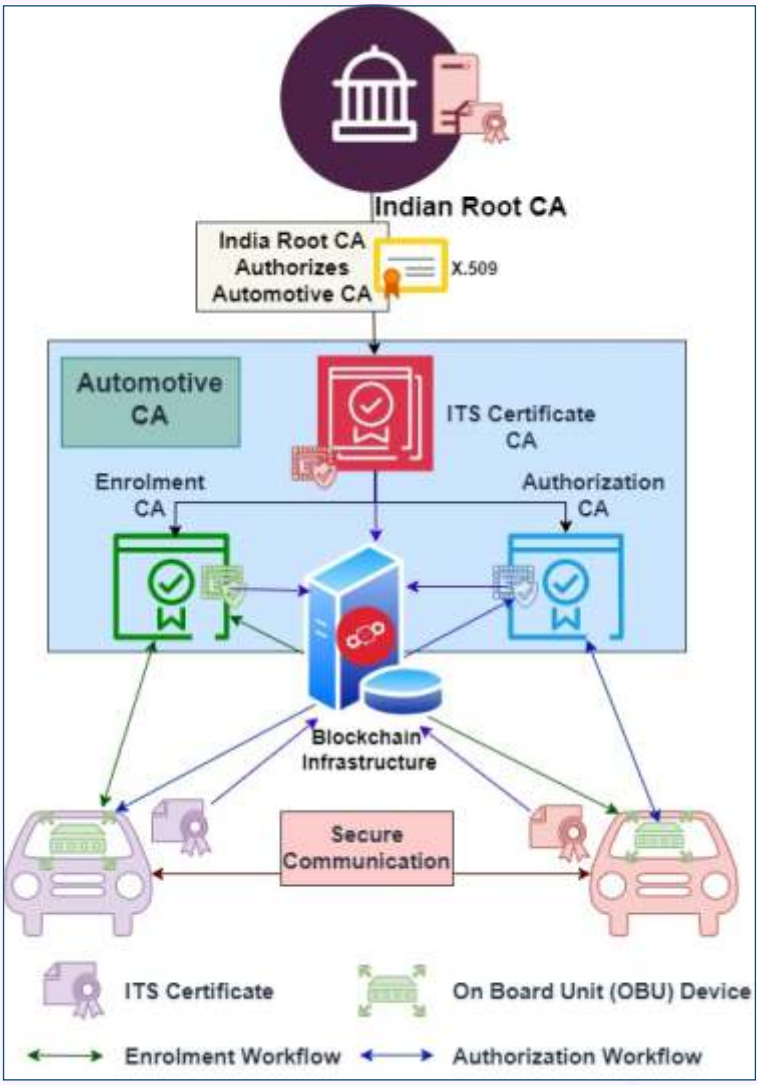
Vehicle's electronic systems security is an important concern with fake or malicious components coming into the vehicle network. This work explores the PKI-based solutions to address the problem. This platform delivers robust protection by issuing digital certificates to essential components like ECUs, gateways, and infotainment systems, etc., using an In-Vehicle server, ensuring secure and trusted communication throughout the vehicle network. Additionally, it can also verify the authenticity of third-party systems that are integrated into the vehicle for securing the in-vehicle network ecosystems. Using this cutting-edge scalable security solutions specifically designed for the automotive industry, OEMs can confidently maintain the integrity of the vehicle's communication systems and protect them from evolving threats.

The activity is being executed under the funding of CCA, MeitY in collaboration with TVS Sensing solutions. The PKI-based security for automotive in-vehicle units developed by C-DAC Bangalore, integrated with automotive components from TVS Sensing Solutions, was installed for state-of-the-art demonstration as part of the National Centre for Digital Trust at C-DAC Bangalore.

PKI-based security for automotive in-vehicle units

Security Credential Management System for Connected Vehicles

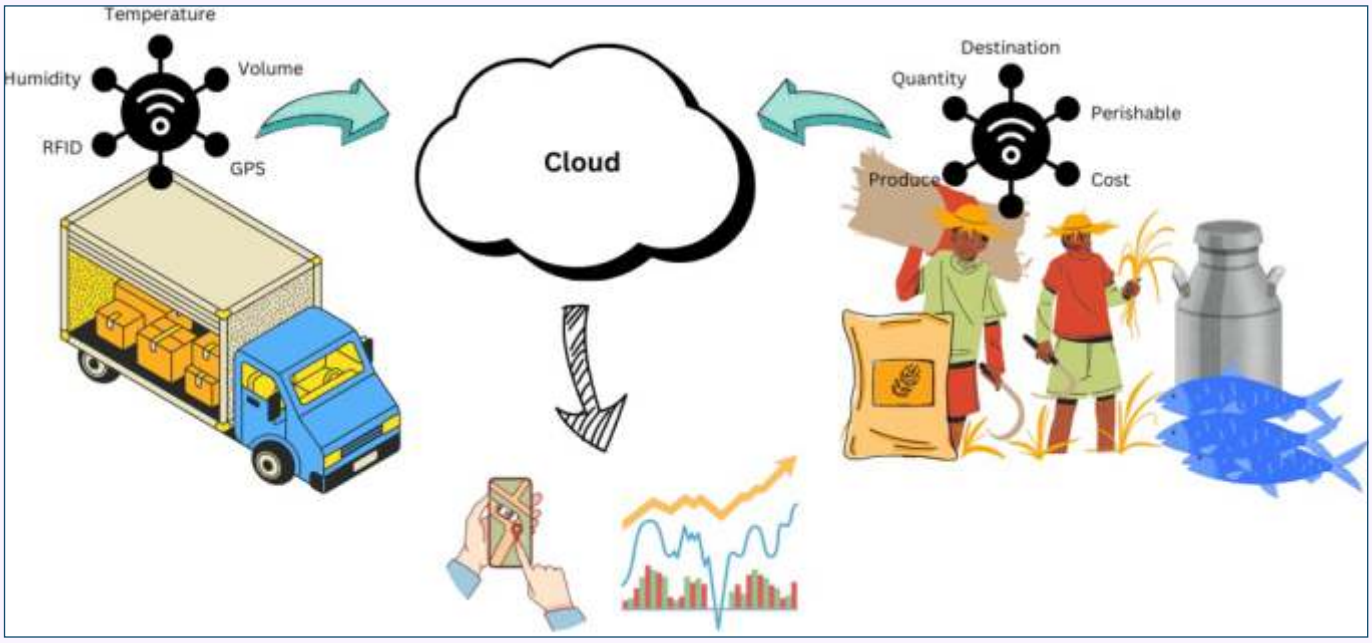
C-DAC has developed a framework for Public Key Infrastructure (PKI) based secure communication in connected vehicle systems. This framework follows global standards specified by IEEE and ETSI which are adopted as the essential credential management system for vehicular communication networks. The framework includes the implementation of Certifying Authorities like Enrolment Authority, Authorization Authority and Misbehaviour Authority to manage certificates and build a fabric of trust between all entities associated in dynamic and mobile vehicular environments. The trust methodology is based on IEEE 1609 certificates.



Public Key Infrastructure (PKI) based secure communication Framework

IoT Platform for Enabling MaaS for Transportation of Agricultural Goods in India

The transportation of agricultural goods in India encounters multiple challenges due to sector-specific traits, geographical diversity, and infrastructural inadequacies. Perishable agricultural products necessitate swift transportation, but inadequate cold storage results in considerable post-harvest losses. Investment in cold chain logistics poses financial challenges for small farmers, while poor infrastructure exacerbates delays and spoilage. Farmers often lack digital tools for transportation coordination, complicating timely deliveries and increasing transport costs. To mitigate these transportation challenges, IoT-based logistics platform for effective agricultural transport planning by the deployment of sensors to continuously monitor containers, assessing available space, environmental conditions, and vehicle positioning. Integrating diverse transport modes through MaaS shall significantly enhance logistics efficiency, reducing costs and transit times for agricultural goods.



MAAS Platform

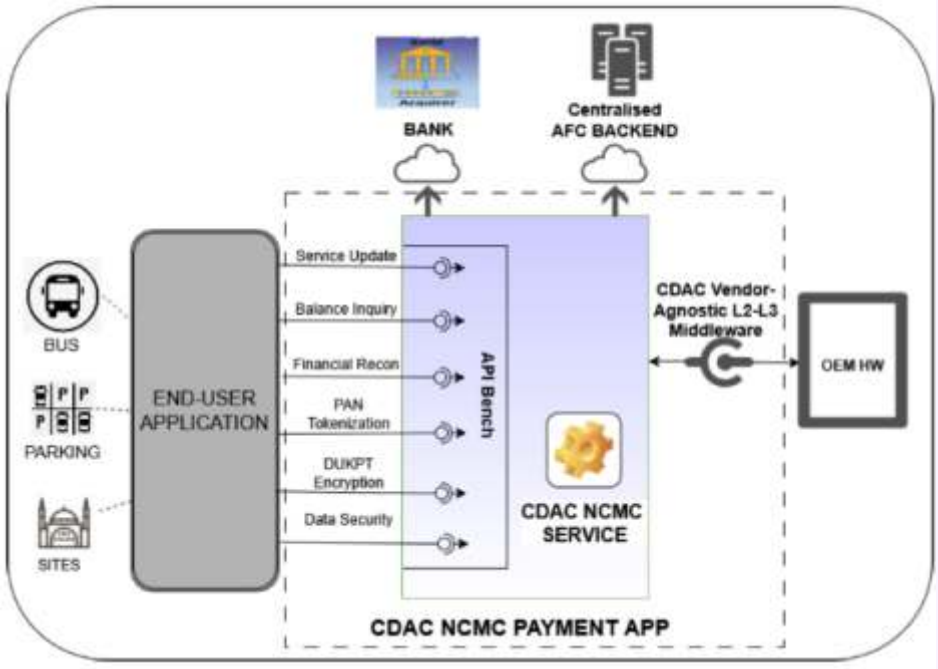
Automotive Board using THEJAS32 Vega Processor

This automotive development board, based on the 32-bit RISC-V VEGA ET1031 (THEJAS32) processor, is designed for robust data communication in embedded and automotive applications. It supports CAN, LIN, RS-422/485, and Ethernet interfaces, with 32 GPIOs, 3 timers, 8 PWM outputs, 3 UARTs, 3 SPI, 2 I^2C, and 4-channel 10-bit ADC. Operating at 100 MHz with 16KB SRAM and 2MB Flash, it runs on 12V input and supports a temperature range of 0°C to 85°C. Ideal for long-distance and in-vehicle data transfer, it enables seamless integration of sensors and external peripherals.

Automotive Development Board

Nation Common Mobility Card (NCMC) Payment App

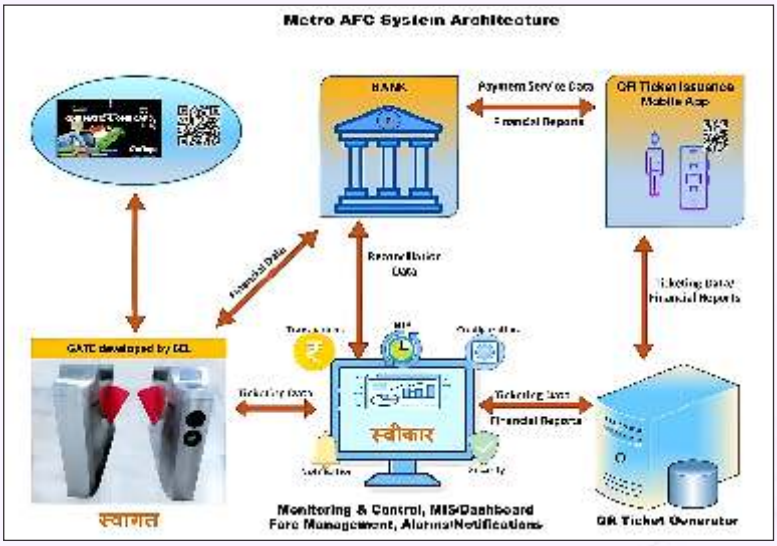
C-DAC's NCMC Payment App enables transit operators to upgrade their ticketing systems for NCMC payments, supporting the Digital India and One Nation One Card initiatives. Launched on February 22, 2024, C-DAC NCMC Payment app is now operating as the primary payment method in 41 parking lots of Chennai Metro Rail Limited (CMRL). CMRL is the first Public Transport Operator using NCMC for their Parking Payment. By May 2025, it recorded more than 2.5 crores transactions worth over INR 6 crore. Key features of C-DAC NCMC Payment app include vendor-agnostic design, plug-and-play deployment, full MoHUA NCMC compliance, and customizable business rules. The NCMC Service Layer manages complete transaction flow, validation, reconciliation, and terminal integration.



C-DAC NCMC Payment App

NCMC & QR compliant AFC Back Office for the Chennai Metro Rail Limited (CMRL).

C-DAC is implementing a QR and Open Loop Ticketing system using NCMC and Account-Based Ticketing. The project includes deploying an AFC Back Office System and Validation Gate Applications across 60 gates. The system supports MoHUA-compliant QR, CMRL proprietary QR and NCMC media, integrates with SBI for reconciliation, and offers real-time transaction tracking, remote gate configuration, and MIS.



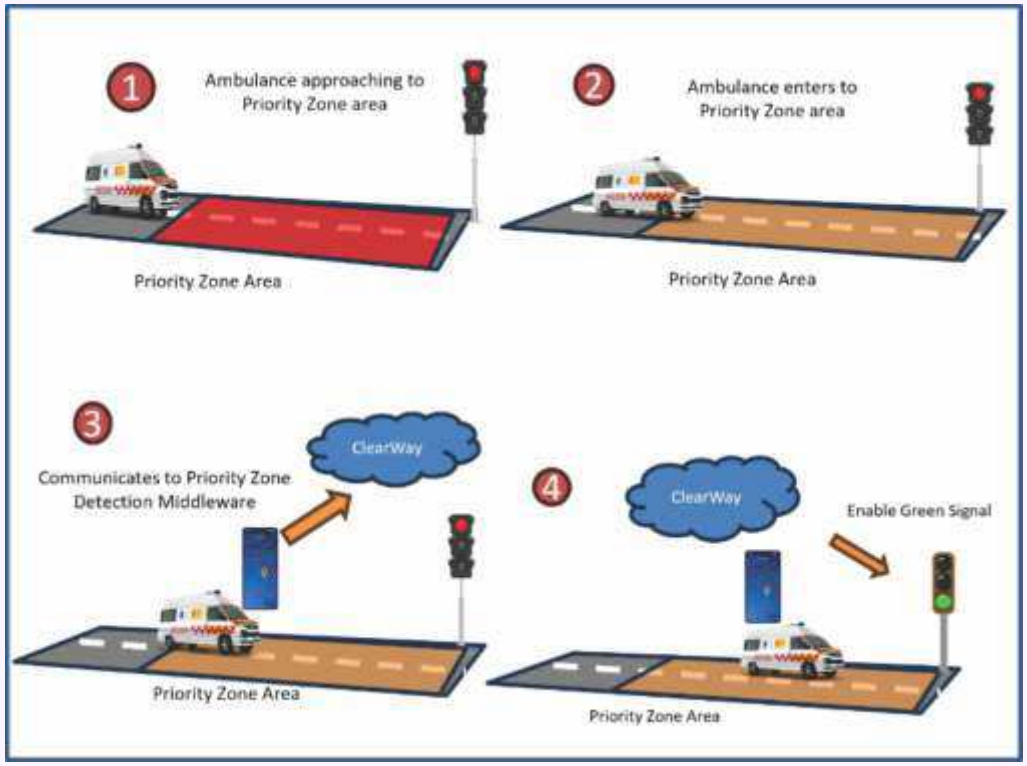
Metro AFC System Architecture

Lab-level implementation is complete with successful demonstrations on three gate types. Components include QR/NCMC validation, ticket issuance and centralized management. Full-scale rollout, integrated with SBI as the acquiring bank, is scheduled across all CMRL stations.

ClearWay-Centralized Traffic Emergency Access Routing with Signal Priority

ClearWay is a cutting-edge, cost-effective solution designed to save lives by addressing critical delays in emergency response caused by traffic congestion. India's high road fatality rates, with 35% of deaths occurring within the "golden hour," highlight the urgent need for faster emergency vehicle transit. ClearWay dynamically provides green signal priority for emergency vehicles at traffic junctions. Utilizing a dedicated mobile app and real-time GPS data, the system intelligently detects emergency vehicles and coordinates with existing Traffic Management Systems. This integration ensures uninterrupted passage, reducing ambulance travel time by 30-40%, especially during peak hours.

The comprehensive ClearWay platform offers features like emergency vehicle enrolment, geo-fence configuration, live tracking, and real-time detection for seamless communication with TMS to activate green lights. By leveraging software and smartphone technology, ClearWay eliminates the need for expensive hardware, offering a smarter, more efficient, and life-saving alternative for emergency vehicle prioritization at signalized intersections.



ClearWay platform

Communication Technology

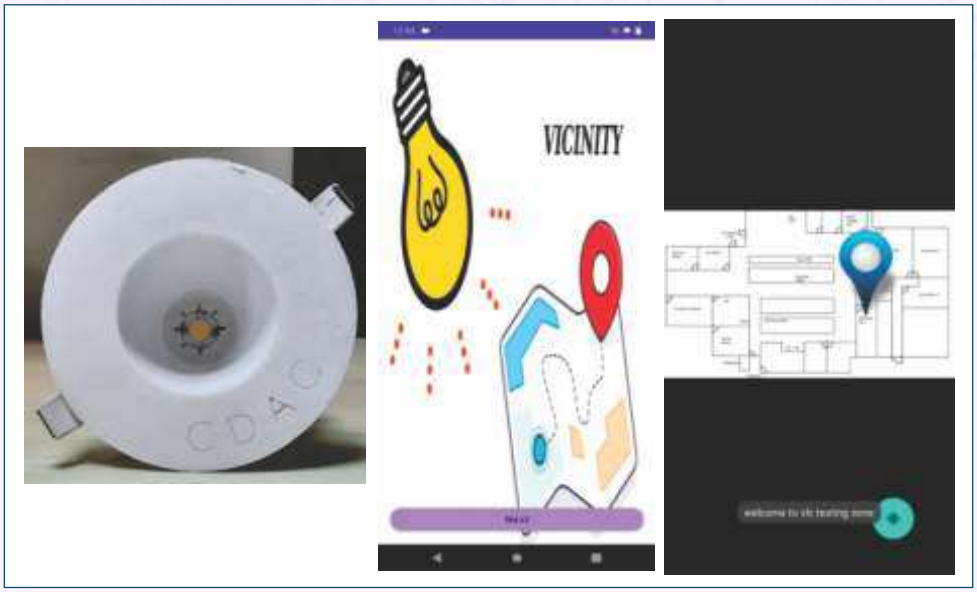
Visible Light Communication

C-DAC has developed two innovative solutions based on Visible Light Communication (VLC) as below:

Indoor Positioning System through Visible Light Communication (NLoS VICINITY)

Smart LED down light fitted in ceilings acts as a VLC Transmitter and image sensor in smart phone acts as a VLC Receiver. Visible Light is used as a communication medium. The data transmitted by the VLC transmitter is captured and decoded by mobile app in a smart phone. Upon decoding the data, mobile app will communicate with server via

GSM/Wi-Fi to get the user location and displays it on map. NLOS-VICINITY represents a leap forward in indoor positioning technology ideal for smart proximity advertising, indoor location-based services and indoor navigation.



NLoS VICINITY - VLC Transmitter (L) and VLC Receiver ®

Visible Light Communication enabled Smart Indoor Lighting System (ILLUMINATE)

Each luminaire is having a Passive Infrared (PIR) sensor and VLC Transceiver module. Luminaries' are grouped together to form zones. PIR is used to sense the occupancy state and visible light is used as mode of communication between the adjacent luminaire. Upon detection of occupancy state under any luminaire in a zone, control command to turn ON all the luminaries' under the zone will be sent via the visible light. Upon detection of non-occupancy state, a luminaire will be turned OFF only when all other luminaire in a zone is non-occupied. ILLUMINATE takes indoor lighting control to a new level of intelligence and sustainability for use in RF free zones.

ILLUMINATE – Quad Directional VLC Transceiver

The technologies, branded as "NLoS VICINITY" and "ILLUMINATE", were successfully transferred to the industry partner, M/s. Nav Wireless Technologies Pvt. Ltd, for further deployment and commercialization.

Development of a Reconfigurable RF-ML Platform for 6G and use case demonstration

This project is being executed under the 6G Accelerated Research Programme of Department of Telecommunication (DoT). The scope of the project includes the development of a reconfigurable platform with a wideband RF front end and baseband accelerators for AI/ML processing. This also includes the demonstration of three uses cases, namely, modulation classification, classification of LTE and 5G signals and digital pre-distortion.

India Open-Source Mobile Communication Network (IOS-MCN)

The India Open-Source Mobile Communication Network (IOS-MCN) project is a collaborative initiative by the Centre for Development of Advanced Computing (C-DAC) - Thiruvananthapuram, IISc Bengaluru, and IIT Delhi, with funding support from the Ministry of Electronics and Information Technology (MeitY). The project aims to develop a production-grade, open-source software stack for 5G and beyond, promoting indigenous innovation and fostering a self-reliant telecom ecosystem in India.

Indian Open-Source Mobile Communication Network

IOS-MCN envisions a robust software platform for next-generation mobile communication (5G/6G), built through a collaborative ecosystem. It seeks to revitalize the Indian telecom landscape by enabling and empowering Indian vendors, startups, and companies to develop and deploy cutting-edge communication technologies.

Through this initiative, IOS-MCN aims to accelerate the development and commercialization of 5G/6G products and services, leveraging the strengths of academia, industry, and government. It strives to harness global open-source communities while establishing a dedicated Indian platform for the co-creation and dissemination of open-source telecom solutions.

The IOS-MCN Consortium offers a neutral, democratic, and trusted forum for translating innovative 5G/6G research into deployable open-source software, ensuring accessibility, transparency, and long-term sustainability for India's telecom sector.

On January 31, 2025, the consortium released "Agartala v0.1.0", the first public build featuring:

- A 5G Core Network Platform
- A Service Management and Orchestration (SMO) layer
- Open RAN compliant RAN (CU/DU)

IOS MCN represents a foundational shift in India's telecom strategy—transitioning from reliance on proprietary global vendors to a home-grown, open, and collaborative ecosystem. With its focus on modular, interoperable, Core and open source RAN, it fosters a new era of innovation, entrepreneurship, and self-reliance in Indian telecom infrastructure.

Power Electronics & Renewable Energy

C-DAC is actively engaged in research and development in the fields of power electronics and renewable energy technologies, with a focus on enhancing energy efficiency and promoting sustainability. Key areas of work include the development of smart grid technologies, intelligent energy management systems, smart meter and EV charging station. These initiatives aim to support the transition to a more resilient and sustainable energy infrastructure. Various solutions developed by C-DAC in this area are as below.

National Mission on Power Electronics Technology (NaMPET)

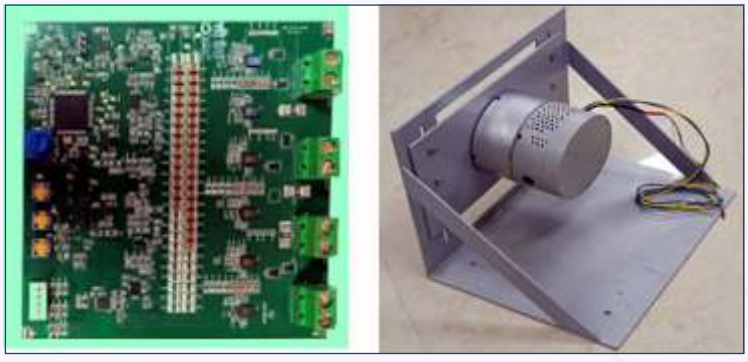
NaMPET, the National level R&D Programme facilitating Research, Development, Deployment and Commercialization of Power Electronics Technology by enhancing the indigenous R&D expertise and infrastructure in the country with active participation from R&D institutions, Academic institutions and Industries. More than 20 Academic Institutions and about 25-30 Industries are actively participating in technology developments and manufacturing through Transfer of Technology (ToT).

During the period, active participation from user agencies, industries and start-ups across various application domain are ensured for the development, deployment, technology transfer and volume manufacturing. As a part of the same, following new technologies and products have been developed and validated:

- High performance WBG MEMS sensors for torque and vibration
- First Indigenous GaO high voltage diode design prototyping
- Low-cost indigenous manufacturing process for high magnetic core power inductor
- WBG Power switch loss estimator (Software Tool)
- Integrated drive for BLDC motor - Compact low power drive for BLDC motor integration
- 30kW liquid cooled PMSM motor design prototyping
- First Indigenous Electrical system emulator - Indigenous design of battery emulation @15kW
- First Indigenous MVB controller for TCN based locomotives- only 2 other solutions worldwide

Integrated drive for BLDC motor - Compact low power drive for BLDC motor integration

Energy efficiency has grown in significance in recent years in order to reduce costs and increase vehicle performance. Because of the losses and maintenance for brushes, conventional dc machines are not desirable for EV. Because of lower efficiency and energy density, induction machine-based systems are less desirable. BLDC motors are best option for low power propulsion applications especially under 3-5 kW because of their inherent advantages. Permanent magnet motors are an increasingly common component of motion control systems due to superior performance, smaller size, high- torque to inertia ratio, high power density, and high efficiency. Furthermore, WBG-device based converter design facilitate integration of motor & control, reducing wiring harness and increase reliability in electric propulsion. In India, standard BLDC motors with power ratings between 250 and 2000 watts are widely used in EV propulsion applications.



Compact 3 kW GaN based Integrated Drive system for BLDC motor

EVSE and Model EV Charging Station

The project "Development of WBG based EV Supply Equipment for Charging" under NaMPET-III is targeted to develop indigenous technologies for EV charging with Wide Band Gap (WBG) devices (SiC and GaN) and to demonstrate the developed chargers in Model Charging Station (MCS). The MCS is installed in Techno Park campus of C-DAC Thiruvananthapuram. The Model Charging Station is envisaged as a platform field trials, upgradations and Transfer of Technology.

The classification of developed chargers is as below:

AC Chargers

- 3.3 kW 3 port AC charger with IEC connector/ M plug (3p to 3 single p)
- 3.3 kW single port AC charger with IEC connector (1p to 1p)
- 7 kW AC charger with Type -II (1p – 1p)
- 22 kW AC charger with Type-II (3p -3p)

DC Chargers

- 3.3 kW GaN based SPV charger with GB/T (1p AC/DC – 48VDC)
- 15 kW SiC based dual point charger (DC-001) with GB/T (3p AC – 48-72VDC)
- 50 kW DC + 22kW AC fast chargers with CCS (3p AC – 360/750 VDC)

III- Wireless Power Transfer (WPT)

- 1.5 kW WPT for E-3W (1 p AC- 48 VDC)

The charging station is powered from the C-DAC substation and the station is equipped with panels and protection equipment. The charging station can support multiple EV-EVSE connectors and voltage/ power levels.

Model Charging Station (MCS) at C-DAC Thiruvananthapuram

Power Quality Devices for Smart Distribution Grid (PQD-PQC)

As a part of the project, power quality devices, including STATCOM and DVR, have been developed and demonstrated. A 50 kVA STATCOM has been tested and deployed for reactive power compensation, harmonic current mitigation, and neutral current compensation at identified sites. The STATCOM technology has been transferred to two industries. These partners are being trained and supported in the development and validation of prototype units. As an extension activity of the project, the inverter hardware for the STATCOM was redesigned with SiC switching devices and the proto unit has been successfully tested and verified.

50 kVA STATCOM installed in industrial premises

50 kVA STATCOM product by ToT partner

Smart Meter Protocol Testing Tool- SMITHA

The project "Design and Development of DLMS COSEM Testing Tools for Smart Meters" was a joint initiative between C-DAC and CPRI Bengaluru, funded by MeitY and CPRI. The project was envisioned to develop tools for testing the communication protocols of both static and smart meters.

Currently, different software applications are used separately for verifying protocol conformance and parameter verification. However, there is no software tool available in the market that can perform both parameter verification and protocol conformance testing in an integrated manner. The developed software application addresses this gap by verifying protocol conformance with IS/IEC 62056 standards, in accordance with SMITHA testing guidelines, and performing parameter verification as per the IS 15959 series of standards.

The performance and accuracy of the tool were benchmarked against existing imported software and other similar applications currently available in the market for smart meter protocol testing. The product was validated by major testing laboratories such as CPRI, Electrical Research and Development Association (ERDA), STQC Directorate, ERTL (North & West), Yadav Measurements, and others. It was also tested by leading meter manufacturers including Schneider Electric India, Secure Meters Private Limited, Genus Power Infrastructures Ltd., HPL Electric & Power Ltd., among others, as well as utilities like the Kerala State Electricity Board Limited (KSEBL).

KSEBL tested all varieties of meters that were submitted as part of its smart meter tender process using the SMITHA software. KSEBL has now initiated the process of purchasing a license for the SMITHA software.

Smart Meter with TEJAS32 (VEGA) RISC-V processor

C-DAC has developed an indigenous smart meter using commercially available off-the-shelf (COTS) microcontrollers and the TEJAS32 (VEGA) RISC-V processor, under the NaMPET and India Microprocessor Program. This meter complies with key Indian standards (IS 16444 and IS 15959) and has been successfully transferred to multiple industries. One of the recipient industries has already obtained certifications and relevant approvals from BIS (ISI) for mass production and commercial sale. The product has also been deployed in a pilot Advanced Metering Infrastructure (AMI) rollout at consumer premises under KSEBL.

With India planning to deploy 25 crore smart meters under the Revamped Distribution Sector Scheme (RDSS), ensuring security, reliability, and minimal dependency and maintenance is crucial. This project aims to engineer and optimize a smart meter based on the VEGA processor, reducing reliance on foreign ICs and enhancing the Technology Readiness Level (TRL) of the indigenous smart meter.

Furthermore, the project seeks to develop a smart meter enclosure that complies with relevant IS standards and is suitable for mass production, addressing both cost and manufacturability concerns. In addition, the project aims to upgrade the existing smart meter design to meet future requirements without the need for hardware changes, ensuring long-term adaptability and cost-effectiveness.

VEGA based 3 Phase Smart Meter PCB

3 Phase Smart Meter PCB using 32-bit COTS MCU

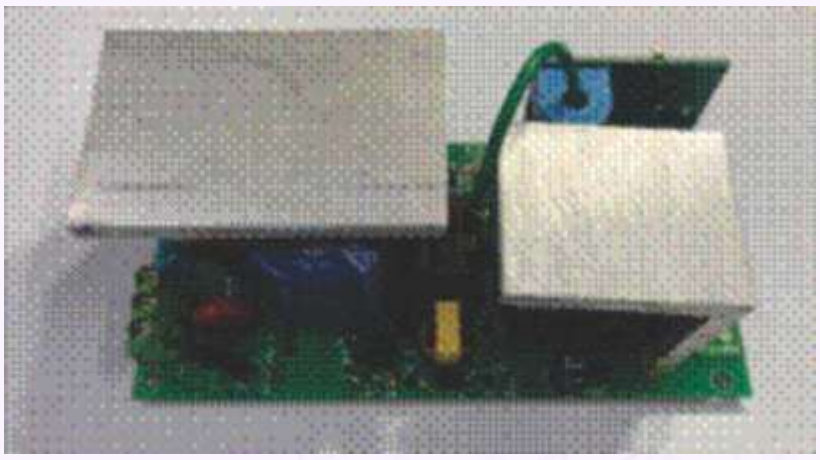
Resilient Industrial Green Energy Microgrid

Microgrid at Industry premise - A technology deployment and field validation with Inhouse technology developed under NaMPET. Use of EV batteries will be verified for grid storage application. The microgrid will be used as a downscaled captive power plant to locally supplement the power demand. This will be helping the industry to bring down its maximum demand and expenditure for electricity. Expected outcome of the project is the use case of used EV battery for Microgrid, Technology optimizations, both functional and cost wise in association with Industry. The project is being executed in collaboration with M/s. Hykon, Kochi. The testing of the industry microgrid power conditioning system is in final stage.

E Rickshaw Battery Charger

C-DAC has developed EV charger to charge 2 and 3 wheeler batteries straight from an AC mains supply. It is a great option for lithium battery charging applications because of its pulse based BMS wakeup algorithm and gradual charging current ramp up. It gives manufacturers flexibility and lessens inventory issues with software selectable options for 48V, 60V, or 72V battery banks and changeable charging currents ranging from 1A to 7A. Additionally, CC/CV (constant current/constant voltage) control via CAN communication is supported by the charger's hardware and software.

With a remarkable peak efficiency of 94%, its single chip resonant converter architecture maintains competitive performance in the IP67 waterproof charger market while guaranteeing a cost-effective bill of materials (BOM). It is available in 500W and 720W configurations, with an optional PFC for 72V 10A output.



EV Charger

Internet of Things (IoT)

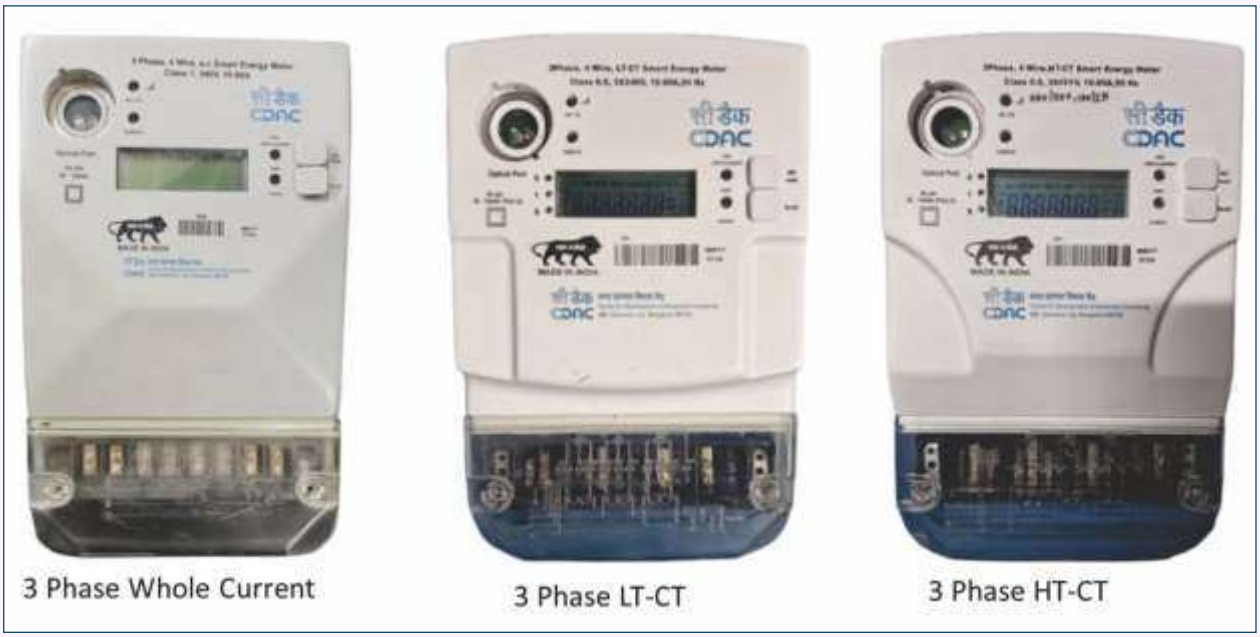
With the proliferation of the Internet of Things (IoT) into every aspect of daily life, C-DAC has developed a range of indigenous solutions aimed at making homes and cities smarter. The key innovations include development of different types of Smart Energy Meter, IoT-based cattle health monitoring system, etc. Various solutions developed by C-DAC in this area are as below.

Smart Energy Meter

The various types of Three Phase Smart Energy Meters have been designed for different applications. These smart meters are compliant to BIS IS16444 Part-1 & Part -2 and IS15959. These meters are equipped with 4G/LTE connectivity and multiple useful features like onboard LCD, Optical port, tamper detection & logging etc. The key features of each type of the meter are described below.

Three Phase Whole Current (Direct Connected) Smart Energy Meter

A Three-Phase Smart Energy Meter (Direct Connected) smart electricity meter has been designed to measure various parameters in three-phase, 4-wire electrical systems. It is typically used in residential, commercial, small scale industrial setups.



Three-Phase Smart Energy Meter

Three Phase LT-CT Smart Energy Meter

It is designed to measure multiple energy parameters in three-phase electrical systems using Low Tension (LT) Current Transformer (CT) connections. These meters are commonly used in industrial, commercial, and high-load residential applications where direct measurement is impractical due to high current levels.

Three Phase (Transformer Operated) HT Smart Energy Meter

It is designed to measure electrical energy consumption in three-phase power systems using Potential Transformers (PTs) and Current Transformers (CTs) in high-power applications. These meters are widely used in sub-stations and large industrial setups.

Go Paryavekshak (Go-P)

Go-Paryavekshak (Go-P) is an advanced IoT-based cattle health monitoring system designed to support farmers and the agricultural sector. This 24/7 monitoring collar device helps to detect early signs of illness and identifies the optimal time for insemination, providing real-time alerts. Unlike international devices, Go-P offers cost-effective solutions for both small and large-scale farms, ensuring wide accessibility and effective performance.

Go-Paryavekshak (Go-P)

Technology transfer process is ongoing with M/s. Handholders Global Private Limited for commercialization of the system.

AIRPravah (Air Quality Monitoring System)

The solution provides a method for monitoring and predicting outdoor live Air Quality Index (AQI) using an AI-based decision-making algorithm and IoT sensors. Air Quality Monitoring System (AQ-AIMS) is A 24x7 real time monitoring system is necessary for outdoor environment which monitors the environmental pollutants like CO, SO2, NO2, O3, CO2 & PM2.5, PM10, PM1 along with temperature & humidity. The system generates Air Quality Index (AQI) as per CPCB guidelines considering the pollutants. The system is also capable of predicting AQI using AI based decision making algorithm in advance which can prevent possibilities of any hazardous outcome. The algorithm is being developed by considering the seasonal invariance. The data transmission is being executed by GSM communication to a web server for continuous monitoring, analysis and visualization. The standalone system can be powered through a secondary source of power (Renewable energy, i.e., solar powered) for sustainable operation. The device can be deployed in Cement and Mines Industries (preferably) or any outdoor environment. A Mechanical enclosure has been also made to sustain the system under mining environment also. The device may also be deployed across the transportation routes of the mine where live monitoring and predicting capability of Future Air Quality Index plays a pivotal role to control the Air Pollution within a certain range.

AIRPravah

Head End System

The Head End System (HES) is a critical component in the advanced metering infrastructure (AMI) within a smart grid ecosystem. It acts as the central hub that interfaces with a network of smart meters, to collect and process metering data. The HES manages the communication protocols and ensures the secure and reliable transmission of data between the smart meters as per the DLMS format and IS15959 standard. HES sends data on request to the Meter Data Management Systems (MDMS).

Meter Data Management System

The Meter Data Management System (MDMS) is a comprehensive solution designed to collect, manage, and process data from smart electricity meters. These meters record essential consumption data, such as electricity usage, which is crucial for energy management. The system also integrates seamlessly with the Head End System.

New Initiatives

A Comprehensive IoT Security Ecosystem and Sandbox

The goal of the project is to provide a robust environment for testing, evaluating, and securing IoT devices and systems. The sandbox serves as an isolated framework to assess compliance, interoperability, performance and security of IoT components. Any suspicious behaviour in IoT hardware, software, or firmware can be identified and contained before the deployment. Some of the major objectives of the project is to develop Secure lightweight embedded OS for threat protection, Self-aware IoT devices with improved hardware root of trust and identity management, Blockchain-assisted IoT security for tamper-proof transactions, Network segmentation using MUD-based behaviour profiling, Zero-trust SDN-based security solutions for IoT infrastructure, A threat intelligence platform for sharing security insights. The project is being executed in collaboration with SETS Chennai, ERNET Chennai, IIT Madras, IIT Bombay, IIIT Bangalore and Amritha Vishwa Vidyapeetham, Kollam.

Multifunctional Drone with in-built AI

Multifunctional Drone with in-built AI" is one of the major project activity initiated by C-DAC under PUSHPAK - National Mission on Drone Technology towards Drone Excellence. The key objective of this project is to design and develop indigenous drone components concluding the Flight Controller, ESCs, Motors, Power management system, communication system, etc. and create an indigenous multifunctional drone prototype which can be used as the base design platform for development of multiple application specific drones with suitable payload and drone configuration. The in-built AI/ML feature can help to achieve on-the-go decision making capability to the Drone.

Collaborative Execution of tasks using Multi-UAV System

Under the "PUSHPAK -National Mission on Drone Technology towards Drone Excellence", the design and development of a multi-UAV system (swarm) for collaborative task execution has been initiated. The key objective of this project is to demonstrate the capability enhancement through a distributed and coordinated multi-UAV framework. It has been envisaged to create a swarm of drones for structural monitoring of high-rise buildings as an example use case. However, the multi-UAV system can be used for various other application domains as well.

IoT based precision agriculture framework for Industry 4.0

The invention introduces an integrated R&D farming system designed to overcome the absence of a standardized, objective method for comparing crop yield and quality across hydroponic, aeroponic, and other soilless cultivation systems. Traditional evaluation methods are often manual, inconsistent, and lack synchronization in data collection, making scientific validation and comparison difficult. The system will enable data-driven optimization, facilitates scientific validation, and supports scalable adoption of soilless farming technologies by researchers, agronomists, and commercial growers.

Design and Development of an Electronic Nose to detect organic content of soil using AI

The primary goal of this project is to develop an electronic nose system capable of detecting organic content of soil using gas emitted from soil for farmer awareness towards the organic farming and reduce the use case of chemical-based fertilizer in agriculture practices. The expected outcome will be new product for Kisan Vikas Kendra (KVKs) and farmers for awareness towards the organic farming practices in agriculture domain. The project is being executed in collaboration with IIT Mandi iHub & HCI Foundation.

Capacity Building and Training Initiatives

In today's age of rapid technological advancements, Capacity building, Training and upskilling are crucial for staying competitive and relevant. Continuous learning enables individuals and organizations to adapt to new tools and methodologies, fostering innovation and efficiency. By investing in skill development, we ensure a future-ready workforce capable of navigating the complexities of a tech-driven world. C-DAC has been contributing in the area of Capacity Building and Training as given below.

Capacity Building Initiatives

FutureSkills PRIME

The Ministry of Electronics and Information Technology (MeitY) in association with NASSCOM has launched the FutureSkills PRIME (FSP) program, a pivotal initiative aimed at enhancing skills and knowledge in emerging technologies viz, Additive Manufacturing/3D Printing, Artificial Intelligence, Augmented/Virtual Reality, Big Data Analytics, Blockchain, Cloud Computing, Cyber Security, Internet of Things, Robotic Process Automation, Social & Mobile etc. The detail of the program is available in the https://futureskillsprime.in/ portal.

The FSP program provides reskilling/upskilling and experiential learning in disruptive technologies, through strategic partnerships with C-DAC/NIELIT Centers, Industries, Academia, Professional Bodies etc. FutureSkills PRIME activities involve Training Program in Emerging Technologies for Students & professionals, industry relevant Courses, to address the skill gap in niche technology areas. As part of phase 2, FSP aims to train around 10 Lakh Beneficiaries including career aspirants, employment seekers, non-IT employees in cross-pollinated digital roles, PSE employers, and IT employees across IT and non-IT sectors over the period of 3 Years through variety of Courses including (a) Bootcamp Courses (BCMP), (b) Government Officer Training- Basic (GOT-B), and (c) Government Officer Training – Advanced (GOT-A), (d) Deep Skilling, (e) Foundational (f) Experiential Learning.

As part of 1st Year of Phase 2 of FSP, overall, 22,756 Beneficiaries were from Bootcamp and GOT Programs conducted by C-DAC/NIELIT Ecosystem. Further, a total of 44 courses were developed under all technologies for Bootcamp, GOT-Basic and GOT-Advanced.

Work-Based Learning (WBL)

The Work-Based Learning (WBL) Programme (Approved as of date- 09.03.2022 to 09.03.2027) is a unique scheme for fresh Graduates Engineers to acquire direct practical experience and exposure on latest Information Technology, Electronics, and related areas. The Scheme is specifically devised for the Graduate Engineers of Scheduled Caste (SC), Scheduled Tribe (ST), Women and Economically Weaker Section (EWS), keeping in view the social / economical background. The Programme provides an opportunity to acquire Technical Knowledge Expansion; Real-time Working Skills; Technology Use; Critical Thinking Skills; Reasoning; Ideation; Analytical Thinking; Interpersonal Skills, etc. in a professional work environment. The Programme entitled “Work Based Learning (WBL) Programme to Strengthen and

Empower SC/ST/Women/EWS Graduate engineers through MeitY Institutions", is a unique Programme to be implemented across the following seven (7) organizations of MeitY, i.e. CERT-In, C-DAC, NIELIT, STQC, CMET, ERNET and SAMEER. The beneficiaries under WBL Programme are paid Rs. 10,000 per month during of the Programme. So far, 2,247 candidates have enrolled, with 1,044 completing their tenure. Over 280 candidates have successfully secured placements in government and private organizations, reflecting the programme's impact in fostering skilled professionals.

SwaYaan

'SwaYaan: Capacity Building for Human Resource Development in Unmanned Aircraft System' is led by C-DAC Hyderabad and IIITDM Kurnool as the Programme Management Unit (PMU) to develop a UAS/Drone Ecosystem across the Nation. The project is implemented in a hub-and-spoke model through 30 institutions including IISc Bangalore, IITs, IIITs, NITs, C-DAC, and NIELIT Centres. Under the project, the overall target is to train 45,000+ candidates through various Formal, Non-Formal programs and Research Program such as MTech in UAS/Drones, Minor degree/Retrofitting courses in UAS/Drones, PG Diploma Program, Short term Skilling Courses, Innovation Challenge, Bootcamps, POC, National Workshops, International Conference, Open Online Courses, IPR (Paper and Patents) creation, etc. over a period of 5 Years.

During the year, a total of 607 activities have been conducted across India under various academic programs, research and innovation initiatives, training sessions, workshops, and other knowledge-sharing efforts. These initiatives have engaged 17,076 participants, collectively accelerating the nation's journey towards becoming a Global Drone Hub by 2030.

Information Security Education and Awareness (ISEA)

Ministry of Electronics and Information Technology (MeitY) is implementing the Information Security Education and Awareness (ISEA) Project Phase-III aimed at development of human resources for safe, trusted, and secure cyber space. This will generate around 2.75 lakh human resources in the area of Information Security over a period of 5 years comprising of 45,000 skilled & certified Cyber Security Professionals (including CISOs, Deputy CISOs, Associate team of CISOs/Aspirants) and training of 2.3 lakh students (UG/PG level), research scholars, faculty, etc. in various formal/non-formal courses and innovation activities in Information Security. Further, more than 12 crore beneficiaries are envisaged to be covered under the Cyber Aware Digital Naagrik (Mass Awareness) component through various activities in direct/indirect mode. So far, 11,341 candidates have been trained/undergoing training in various formal/ non-formal courses, professional training programs, innovation and other activities in Information Security through 50 institutions.

C-DAC Hyderabad in association with Indian Computer Emergency Response Team (CERT-In) organized a 4-day training and certification programme on "Level 1 Training on "Cyber Security for Banking, Financial Services & Insurance Sector" during January 2025 at C-DAC Hyderabad Campus. This initiative was part of the NAAT audit and assessment, as well as the "Generating Highly Skilled & Certified Cyber Security Professionals (CISOs)" programme. 33 CISO team members/officers participated from various organizations.

A four-day training and certification programme on "Sector Specific Operational Technology (OT)/Industrial Control System (ICS) Security – Level 2" was conducted during January 2025 as part of "Generating Highly Skilled & Certified Cyber Security Professionals (CISOs)".cted during January 2025 as part of "Generating Highly Skilled & Certified Cyber Security Professionals (CISOs)". A four-day Training and Certification programme on "Sector Specific Telecom Security – Level 1" was conducted during February 2025 at Cert-In, New Delhi as part of "Generating Highly Skilled & Certified Cyber Security Professionals (CISOs)".

Training Programmes

Post Graduate Diploma Training Programme (PG-Diploma)

C-DAC's Education and Training have been developing skilled resources as part of the Skill India initiative through its Post Graduate Diploma and Post Graduate Degree awarding programmes for its internal human resources needs of Research and Development activities and IT industry. These skill enhancement ICT training courses are imparted by C-DAC training centres as well as Authorised Training Centres (ATCs) spread across India.

C-DAC ACTS is recognized by the National Council of Vocational Education and Training (NCVET) with dual recognition as an awarding body and assessment agency. C-DAC is in process of aligning its courses to the NSQF and New National Credit Framework (NCrF) under the NEP 2020.

PG Diploma courses are conducted in the areas of Advanced Computing, Artificial Intelligence, Big Data Analytics, IT Infrastructure Systems and Security, HPC System Administration, HPC Application Programming, UAS programming, IoT Embedded System Design, and VLSI Design. These PG-Diploma courses help the students to enhance their skillsets, thereby meeting the ever-evolving requirements of the IT industry. These courses provide an in-depth understanding of the latest technologies in the IT domain, with a major focus on the practical aspects.

More than 3000 students have been trained in different PG-Diploma courses through 11 ATCs during the year.

Corporate Training for Corporate, PSU and Government Organization

C-DAC has conducted the ITEC and e-ITEC programs for the international participants under Indian Technical & Economic Cooperation (ITEC) scheme of MEA, Government of India. C-DAC has trained around 300 participants from more than 100 ITEC partner countries.

The HQ Southern Command Pune training on Incident handling and security has been conducted. The institutional training for ACCS, Ahmednagar has also been conducted for 15 Officers in Cyber Security domain.

Formal Degree Programs

- M. Tech (CSE) programme is being offered since 2003. The intake is 25 students per year. The objective of the program is to produce postgraduates with advanced knowledge in one or more areas of Computer Science.
- C-DAC was conducting MBA-IT (erstwhile MBA-SEM), in affiliation with Guru Gobind Singh Indraprastha University (GGSIPU) since 2006. The programme is now offered as MBA. The programme is meant to transform the engineers to lead global businesses in an increasingly complex and dynamic environment. It is conceived, designed and structured as a Two-Year Full-Time Management Programme with dual specialization. Intake is 60 students per year.

Programme for Advancing Computer Education (PACE)

Programme for Advancing Computer Education (PACE) of C-DAC offers a wide range of training programs in basic and advanced computer courses with multilingual touch, aiming to reach individuals at the grassroots level of society. The program provides 73 distinct courses across multiple categories, including Certificate, Diploma, Advanced Diploma, Modular, and Specialized courses. These courses training is managed through a network of six Authorized Regional Coordinators (ARCs) and over 175 Authorized Training Centres (ATCs), spread across the country, from metropolitan cities to rural panchayats. During the period, 25,515 students had enrolled in various courses, and 29,918 students had been certified.

Resources, Facilitation Services and Initiatives

International Collaborations/Co-operations

With support from the Ministry of External Affairs (MEA), C-DAC extends its expertise in ICT to collaborating nations and nurtures its ICT centres. During the year, the following activities were carried out as part of this initiative:

1. Under India-Argentina Centre of Excellence in Information Technology (IA-CEIT) project, IA-CEIT was handed over to University of Hurlingham on December 2024 and had trained more than 800 participants over the period of two years.
2. Under the Centre of Excellence in Software Development & Training (CESDT) project in Cambodia, three certificate courses have been launched with the approval of the Government of Cambodia. These include Certificate Course in Network Administration, Cyber Security and Full Stack Development. A total of 330 students have enrolled in these courses.
3. India - Solomon Islands Centre of Excellence in IT (IS-CEIT) setup by C-DAC with the financial assistance from Government of India is operational and IS-CEIT is delivering holistic ICT training. IS-CEIT has commenced the training for the Certificate courses in Information Technology and Data Analysis, for students, working professional and nominated Government officials.
4. India - Vanuatu Centre of Excellence in IT (IV-CEIT) at Vanuatu Institute of Technology (VIT), Port Vila setup by C-DAC with the financial assistance from Government of India was inaugurated on June 11, 2024 by Hon'ble President of Vanuatu, Mr. Nikenike Vurobaravu along with High Commissioner of India to New Zealand (accredited to Vanuatu), H.E. Ms. Neeta Bhusan. IV-CEIT in Vanuatu is offering Micro Qualification in Office Automation and Information Technology.
5. India - Vietnam Centre of Excellence in Software Development and Training (CESDT) setup by C-DAC at Posts and Telecommunications Institute of Technology (PTIT) at Ho Chi Minh City, has been inaugurated by, H.E. Mr. Sandeep Arya, Ambassador of India to Vietnam on November 27, 2024. He was joined by Mr. Phan Tam, Hon'ble Deputy Minister of Ministry of Information and Communications (MIC), Government of Vietnam and Dr. Vipra Pandey, Counsellor General Of India to Vietnam along with other senior officials from PTIT and MIC, Government of Vietnam. CESDT is setup by C-DAC with the financial assistance under ASEAN – India Cooperation Fund. C-DAC has setup the entire IT infrastructure and supplied Course Material & Reference Books at CESDT.
6. C-DAC is working under the GANANA, an India-EU joint initiative to advance the development of scientific High-Performance Computing (HPC) applications, is envisaged to be a pioneering concerted effort in the areas of climate change, natural hazards, and bioinformatics.
7. In partnership with Dr. Khushboo Borah from the University of Exeter, UK, the Bioinformatics team at C-DAC conducted a comprehensive study on the differential metabolite production in Mycobacterium tuberculosis under various drug treatments. The team developed a Bioinformatics pipeline for differential reducibility analysis using a genome-scale metabolic network approach. This innovative work was published in the prestigious Journal of Biological Chemistry

Patents/Copyrights

Patents

Patents Granted

1. "Smart detection system for under-vehicle objects and animals", Dr. V. Karthika, Mr. B. Ajay, Mr. Mishra Nayan Ashok, Mr. Haribabu Pasupuleti, Dr. Seshadhri Srinivasan and Mr. K. Velmurugan, Patent No. - 430362-001, Granted, December 9, 2024
2. "Automatic under-vehicle safety system for detecting objects and hazards", Dr. V. Karthika, Mr. B. Ajay, Mr. Mishra Nayan Ashok, Mr. Haribabu Pasupuleti, Dr. Seshadhri Srinivasan and Mr. K., Patent No. - 430365-00, Granted, December 13, 2024
3. "System and method for preserving the privacy of the participating entities in digital payment", Dr. Balaji Rajendran, Mr. Anoop Kumar Pandey and Mr. B S Bindhumadhava, Patent No. – 556731, Granted, December 24, 2024
4. "Method and system for authenticating a user using a Personal Authentication Device (PAD)", Mr. Sreekanth N S, Ms. Nobby Varghese, Mr. Haribabu Pasupelti, Mr. Gopinath P , Ms. Karthika V, Mr. Kaushik Nanda, Mr. Indu Sashidharan, Mr. Vaibhav Pratap Singh and Mr. Uttam Kumar, Patent No.- 540140, Granted, May 30, 2024
5. "Method of adaptively varying inter-frame gap between successive ethernet packets at media access control layer", Mr. Vivian Desalphine, Ms. Anjana B L and Mr. David Selvakumar, Patent No. – 542876, Granted, June 25, 2024
6. "A Honeypot framework system for capturing Cyber Attacks", Mr. Rakesh Kumar Sehgal, Mr. Saurabh Chamotra, Mr. Sanjeev Kumar, Mr. Munish Verma, Mr. Kuwar Singh and Mr. Vijay Kumar Sharma, Patent No. – 551851, Granted, October 3, 2024
7. "A system and comprehensive methods for malware detection and classification based on Artificial Intelligence", Mr. Rakesh Kumar Sehgal, Mr. Sanjeev Kumar, Mr. Saurabh Chamotra, Mr. Munish Verma, Mr. Mani Arora and Mr. Vijay Kumar Sharma, Patent No. – 542238, Granted, June 19, 2024
8. "Health Monitoring System and Method", Dr. Balwinder Singh, Patent No. – 202311054048, Granted, October 7, 2024
9. "IoT Based Aquaponics System", Dr. Mandeep Singh and Dr. Jaspal Singh, Patent No. - 403518-001, Class 15-99, Granted, May 29, 2024
10. "Electronic Unit for Ultrasonic Solid-propellant Burn Rate Measurement System (USBRMS)", Mr. Haneesh S, Mr. Harikrishnan B, Mr. Sarath Chandran R, Mr. Rajesh K R, Mrs. Sindhu Rajan, Dr. Jeenu Raghavan (VSSC) and Mr. Kiran Pinumalla (VSSC), Patent No. – 535961, Granted, April 30, 2024
11. "A Method and A Portable System for Detecting Landmines", Mr. Haneesh Sankar T P, Mr. Harikrishnan C S, Mr. Vishnu S, Mr. Abhijith M S and Mr. Rajesh K R, Patent no. – 559946, Granted, February 11, 2025

Patents Filed

1. "System and method for detection of fraudulent activities during an assessment", Mr. Ramu Parupalli, Mr. Samir Nayakawadi, Ms. B. Vijayalakshmi, Mr. B. Erasmus Arockiam and Mr. Mothukuri Udaya Kumar, Patent Application No. – 202441077376, October 11, 2024
2. "Biosensing device and method for rapid screening of bacterial pathogen thereof", Mr. Souvik Pal, Mr. Subrata Sarkar, Mr. Tamal Dey, Mr. Soumyadeb Bhattacharyya, Mr. Subhankar Mukherjee, Mr. Rabindranath Kanjilal, Mr. Shubhajit Bhar, Mr. Varun Shrotri, Ms. Hena Ray and Mr. Alokesh Ghosh, Patent Application No. 202431069116, September 12, 2024
3. "A device and method for detecting food toxin", Mr. Subrata Sarkar, Mr. Ravi Sankar, Mr. Arindam Niyogi, Mr. Soumyadeb Bhattacharyya, Mr. Koustuv Ghosh, Mr. Souvik Pal, Mr. Subhankar Mukherjee, Mr. Rabindranath

Kanjilal, Mr. Shubhajit Bhar, Mr. Arun Jana, Ms. Hena Ray, Mr. Alokesh Ghosh, Mr. Kumaraswamy Jeyaram, Mr. Santosh Keisam and Mr. Om Krishan Singh, Patent Application No. – 202431077025, October 10, 2024

4. "MAST_D", Mr. Subhankar Mukherjee, Ms. Hena Ray, Mr. Alokesh Ghosh, Mr. Karabi Biswas, Mr. Avijit Mondal, Mr. Ajoy Mandal, Mr. Muthu Karunakaran, Mr. Champak Bhakat and Mr. Om Krishan Singh, Patent Application No. – 202431066949, September 4, 2024
5. "Electronic Nose sensor placement unit for soil assessment", Dr. Balwinder Singh, Patent Application No. – 435910-001, October 28, 2024
6. "Soil assessment apparatus and method", Dr. Balwinder Singh, Patent Application No. – 202411080944, October 24, 2024
7. "A Device for Depth And Distance Measurement Employing Digital Coded Wide-Band Ultrasonic Signal", Mr. Haneesh Sankar, Mr. Sarath Chandran, Ms. Annapurna S, Ms. Jiji Stephen and Mr. Rajesh K. R., Patent Application No. – 202441036169, May 7, 2024
8. "High Precision High Stability Three-Way Ground Isolated Low Noise Instrumentation Amplifier with Inbuilt Excitation Voltage Source", Mr. Haneesh Sankar, Mr. Sarath Chandran, Ms. Annapurna S, Ms. Jiji Stephen and Mr. Rajesh K R, Patent Application No. – 202441038075, May 15, 2024
9. "Low Noise Constant Current Source", Mr. Haneesh Sankar, Mr. Sarath Chandran and Mr. Rajesh K R, Patent Application No. – 202441038831, May 17, 2024
10. "System for Glacial Lake outburst flood monitoring and early warning using multi-sensor instrumented buoy", Mr. Vishnu S, Mr. Harikrishnan C, Mr. Anish Sathyan, Ms. Divya M H and Mr. Rajesh K R", Patent Application No. – 202441076543, October 9, 2024
11. "Dual-fed flux-coupled converter with natural redundancy for x-ray generator", Mr. Subhash Joshi T.G., Mr. T.S. Bheemraj, Mr. Muhammad Rafi, Mr. Kiran Babu and Ms. Seena, Patent Application No. – 202441060870, August 12, 2024

Copyrights

Copyrights Awarded

1. "Tel tad ki kheti (oil palm cultivation practices)", Dr. M. V. Prasad, Dr. K. L. Mary rani and Mr. M. Kumar, Copyright No. - SW-19818/2024, Awarded, December 10, 2024
2. "Oil palm disease management – English", Dr. K. L. Mary Rani, Dr. M. V. Prasad, Dr. M. Praveena Deepthi and Mr. M. Kumar, Copyright No. - SW-19820/2024, Awarded, December 10, 2024
3. "Oil palm pest management – English", Dr. K. L. Mary Rani, Dr. M. V. Prasad, Dr. P. Kalidas, Dr. L. Saravanan, and Mr. M. Kumar, Copyright No. - SW-19821/2024, Awarded, December 10, 2024
4. "Tel tad ki pidak prabhandhan - Hindi (Oil palm pest management)", Dr. M. V. Prasad, Dr. K. L. Mary Rani and Mr. M. Kumar, Copyright No. - SW-19822/2024, Awarded, December 10, 2024
5. "RIGE-SENSE: a machine vision solution for estimation of the age of the raw rice", Mr. Gopinath Bej, Mr. Santanu Kamilya, Mr. Tamal Dey, Mr. Arindam Niyogi, Mr. Tapas Sutradhar, Mr. Abhra Pal, Dr. Amitava Akuli and Dr. Alokesh Ghosh, Copyright No. - SW-18776/2024, Awarded, May 15, 2024
6. "Bio-ExP 1.0: Bio-Electrochemical eXperimentation Platform", Mr. Ravi Sankar, Mr. Subrata Sarkar, Mr. Arindam Niyogi, Mr. Koustuv Ghosh, Mr. Soumyadeb Bhattacharyya, Mr. Shubhajit Bhar, Mr. Souvik Pal, Mr. Subhankar Mukherjee, Ms. Hena Ray and Mr. Alokesh Ghosh, Copyright No. - SW-20027/2025, Awarded, January 7, 2025
7. "CoLOSENS: an affordable colorimetric diagnostic instrument", Mr. Soumyadeb Bhattacharyya, Mr. Tamal Dey, Mr. Arindam Niyogi, Mr. Shubhajit Bhar, Mr. Subhankar Mukherjee, Mr. Souvik Pal, Mr. Subrata Sarkar, Ms. Hena Ray, Mr. Alokesh Ghosh and Mr. Thangjam Suraj Singh, Copyright No. - SW-19401/2024, Awarded, September 10, 2024

8. "Copyright of iOncology.ai source code", Ms. Lakshmi Panat, Ms. Swapna Yenishetti, Ms. Snehal Sapkale, Mr. Pritam Tambe and Mr. Ganesh Karajkhede, Copyright No. - SW-18919/2024, Awarded, June 3, 2024
9. "Indian Textiles & Crafts Repository", Mr. Shashank Sharadchandra Puntamkar, Mr. Sudhir Patel, Mr. Sanjay Rabidas, Mr. Srinu Naik Banavathu, Mr. Niranjan Patgaonkar, Mr. Saurabh Koriya, Mr. Ritesh Malviya, Mr. Suman Harsha, Mr. G Lakshmi Prasanna, Mr. Akash Subhash Auti, Mr. Akash Yadav, Ms. Shraddha Kalyankar, Ms. Bhagyashri Bobade, Mr. Vivek Bundele, Mr. Mani Singh, Ms. Anitha S, Ms. Anshuma Acharya and Mr. Manhar, Copyright No. - SW-19053/2024, Awarded, June 20, 2024
10. "A Software Web-Application Titled Koshashri: Sanskrit Encyclopaedic Dictionary", Mr. Shashank Puntamkar, Mr. Nigod Dhurke, Mr. Sudhir Patel, Mr. Sandeep Gaikwad, Mr. Sanjay Rabidas, Mr. Nitin Karale, Mr. Saurabh Koria, Mr. Jayawant Karale, Mr. Vaibhav Kalyankar, Ms. Pratiksha Deshmukh, Ms. Shraddha Kalyankar, Mr. Sanket Narkhede, Mr. Niranjan Patgaonkar, Ms. Lakshmi Prasanna, Ms. Anitha Siddharaju, Ms. Abhilasha Barule and Ms. Shivani Kothavale, Copyright No. - SW-19110/2024, Awarded, June 27, 2024
11. "SoUNDS MK3-R1 Dual Channel User Interface", Ms. Nimmy Mathew, Ms. Ramya S, Ms. Rosini Sasidharan and Ms. Lekshmy Janardhanan R, Copyright No. - SW-19909/2024, Awarded, December 27, 2024
12. "C-SCAN NDT Software", Ms. Nimmy Mathew, Ms. Lekshmy Janardhanan R and Ms. Ramya S, Copyright No. - SW-19574/2024, Awarded, October 17, 2024
13. "SoUNDS MK3 R1 FIRMWARE", Ms. Parvathy S. R. and Ms. Anju V.S., Copyright No. - SW-19755/2024, Awarded, November 25, 2024
14. "PRIAMP Frequency Response Analyzer Software", Ms. Annapurna S M, Mr. Sarath Chandran R, Mr. Haneesh Sankar and Mr. Rajesh K R, Copyright No. - SW- 18947/2024, Awarded, June 6, 2024
15. "Acoustic Data Acquisition and Analysis Utility", Ms. Joby Thomas and Ms. Parvathi M.S, Copyright No. - SW-18949/2024, Awarded, June 6, 2024
16. "CAPSapp : Mobile App for Cancer Awareness Prevention and Screening", Mr. Chris Elza John, Mr. Aswathy M G, Mr. Sherin Sebastian, Mr. Jiji P B, Mr. Ashish, Ms. Nisha Kumari, Mr. Byju N B and Ms. Thara S Pillai, Copyright No. - SW-20030/2025, Awarded, January 7, 2025
17. "Parameter Verification Testing Module for Parameters, Profile Parameters, Security, Events And General Purpose Parameters For Smart Energy Meter As Part Of Smart Meter Integrated Testing And Higher Analysis (SMITHA) For Bharat Smart Meter Protocol Analysis (BSMPA)", Mr. Jiju K, Ms. Priya S, Ms. Viji Bharathi (CPRI), Mr. Dhanavath Shankar (CPRI) and Mr. Musham Hari Prasad (CPRI), Copyright No. - SW-18703/2024, Awarded, May 2, 2024
18. "3-phase electric locomotive simulator with IEC 61375-compliant vehicle control unit (vcu) Interface", Ms. Sreedevi M L, Mr. Arun Raj, Mr. Kumar K P, Mr. Sigi C Joseph, Mr. Nevin Samuel, Mr. Ajeesh A, Mr. Renji V Chacko and Mr. Jayan P P, Copyright No. - SW-19029/2024, Awarded, June 20, 2024
19. "BHARAT IoT AT Commands Version 1.0", Mr. Jiju K, Ms. Devika K S, Mr. Ashish Murikingal (ProChip) and Mr. Anoop V G (ProChip), Copyright No. - L-154055/2024, Awarded, September 20, 2024
20. "Smart Meter Integrated Testing and Higher Analysis (SMITHA)-Bharat Smart Meter Protocol Analysis (BSMPA) Version 1.7", Mr. Jiju K, Ms. Priya S, Ms. Viji Bharathi (CPRI), Mr. Dhanavath Shankar (CPRI) and Mr. Musham Hari Prasad (CPRI), Copyright No. - SW-19753/2024, Awarded, November 25, 2024

Copyrights Filed

1. "An Artificial Intelligence (AI) based expert solution for quality analysis of multiple crops - tur (arhar whole), moong (whole), bengal gram, sorghum & wheat", Ms. Abhra Pal, Mr. Gopinath Bej, Mr. Tamal Dey, Mr. Tapas Sutradhar, Mr. Santanu Kamilya, Dr. Subrata Sarkar, Dr. Amitava Akuli, Dr. Alokesh Ghosh, Dr. Monika A. Joshi and Mr. Kunal Pandey, Copyright Application No. - 28632/2024-CO/SW, September 13, 2024
2. "Machine Vision Solution for Appearance-based Quality Assessment of Chilli", Mr. Tamal Dey, Mr. Abhra Pal, Mr. Gopinath Bej, Mr. Tapas Sutradhar, Mr. Santanu Kamilya, Dr. Subrata Sarkar, Dr. Amitava Akuli and

Dr. Alokesh Ghosh, Copyright Application No. - 27249/2024-CO/SW, August 30, 2024

3. "CG-STAT: Electrochemical Analysis of Cyanogenic Glycoside", Mr. Arindam Niyogi, Mr. Ravi Shankar Subrata Sarkar, Mr. Koustuv Ghosh, Mr. Shubhajit Bhar, Mr. Soumyadeb Bhattacharyya, Mr. Subhankar Mukherjee, Mr. Souvik Pal, Ms. Hena Ray, Mr. Arun Jana and Mr. Alokesh Ghosh, Copyright Application No. - 13567/2024-CO/SW, April 29, 2024
4. "MAST-D-MTSGTCO: The Mastitis Detection Software", Mr. Subhankar Mukherjee, Ms. Hena ray, Mr. Alokesh Ghosh, Mr. Karabi Biswas, Mr. Avijit Mondal, Mr. Ajoy Mandal, Mr. Muthu Karunakaran, Mr. Champak Bhakat and Mr. Om Krishan Singh, Copyright Application No. - 39092/2024-CO/SW, December 13, 2024
5. "Smart Meter Integrated Testing and Higher Analysis Bharath Smart Meter Protocol Analysis (Smitha-Bsmpa) User Manual Version 1.0", Mr. Jiju K and Ms. Priya S, Copyright Application No. - 36112/2024- CO/L, November 19, 2024
6. "Firmware for Real-Time Control of Dynamic Voltage Restorer", Mr. Subhash Joshi T G, Ms. Manju A.S, Mr. Saravanakumar A and Mr. Aby Joseph, Copyright Application No. - 38371/2024-CO/SW, December 5, 2024

Awards and Accolades

1. Dr. Sanjay Sood, Scientist F, C-DAC Mohali received the Global Innovator Award at the Global Digital Health Summit, Mumbai, in October 2024, for his pioneering contributions to eSanjeevani, India's national telemedicine platform in the category of Digital Transformation Initiative of the year 2024. The award recognizes eSanjeevani's transformative impact on digital healthcare, enabling millions of remote consultations and enhancing healthcare accessibility across India.

2. C-DAC Mohali has received a prize during a nationwide online hackathon focused on "Digital Crop Survey" organized by the Department of Agriculture & Farmer Welfare under the Ministry of Agriculture & Farmer Welfare for "5G enabled AI-powered wireless camera monitoring of Crops/insects/pests", a solution developed for the surveillance of crops/insects/pests with cameras.

   The rigorous selection process narrowed down the initial 53 teams to 15, with three finalists chosen from each participating zone. The exceptional performance secured them a well-deserved second place at national level, along with a prize of 3 Lakhs presented by Honourable, Shri Manoj Ahuja, Secretary, Department of Agriculture & Farmers Welfare on June 7, 2024 at Ministry of Agriculture & Farmers welfare, Krishi Bhawan, New Delhi.

3. C-DAC Thiruvananthapuram has received the prestigious, "United Nations Inter-Agency Task Force (UNIATF) award on NCDs 2024" for the outstanding work on NCDs including leveraging on innovation and technology for the 'Digitally Connected Tribal Colonies' project in Kerala, that effectively integrates AI technology and indigenous medical devices to screen and prevent NCDs, including cervical and oral cancer, among marginalized tribal communities, using the local community to provide health education and awareness. Dr Hanan Balkhy, Regional Director for EMRO announced winners during the 79th United Nations General Assembly in New York, on September 25, 2024.

4. C-DAC has received the Federation of Indian Chamber of Commerce and Industries (FICCI) 16th Healthcare Excellence Award 2024 on November 5, 2024 for ABDM FHIR Connector under Digital Transformation Initiative of the year. ABDM FHIR Connector is a middleware tool which allow health informatics applications to onboard on ABDM Eco System and compliance to health standards. ABDM FHIR Connector has on boarded 30+ instances and 2000+ hospitals. The award was presented in the gracious presence of Shri Kapil Dev at India Habitat Centre, New Delhi.

5. C-DAC Noida has bagged the Gems of Digital India Award for ABDM FHIR Connector under the Gems of Digital India Analyst Award at the Claridge's Hotel, New Delhi on July 26, 2024.

6. 5th Economic Times Government PSU Leadership & Excellence Gold Award 2024 was received by C-DAC Noida for e-BIS Portal under the category of Adoption of Smart Governance on June 21, 2024, by Dr. Jitendra Singh, Honourable Minister of State for Science & Technology and Earth Sciences in Hotel Lalit, New Delhi.

Events / Conferences

1. Shri Ashwini Vaishnaw, Hon'ble Minister E&IT announced the winners of "Indian Web Browser Development Challenge" at Delhi on March 20, 2025.

2. 5th International Conference on Public Key Infrastructure and its Applications (PKIA 2024) was organised at Bangalore during September 5-6, 2024 to provide a platform for presenting novel ideas from academia and industry on traditional and emerging topics and new paradigms in the areas of PKI.

3. 5 days Analog & Digital Design Hackathon was organized at Bangalore during March 16-20, 2025 in collaboration with MeitY.

4. One Day National Conference on "Unlocking Potential of Blockchain, Metaverse & Web3: Opportunities & Challenges for Accelerating Use Cases Towards Viksit Bharat" was organized at IIIT Hyderabad on June 14, 2024 to promote blockchain research and National Blockchain Framework.

5. Seminar on Secure Software Development Lifecycle Practices was organised at Assam Royal Global University, Guwahati on March 21, 2025 in collaboration with IIT Bhilai to proliferate information about importance of SSDLC practices and promote SSDLC Certification Initiative by C-DAC Hyderabad and IIT Bhilai.

6. Royalty Sharing Ceremony of 'Aqua SURAKSHA' was organized at C-DAC Kolkata on November 21, 2024 to commemorate the successful sale of five units of the 'Aqua SURAKSHA' device, highlighting its journey from development to commercialization.

7. Stakeholder's meet was organized at C-DAC Kolkata on January 10, 2025 to discuss the application of ICT and electronics for processed food quality estimation, unveil the 'e-GUNA' products, and foster collaboration among industry, academia, and R&D labs for advancing food safety and processing technologies in collaboration with IBSD Imphal, NIT Nagaland and IIT, Hyderabad.

8. The Symposium on "Food Processing using Additive Manufacturing" was conducted at C-DAC, Kolkata on July 26, 2024 to provide a platform to collaborate and brainstorm on various business development strategies for 3D-printed food processing in collaboration with Central Manufacturing Technology Institute (CMTI), Bangalore, CSIR - Central Food Technological Research Institute (CFTRI), Mysore and IIM Calcutta Innovation Park (IIM CIP), Kolkata.

9. Workshop on Emerging Technologies for Healthcare for exploring technological interventions in healthcare was organized at AIIMS, New Delhi on October 22, 2024 in collaboration with AMRITA University.

10. Advanced Training Programme on Responsible AI: Concepts, Applications and Ethical Considerations was organized at C-DAC Mohali during November 18-22, 2024 to equip Scientists and Technologists working in Government Sector for fostering deep understanding of responsible AI principles and practical approaches to addressing challenges in AI deployment in collaboration with Department of Science and Technology (DST).

11. Technology Based Entrepreneurship Development Programme (TEDP) in AI Technology was conducted at C-DAC Mohali during January 6-15, 2025 for providing training in the specific technology areas in collaboration with Department of Science and Technology (DST).

12. Capacity building workshop for DRDO personnel on emerging technologies including Industrial Automation, Robotics and Artificial Intelligence was conducted at C-DAC, Mohali during November 25, 2024 to December 6, 2024 in collaboration with Centre for Personnel Talent Management (CEPTAM), the nodal agency of DRDO.

13. Specialized Training Programme for Digital Health Interventions for Developing Countries (Women only) was organized at C-DAC, Mohali during July 24, 2024 to August 6, 2024 to offer a comprehensive understanding of primary healthcare in developing countries, addressing challenges and opportunities through expert-led sessions in collaboration with Ministry of External Affairs (MEA).

14. Special Telemedicine Training program under India-U.S. Triangular Development Partnership (TriDeP) project on "Putting India's Telemedicine Health Care Model to Work during Disasters and Pandemics in the Philippines" was organized at C-DAC Mohali in collaboration with Ministry of External Affairs (MEA) during April 8-12, 2024 to equip officials from the Philippines with in-depth knowledge and practical insights into India's telemedicine healthcare model, particularly its application during disasters and pandemics

15. Specialized Training Programme on Operationalization of Population Scale Telemedicine Platform was organized at C-DAC Mohali in collaboration with Ministry of External Affairs (MEA) during September 18, 2024 to October 1, 2024 to provide a comprehensive understanding of primary healthcare in developing countries, focusing on challenges and opportunities.

16. Specialized Training Programme in Internet of Things Applications in Agriculture was conducted at C-DAC Mohali in collaboration with Ministry of External Affairs (MEA) during January 29, 2025 to February 11, 2025 to equip participants with a comprehensive understanding of automation in agriculture using IoT.

17. Discussion Meet on AI for Agriculture Sector – Trends, Challenges & Future Prospects was organized at C-DAC Mohali on September 6, 2024 to understand existing research initiatives in AI integration in the agriculture sector, in collaboration with DSIR, Ministry of Science and Technology, Government of India.

18. Training Workshop on Ethics and Governance was organized at C-DAC Mohali on September 20, 2024 in collaboration with IIPA - Punjab and Chandigarh Regional Branch for employees of C-DAC for building capacity in Ethics and Governance.

19. Workshops on C-DAC Digital Governance solutions and services with Emerging technologies was organized at Raipur to build awareness about various Digital Governance products/services of C-DAC on November 25, 2024 and February 11, 2025.

20. Online labs training program at Rajasthan was conducted at Rajasthan for deployment of Olabs on August 21, 2024.
21. National Workshop on Ransomware and Digital Infrastructure Protection (NWRDIP) – 2025 was organised at Patna, Bihar on March 05, 2025 for raising awareness of ransomware risks, offering strategies to prevent, respond to, and recover from attacks.

22. National Symposium on Developing Innovation, Incubation and IPR Ecosystem (NSDIIIE) – 2025 was organized for innovators, entrepreneurs, and researchers in Bihar to explore key concepts in Innovation, Incubation, and Intellectual Property Rights (IPR) at Patna, Bihar on March 08, 2025 in collaboration with Accures IP Care.

23. Advanced Training was conducted to enhance expertise in Large Language Models (LLMs) and Generative AI in hybrid mode at C-DAC Pune on February 25-27, 2025 in collaboration with Nvidia India.

24. Accelerating Biology 2025: Compute to Transcend was organized at Pune to disseminate NSM-NPGDD products during January 7-9, 2025

25. NRCeS Users' Meet Summer 2024 was conducted at Pune on Ayushman Bharat Digital Mission (ABDM), National Health Claim Exchange (NHCX), Digital Health Accreditation, Digital Personal Data Protection (DPDP) Act and experiences in the implementation of standardization in digital health on May 03, 2024.

26. Workshop was conducted for EHR Standards for India and its Adoption in ABDM and NHCX at Aditya Birla Memorial Hospital, Pune on August 23, 2024.
27. Workshop was organized for experts, policymakers, and practitioners to explore the transformative potential of geospatial technologies at C-DAC Pune on November 22, 2024 in collaboration with Indian Society of Remote Sensing (ISRS) and Indian Society of Geomatics (ISG).

28. Workshop on Seismic modeling and migration using SeisRTM was organized broaden the software's reach, fostering its development while simultaneously advancing research and development in seismic imaging at IIT Roorkee, IIT (ISM) Dhanbad and Banaras Hindu University (BHU) on December 6, 2024, February 8-10, 2025 and March 26-28, 2025 respectively.

29. Quantum Accelerated Computing Symposium & Workshop was organized focussing on fundamentals of Quantum Mechanics, Quantum Hardware Technologies, Quantum Software Ecosystem, HPC-based Quantum Accelerators, etc. at Symbiosis Institute of Technology (SIT), Pune during October 14-15, 2024.

30. AgriHub - Industry-Academia Workshop was conducted on Research Innovation for Commercialization at IISER Pune on March 10, 2025 in collaboration with IIT Indore, ICAR-IISR, ICAR-CIAE Bhopal.

31. Workshop & Symposium on Quantum Science and Technology (QST) for Knowledge dissemination was organized at Indian Institute of Information Technology Allahabad during March 17-18, 2025.

32. Himashield Grand Challenge was conducted for fostering innovation in Glacier Lake Outburst Flood (GLOF) mitigation which provided a platform for young researchers and innovators to develop indigenous, sustainable solutions at C-DAC Thiruvananthapuram during February 27-28, 2025 in collaboration with MeitY.

33. One day hands-on workshop on DIR-V VEGA Processors using the ARIES development boards for engineering students was conducted at IIT Madras on March 1, 2025.

34. DIR-V VEGA Roadshow was organized to showcase DIR-V VEGA processors, ARIES development boards and applications at IIT Jammu on January 27, 2025.

35. VLSI Design Conference was organized to showcase DIR-V VEGA processors, ARIES development boards and applications at Bengaluru during January 4-8, 2025.
36. Five-day workshop on FPGA based SoC Design Covering DIR-V Architecture & Applications was conducted at NIELIT, Calicut during December 9-13, 2024

37. Hands-on workshops on DIR-V VEGA Processors using the ARIES development boards were conducted for engineering students at various institutes during June 2024 to November 2024.

Research Papers/Publications

Journals

1. Manavalan, "HPC for SARMSS Data Fusion Experiments", Universal Library of Innovative Research and Studies, DOI: https://doi.org/10.70315/uloap.ulirs.2024.0101004 , Issue 1 (1), Pages 20-24, 2024.
2. Vijayalakshmi B, Kondapur Aneesh Deshpande and Nishkarsh Krishan, "Use of AI to augment multilingual content in cyberspace for development - An Indian case study", IEEE Global Humanitarian Technology Conference (GHTC), DOI: 10.1109/GHTC62424.2024.10771552, IEEE, Philadelphia, Pennsylvania, USA, Pages-31-35, 2024.
3. Dei, J., Mondal, S., Biswas, A., Sarkar, D. J., Bhattacharyya, S., Pal, S., & Behera, B. K., "Cr-Detector: A simple chemosensing system for onsite Cr (VI) detection in water", PLOS ONE, Volume-19, Issue-1, Pages-e0295687, 2024.
4. Dhruba Jyoti Sarkar, Ayan Biswas, Shirsak Mondal, Vijay Kumar Aralappanavar, Jyotsna Dei, Swapnil Sinha, Bijay Kumar Behera, Ramij Raja, Soumyadeb Bhattacharyya, Souvik Pal, Subhankar Mukherjee, Vipul Bansal, Basanta Kumar Das, "Aeromonas veronii specific aptamer and peroxidase mimic tyrosine-capped gold NanoZymes enable highly specific sensing of fish pathogenic bacteria", Biosensors and Bioelectronics: X, Volume-19, Pages-100505, 2024.
5. Arindam Niyogi, Priyanka Sarkar, Soumyadeb Bhattacharyya, Souvik Pal, Subhankar Mukherjee, "Harnessing the potential of agriculture biomass: reuse, transformation and applications in energy and environment. Environmental Science and Pollution Research", Environmental Science and Pollution Research, Volume-DOI:10.1007/s11356-024-34232-7, 18 July 2024.
6. Bhuman Gangopadhyay, J Subash, Nandan Saha, Shamima Hussain, Souvik Pal, Subhankar Mukherjee, Ranjit Hawaldar, Subhenjit Hazra, Dipankar Chattopadhyay, "Low-Temperature Base-Catalyzed Si-Capped ZnO Quantum Dots for pH-Switchable Dual Sensing of Amoxicillin and Cr3+", ACS Applied Nano Materials, Volume-7, Issue-17, Pages-20829-20840, 2024.
7. Arghyadip Manna, Souvik Pal, Bidisa Das, Satishchandra Ogale, Manas K. Bhunia, "Modulation of Electron Push–Pull by Redox Non Innocent Additives for Long Cycle Life Zinc Anode", Volume-20, Issue-46, Pages-2404752, 2024.
8. Das, S., Kaur, H., Mukherjee, S., Chakraborty, M., Gupta, R., Roy, S., & Das, M., "Developing a digital data platform for surveillance of food and water-borne pathogens in North East India: insight for public health advocacy. Frontiers in Public Health", Frontiers in Public Health, Volume-12, Pages-1422373, 2024.
9. Hazra, Abhisek, Shuvajit Maity, Barnali Pal, & Asok Bandyopadhyay, "Adversarial attacks in signature verification: a deep learning approach", "Computer Science and Information Technologies [Online], Volume-5, Issue-3, Pages-215-226, Web, 2024.
10. George, Emma, Sarah Jameel, Stacie Attrill, Shailaja Tetali, Erin Watson, Lalit Yadav, Sanjay Sood, et al., "Telehealth as a Strategy for Health Equity: A Scoping Review of Telehealth in India During and Following the COVID19 Pandemic for People with Disabilities", Telemedicine and eHealth (2024), Volume- 30, Issue-5, Pages-6, 2024.
11. Shiva Sharma, Naresh Kumar, and Manjit Kaur, "Enhanced 3D indoor position estimation from smartphone's inbuilt IMU and pressure sensor via hybrid approach", Cluster Computing, Volume-27, Issue-8, Pages-10953-10970, 2024.
12. Shiva Sharma, Naresh Kumar, and Manjit Kaur, "Conventional system to deep learning based indoor positioning system", Indian Journal of Engineering and Materials Sciences, Volume-31, Issue-1, Pages 7-24, 2024.
13. Kumar, Sanjeev, B. Janet, and Subramanian Neelakantan, IMCNN: Intelligent Malware Classification using Deep Convolution Neural Networks as Transfer learning and ensemble learning in honeypot enabled organizational network, Computer Communications, Elsevier, Volume-216, Issue-https://doi.org/10.1016/j.comcom.2023.12.036, Pages 16-33, 2024

14. Kumar, Sanjeev, and Anil Kumar, "Image-based malware detection based on convolution neural network with autoencoder in Industrial Internet of Things using Software Defined Networking Honeypot", Engineering Applications of Artificial Intelligence, Elsevier, Volume-133, Issue-Part D, 2024.
15. Birinderjit Singh Kalyan, Balwinder Singh, "Fault-tolerant quantum-dot cellular automata linear feedback shift register for nano communication applications", Results in Optics, Volume- 16, Issue- 100705, Pages 12-19, June 2024.
16. Himanshu Upadhyay, Aditya Waska, Rekha Nair, Cini Radhakrishnan, "QR Code Crypt: A Comprehensive Approach to Secure Offline Demography Data Storage", International Journal of Science and Advanced Information Technology, Volume-13 (6), Pages 36-40, November - December 2024,
17. Seher Shah, Kaustubh Dev, Nirmala Salam, "Blockchain based Tamperproof FIR Chain", IJIRCCE, Volume-12, Issue-10, Pages-11652 – 11660, 2024
18. Neeraj Bharti, Ruma Banerjee, Archana Achalare, Sunitha Manjari Kasibhatla & Rajendra Joshi, "Estimation of genetic variation in vitiligo associated genes: Population genomics perspective", BMC Genomic Data, Volume-25, Issue-72, 2024.
19. Ye Xu1, Ruma Banerjee, Sunitha Kasibhatla, Johnjoe McFadden, Rajendra Joshi and Khushboo Borah Slater, "Differential producibility analysis reveals drug-associated carbon and nitrogen metabolite expressions in Mycobacterium tuberculosis", Journal of Biomedical Chemistry, 2025
20. Jani V, Koulgi S, Uppuladinne MVN, Thrigulla S R, Gundeti M, Prasad GP, Kumar S, Narayanam S, Sonavane U, Joshi R., "Evaluating therapeutic potential of AYUSH-64 constituents against omicron variant of SARS-CoV-2 using ensemble docking and simulations", Curr Res Struct Biol, Volume-7, May 2024.
21. Thrigulla S R, Singh G, Soni H, Tandon S, Koulgi S, Uppuladinne MVN, Jani V, Sonavane U, Joshi R, Gandhi Y, Kumar V, Charde V, Mishra SK, Chincholikar M, Narayan R, Lavaniya V, Narasimhaji CV, Srikanth N, Acharya R., "In-silico evaluation of Oroxylum indicum vent compounds in the plausible treatment and prevention of nasopharyngeal cancer", J Ayurveda Integr Med., Volume-15, Issue-3, 2024.
22. Kotipalli A, Koulgi S, Jani V, Sonavane U, Joshi R., "Early Events in 2AR Dimer Dynamics Mediated by Activation-Related Microswitches", J Membr Biol., Volume-257, Pages-323-344, 2024.
23. Uppuladinne, M. V., Koulgi, S., Jani, V., Sonavane, U., & Joshi, R., "Unlocking the potential of RNAi as a therapeutic strategy against infectious viruses: an in-silico study", Chemical Papers, Volume-78, Pages-1537-1552, 2024.
24. Banesh, S., Gupta, N., Reddy, C. V., Mallikarjunachari, U., Patil, N., Uddhavesh, S., & Saudagar, P., "A novel approach to design chimeric multi epitope vaccine against Leishmania exploiting infected host cell proteome", Heliyon, 2024.
25. Sooram, B., Mallikarjunachari, U., Uddavesh, S., & Saudagar, P., "Pharmacophore-guided drug design using LdNMT as a model drug target for leishmaniasis", Journal of Biomolecular Structure and Dynamics, Volume-10, Issue-10, 2024.
26. Dowerah, D., VN Uppuladinne, M., Paul, S., Das, D., Gour, N. K., Biswakarma, N., & Deka, R. C., "A Study Modeling Bridged Nucleic Acid-Based ASOs and Their Impact on the Structure and Stability of ASO/RNA Duplexes", Langmuir, Volume-40, Issue-41, 2024.
27. Jani V, Sonavane U, Joshi R., "Insight into structural dynamics involved in activation mechanism of full length KRAS wild type and P-loop mutants", Heliyon, Volume-10, Issue-16, 2024.
28. Ghosh A, Jani V, Sonavane U, Naphade A N, Joshi R, Kulkarni M J, Giri A P, "The multi-dimensional impact of captopril modification on human serum albumin", Int J Biol Macromol, Volume-274, 2024.
29. Mantri M., Sunder G., Kadam S. and Abhyankar A., "A perspective on digital health platform design and its implementation at the national level", Volume-6, April 2024.
30. Sharma, S. K., Mantri, M., and Sunder G., "Improving health and managing illness through wearables: The importance of terminology", African Journal of Biological Sciences, Vol 6, SI 3:1778-86, June 2024.

31. Dutta, U., Singh, Y. K., Prabhu, T. S. M., Yendargaye, G., Kale, R., Khare, M. K., Kumar, B., and Panchang, R., "Embankment Breach Simulation and Inundation Mapping: Leveraging High-Performance Computing for Enhanced Flood Risk Prediction and Assessment", ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume X-3-2024, Issue-https://doi.org/10.5194/isprs-annals-X-3-2024-117-2024, Pages-117–123, 2024.

32. Ghogale, K. N., Apare, R. S., & Borhade, R. H., "A Technique for Re-identifying Person in Video Surveillance through the Amalgamation of Deep Neural Networks", The Indian Journal of Technical Education (IJTE), ISSN 0971-3034, Volume-47, Special Issue No. 2, Pages-165-170, May 2024.

33. Sivakumar V., Biju C., "Artificial intelligence in hyperspectral remote sensing for mineral prospecting", Journal of Emerging Technologies and Innovative Research, Volume-11, Issue-12, Pages-844-846, 2024.

34. Kale, Manish P., Sri Sai Meher, Manoj Chavan, Vikas Kumar, Md. Asif Sultan, Priyanka Dongre, Karan Narkhede, Jitendra Mhatre, Narpati Sharma, Bayvesh Luitel, et al., "Operational Forest-Fire Spread Forecasting Using the WRF-SFIRE Model", Remote Sensing (MDPI), Volume-16, Issue-13: 2480, Pages-28, 2024.

35. Pardeshi, S., Manoj Chacan, Manish Kale, Manoj Khare, Nikhil Lele and B.K. Bhattacharya, "e-Mangrove carbon pool patterns in Maharashtra, India", Journal of Indian Society of Remote Sensing, Springer, Volume-52, March, Pages-735 – 746, 2024.

36. Richa Rastogi, Abhishek Srivastava, Monika Gawade, Bhushan Mahajan, Laxmaiah Bathula and Saheb Ghosh, "Optimal Imaging Aperture for computational efficiency in 2D and 3D Reverse Time Migration using SeisRTM", First Break, Volume-42, Issue-12, Pages-53 – 60, 2024.

37. Babu, Anand; Ghatnekar, Saurabh G., Saxena, Amit, Mandal, Dipankar, "Entanglement-enabled quantum kernels for enhanced feature mapping", URL: https://doi.org/10.1063/5.0240894, Volume 2, Issue 1, March 2025, APL Quantum, Volume-2, Issue-1, Pages-016116, 2025.

38. Mannem Sri Nishma, Satendra Gupta, Tapas Saini, Harshada Suryawanshi, Anoop Kumar, "Design and Implementation of Face Image-Based Liveness Detection Using Deep Learning", Smart Trends in Computing and Communications Proceedings of SmartCom 2025, Volume 7, Springer, Pune, January 2025.

39. Ramij Raja, Dhruba Jyoti Sarkar, Ayan Biswas, Shirsak Mondal, Vijay Kumar Aralappanavar, Jyotsna Dei, Bijay Kumar Behera, Soumyadeb Bhattacharyya, Souvik Pal, Subhankar Mukherjee, Basanta Kumar Das, "Colorimetric detection of Cr(VI) in water using tetramethyl benzidine (TMB) as an indicator", Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy, Volume-324, Pages-124967, 2025.

Conference Papers

1. Aniket P. Garade, Sushil Pratap Singh, Juliya James, Deepika H. V., Haribabu Pasupuleti, S A Kumar, Sudarsan S D, "Optimization Strategies to Accelerate BLAS Operations with ARM SVE", 28th Annual IEEE High Performance Extreme Computing Conference, IEEE Xplore, Virtual Conference, Pages-8, 2024.

2. S. K. Saurav, S. K. Ashna, N. K. Gupta, D. Kamei, R. Manavalan, S. Janakiraman, "Optimization and Scaling of OpenFOAM-based Urban Modelling Simulations for High-Performance Computing Platforms", 2024 IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT), IEEE, Indian Institute of Science (IISc), Bangalore, Pages-1-6, 2024.

3. Dermal, S., Asvija B. and Raghava, G.N., "Simulation of Quantum Entanglement and Quantum Teleportation for Advanced Networks", IEEE International Conference on Electronics, Computing and Communication Technologies (CONECCT), IEEE, Bangalore, Pages 1-5, 2024.

4. Vigya, A. Raveendran, L. Mahendra and R. S. Kumar, "Conformance testing tool for Power SCADA Communication Protocol", Proceedings of 2024 IEEE PES Innovative Smart Grid Technologies - Asia (ISGT Asia), IEEE, Bengaluru, India, Pages 1-6, 2024.

5. Shubham Goyal, Ms. Swati Singh, Gopinath Palaniappan, Dr. Balaji Rajendran and Dr. Sudarsan S. D., "Leveraging DNS Traffic Analysis for Threat Detection using Explainable AI", 29th Annual International Conference on

Advanced Computing and Communications (ADCOM 2024), Communications in Computer and Information Science (CCIS), Springer Nature Switzerland, IIITB, Bangalore, 2024.

6. R. Giridhar Reddy, Dr. Pushpinder Singh Pateja, Dr. Adarsh Patel, Mr. Gopinath Palaniappan, Dr. Balaji Rajendran, "Identifying Sybil Attacks in Blockchain Networks through Behavioral Analysis and Zero Knowledge Proof implementations", 1st International Conference on Data Computation and Communication (ICDCC 2024), IEEE Xplore, VIT, Bhopal, 2024.
7. Surabhi Dwivedi, Balaji Rajendran, P. V. Akshay, Akshaya Acha, Praveen Ampatt & Sithu D. Sudarsan, "IntelliSOAR: Intelligent Alert Enrichment Using Security Orchestration Automation and Response (SOAR)" Information Systems Security, Lecture Notes in Computer Science ((LNCS,volume 15416)), Springer Nature Switzerland, Jaipur, Rajasthan, India, Pages-453-462, 2024.
8. Venkata Reddy Kolagatla, Aneesh Raveendran and Vivian Desalphine, "A Novel and Efficient SPI enabled RSA Crypto Accelerator for Real-Time applications", 28th International Symposium on VLSI Design and Test (VDAT), Vellore, India, Pages 1-6, 2024
9. Venkata Reddy Kolagatla, Aneesh Raveendran and Vivian Desalphine, "Enhancing Performance and Scalability: A Novel Hardware Architecture for 1024-bit Miller-Rabin Primality Testing", 28th International Symposium on VLSI Design and Test (VDAT), Vellore, India, Pages 7-12, 2024.
10. Smitha G Havanur, Abey Jacob, "Approach to Post Quantum Cryptography Validation", IEEE International Conference on Public Key Infrastructure and its Applications (PKIA 2024), September 2024.
11. Solaimurugan Vellaipandiyan, Shib Kumar Saraf, "Multifaceted Feature Extraction and Machine Learning Approaches for Mortality Risk Prediction in Pediatric Intensive Care Units", Institute of Electrical and Electronics Engineers (IEEE), Chennai, India, 2024
12. Arockiasamy, John Prakash, Irene Sabarimuthu, Lydia Elizabeth Benjamin, and Srinivasan Palaniswami, "Title-Pbins:private bins for top-k semantic search over encrypted data using transformers", Journal-International Journal of Information Security, 2024.
13. Dhivya G et al., "A Unified LPWAN Gateway and IEEE 802.15.4g Mote for Enhancing Indian Smart City Networks", IEEE International Conference on Intelligent Reality (ICIR 2024), IEEE, Coimbra, Portugal, 2024.
14. B. Erasmus Arockiam, Ramu Parupalli, B. Vijayalakshmi, Hendry Anupama, "Identification of learning attitude by grouping using K-Prototypes clustering for Learner motivational activities in E-Learning– an Implementation", 2024 IEEE 6th International Conference on Cybernetics, Cognition and Machine Learning Applications (ICCCMLA), IEEE, Hamburg, Germany, Pages 45-49, 2024
15. Sunnam Venkata Srikanth, Santosh Sam Koshy, R. Harin, M. Prasad, C. Murali Krishna, "India's V2X Future: C-V2X vs. DSRC – A Comparative Study", 2024 IEEE 10th International Conference on Engineering and Emerging Technologies (ICEET), IEEE, Dubai, United Arab Emirates, 2024.
16. Shiva Sharma, Naresh Kumar, and Manjit Kaur, "Enhanced Accuracy for Indoor Position Estimation using Smart Phone Sensors' Data via Sensor Fusion and MLP", "Proceedings of 5th India Council International Subsections Conference (INDISCON)", IEEE, Chandigarh, Pages 1-6, 2024.
17. S. Kumar, Y. Sapru and N. S. Chahal, "Malicious program detection using distinct textural features and fine-tuned InceptionV3 model", IEEE 5th India Council International Subsections Conference (INDISCON), IEEE, Online, Pages 1-6, 2024.
18. Kareena Yadav, Pawan Srivastava, Balwinder Singh, "Comparative Analysis of Different Operational Transconductance Amplifiers", 2024 IEEE 5th India Council International Subsections Conference (INDISCON), IEEE, Chandigarh, India, Pages 1-6, November, 2024.
19. Dr. Madhurendra Kumar, Sourish Behera, Kumar Bhaskar, Ashu Krishna, and Hari Prakash, Srivastava, "Smart Card Reading Optimization Using Dynamic Framing Protocol (DFP) on RFID Reader System", 2024 13th International Conference on System Modeling & Advancement in Research Trends (SMART), IEEE, Teerthanker Mahaveer University, Moradabad, UP, India, ISBN: 979-8-3503-8058-3, 2024.

20. Ravi Payal, Amit Prakash Singh, "Model of FPGA Enabled body monitoring system using I2C protocol", Library of Progress-Library Science, Information Technology & Computer, Volume-44, Issue-3, 2024.

21. Ravi Payal, Amit Prakash Singh, "Optimizing Machine Learning applications: A comparative Study of AVR, ARM and FPGA", Nanotechnolgy Perceptions, Volume-20, Issue-6, 2024.

22. Lakshmi Kalyani, Mary Jacintha, Debjit Kar, Notan Roy, V. K. Sharma, "A Comparative Analysis of Text Embeddings (TF-IDF, Word2Vec, Fast Text) for Machine Learning-Based Fake News Detection", TIJER International research journal, Volume 11, Issue 6, Pages 760-763, 2024.

23. Samruddhi Mane, Ritesh R. Dhote, Aditya Kumar Sinha, Raja Thirumalaiswamy, "Digital twin in the chemical industry: A review", Digital Twins and Applications, Volume-1, Issue-2, Pages 103-197, December 2024.

24. Amit Saxena, et al., "A Study on Post Quantum - Recent Techniques, Challenges and Bibliometric Analysis", DOI:10.1109/PuneCon63413.2024.10895634, December 2024, Proceedings of IEEE Pune Con 2024, IEEE, Pune, India, December 13-15, 2024.

25. G. Belekar, M. Modani and A. Banerjee, "Portfolio Optimization using Accelerated Quantum Simulation", International Conference on Trends in Quantum Computing and Emerging Business Technologies, Pune, India, 2024, doi: 10.1109/TQCEBT59414.2024.10545076., Pages 1-6, 2024.

26. Arsheyee Shahapure, Rajat Gupta, Prathamesh Bhole, Vethonulu Losu, Madhura Kulkarni, Anindita Banerjee, "Detection of Malignant Cancerous Nuclei Using Quantum Hadamard Edge Detection Algorithm", 2024 IEEE Pune Section International Conference (PuneCon), IEEE, Pune, Pages 1-6, December 2024.

27. Swapna Yenishetti; Ganesh Karajkhede; Lakshmi Panat, "Methodology for development of Artificial Intelligence based model for Ayurved Tongue examination", 2024 IEEE 9th International Conference for Convergence in Technology (I2CT), Conference paper Published in IEEE Explore; Date Added to IEEE Xplore: 10 June 2024; (https://ieeexplore.ieee.org/document/10543901), Lonavala, Pune, India, Pages-1-7, 2024.

28. Swapna Yenishetti; Ganesh Karajkhede; Lakshmi Panat, "Virtual Yoga Teacher with AI Model For Yoga Posture Correction For Good Health", ITU Kaleidoscope: Innovation and Digital Transformation for a Sustainable World (ITU K) 2024, 13 December 2024, (https://ieeexplore.ieee.org/document/10772930), Bharat Mandapam, New Delhi, India, Pages 1 - 8, 2024.

29. Snehal C. Sapkale, Swapna Yenishetti, Lakshmi Panat, "Artificial Intelligence (AI)-Deep Neural Network (DNN) based Classification model to find BI-RADS score from Mammogram Images", 2024 5th IEEE Global Conference for Advancement in Technology (GCAT), Karnataka, India. October 4-6, 2024, IEEE Explore, Nagarjuna College of Engineering & Technology (NCET), Bengaluru, Pages 1-7, 2024.

30. Manish Kumar Gupta, Gaurav Phokmare, Sonal Todkar, Siddharth Dhawan, Hemant Desai, Neha Gupta, Yogesh Shishodia, Saurabh Salunkhe, "Chitrantaran: Web-based Platform to Enhance the Document Digitization Process using OCR and Machine Translation", 2024 4th Interdisciplinary Conference on Electrics and Computer (INTCEC), INTCEC 2024, 11 - 13 June 2024, https://ieeexplore.ieee.org/document/10602999, Lewis University, Chicago, Romeoville, Illinois, USA, Pages 1-6, 2024.

31. Pavan Kurariya, Prashant Chaudhary, Jahnavi Bodhankar, Lenali Singh and Ajai Kumar, "Interlingual Syntactic Parsing: An Optimized Head-Driven Parsing for English to Indian Language Machine Translation", International Journal on Natural Language Computing, Volume-13, Number 4, August 2024.

32. Pavan Kurariya, Prashant Chaudhary, Jahnavi Bodhankar, Lenali Singh and Ajai Kumar, "Bi-Directional Head-Driven TAG Parsing for English to Indian Language Machine Translation", Computer Science and Information Technology Advances, AIRCC Publishing Corporation, Chennai, India, August 17 - 18, 2024.

33. M. K. Gupta et al., "Chitrantaran: Web-based Platform to Enhance the Document Digitization Process using OCR and Machine Translation", 4th Interdisciplinary Conference on Electrics and Computer (INTCEC), INTCEC61833.2024.10602999, Chicago, IL, USA, Pages 1-6, 2024.

34. Hruturaj Nikam, Mahesh Bhargava, Sibadatta Sasmal, Pavan Dhote, Lenali Singh, "Enhancing Agricultural Practices with AgroDialogue: A Chatbot Framework", 7th International IEEE conference PUNECON – 2024, IEEE

International Conference, DEFENCE INSTITUTE OF ADVANCED TECHNOLOGY (DIAT), Pune, Pages 1-6, December 2024.

35. Nigod Dayal Dhurke, Sanjay Rabidas, Sanket Vijay Narkhede, "Intelligent Dictionary Elements Extraction using Optical Character Recognition and Deep Learning based Object Detection", (https://doi.org/10.1109/I2CT61223.2024.10544007), Proceedings of 2024 IEEE 9th International Conference for Convergence in Technology (I2CT), 05-07 April 2024, IEEE 9th I2CT 2024, India, Pages 6 (Paper id 533), 2024.
36. Suresh Sharma, Manisha Mantri, and Gaur Sunder, "Digital health standards in nursing informatics: Working with SNOMED CT and nursing terminology", National Conference on Digital Transformation in Nursing: Clinical Judgement & Documentation, VSPM Madhuribai Deshmukh Institute of Nursing Education, Lata Mangeshkar Hospital, Nagpur, India, June 2024.
37. Suresh Sharma, Achyut Patil, Manisha Mantri, and Gaur Sunder, "Enhancing ePrescription with SNOMED CT multiple-lingual capability", SNOMED International Expo 2024, Seoul, South Korea, October 2024.
38. B. Kavitha, Manisha Mantri, S. Sarbadhikari, "Position paper on Nursing Informatics in India", National Nursing Summit on Digital Health, Jio World Convention Centre, Mumbai, October 4, 2024.
39. Arpit Kahndelwal, Tushar Fegade, Shailendra Singh Narwariya, Gaur Sunder, "Impact of Medical Imaging in Telehealth", TELEMEDICON 2024 International conference of Telemedicine Society of India, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, November 28-30, 2024.
40. Sneha Todkar, Bhumika Kawashi, Shailendra Singh Narwariya, Gaur Sundar, "Mechanism of Privacy & Security in Telehealth Scenario", TELEMEDICON 2024 International conference of Telemedicine Society of India, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, November 28-30, 2024.
41. Ameya Patil, Tushar Fegade, Shailendra Singh Narwariya, Gaur Sunder, "Role of Digital Twins in Healthcare", TELEMEDICON 2024 International conference of Telemedicine Society of India, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, November 28-30, 2024.
42. Madhura Deo, Bhumika Khawshi, Shailendra Singh Narwariya, Gaur Sunder, "Medical Standards for Telehealth", TELEMEDICON 2024 International conference of Telemedicine Society of India, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, November 28-30, 2024.
43. T. S. Murugesh Prabhu, Yogesh Kumar Singh, Upasana Dutta, Girishchandra Yendargaye, "Flood Early Warning System utilizing direct-rainfall method in a 2-D hydrodynamic model", National Symposium on Tropical Meteorology, TROPMET 2024, NIT, Rourkela, Odisha, 2024.
44. Dutta Upasana; Singh Yogesh Kumar; Prabhu T S Murugesh; Y Girishchandra; Kale Rohini; Khare Manoj Kumar; Kumar Binay; Panchang Rajani (2023), "Embankment Breach Simulation and Inundation Mapping: Leveraging High-Performance Computing for Enhanced Flood Risk Prediction and Assessment", ISPRS Technical Commission III, Mid-term Symposium on Remote, ISPRS, Belém, Brazil, 4-8 November 2024.
45. Ghogale K. N., Apare R. S., & Borhade R. H., "A Deep Residual Network-Based Approach to Reidentify Persons via Face Features Extraction from Video Frames", IEEE International Conference on Blockchain and Distributed Systems Security (ICBDS) (pp. 1-5), IEEE, Pune, India. October 17 - 19, 2024.
46. Karamtoth Shankar Naik Rathod, "Occlusion-Aware u-net Framework for Enhanced Road Extraction in high-resolution Satellite Imagery", Souvenir Cum Abstract Volume National Symposium on Remote Sensing for Sustainable Future: A Roadmap towards Viksit Bharat & Annual Convention of Indian Society of Remote Sensing and Indian Society of Geomatics, ISRS 2024, Pages 70-71, Dr. A. P. J. Adbul Kalam Technical University, Lucknow, UP, 2024.
47. Meenal M., Sivakumar, V. Sourish C., "Remote Sensing of Soils, Minerals and Rocks", Remote sensing of earth surface features and natural resources, Pages 85-116, Indira Gandhi National Open University (IGNOU), New Delhi, 2024.

48. R. Rastogi, A. Srivastava, N. Mangalath, B. Mahajan, S. Ghosh and S. Phadke, "Fast Reverse Time Migration with Enhanced Efficiency and Reduced Computational Load Using Partial Snapshot Storage", Pages 1-5, 85th EAGE Annual Conference & Exhibition, European Association of Geoscientists & Engineers, Oslo, Norway, 2024.

49. Richa Rastogi, Abhishek Srivastava, Monika Pokharkar, Nithu Mangalath, & Saheb Ghosh, "Efficient imaging aperture criterion for reduction of computational cost of TTI RTM", ASEG DISCOVER Symposium (ASEG), Zenodo, Hobart, Australia, 2024.

50. Neelkumar K. Shah, Mayur Bilapate, Sachin Nandurkar, Mohammad Aziz Maalik, Niteshkumar Harne, Karimullah Shaik, Ajai Kumar, "Security Assessment Framework and Evaluation for Blockchain Applications (SAFE-Block)", 2024 IEEE International Conference on Blockchain and Distributed Systems Security (ICBDS), IEEE Xplore, Pages 1-11, VIT College, Pune, India, October 17 - 19, 2024.

51. Islam S., Karipot A., Bhawar R., Sinha P., Kedia S. and Khare M., "Urban heat island effect in India: a review of current status, impact and mitigation strategies", Discover Cities, 1(1), pp.1-28, 2024.

52. Govardhan G., et al (2024), "Decision Support System version 1.0 (DSS v1.0) for air quality management in Delhi, India", Geoscientific Model Development, DOI:10.5194/gmd-17-2617-2024, 2617–2640, April 17, 2024.

53. Karrevula N. R., Nadimpalli R., Sinha P., Mohanty S., Boyaj A., Swain M. and Mohanty U.C., "Performance Evaluation of WRF Model in Simulating Extreme Rainfall Events Over Bhubaneswar Urban Region of East Coast of India" Pure and Applied Geophysics, pp.1-27, 2024.

54. Karrevula N.R., Boyaj, A. Sinha, P., Nadimpalli R., Mohanty U.C., Islam S., Kaginalkar A. and Vinoj V., "Role of planetary boundary layer physics in urban-scale WRF model for predicting the heat waves over tropical city Bhubaneswar", Journal of Earth System Science, 133(3), pp.1-26, 2024.

55. Boyaj A., Karrevula N.R., Sinha P., Patel P., Mohanty U.C. and Niyogi D., "Impact of increasing urbanization on heatwaves in Indian cities", International Journal of Climatology, 44(11), Pages 4089-4114, 2024.

56. Boyaj A., Sinha P., Mohanty, U.C., Vinoj V., Ashok, K., Islam, S., Kaginalkar A. and Khare M., "Projected frequency of low to high-intensity rainfall events over India using bias-corrected CORDEX models", Atmospheric Research, p.107760, 2024.

57. Palash Sinha, Sahidul Islam, Sumita Kedia, Ketaki Belange, T.S. Saikrishna, Neelesh Kharkar, and Manoj Khare, "Heatwave Predictions and Decision Support System for Advisory", TROPMET 2024, NIT Rourkela, December 10-12, 2024.

58. Bhawar Rohini L., Vinay Kumar, Divyaja Lawand, Sumita Kedia, Mrunal Naik, Shripriya Modale, P. R. C. Reddy, Sahidul Islam, Manoj Khare, "Aerosol Emission Patterns from the February 2019 Karnataka Fire", Fire, 7, 424. https://doi.org/10.3390/fire7120424, 2024.

59. Annapurna S. M.; Sarath Chandran R.; Haneesh Sankar T. P.; Rajesh K. R., "Enhancing Accuracy in Doppler Frequency Shift Estimation and Velocity Measurement for Doppler Velocity Log Applications: A Comparative Study", IEEE: 2024 11th International Conference on Signal Processing and Integrated Networks (SPIN), IEEE, Noida, Pages 322 -327, 2024.

60. Vinukumar A. R., Premjith A. V., Sri Ram Shankar Rajadurai, Sivakumaran Natarajan, "Implementation and Testing of Programmable Logic Controller (PLC) functionality on C-DAC VEGA RISCV Microcontroller using OpenPLC", Emerging Electronics and Automation (E2A 2024), Springer, NIT Silchar Assam, Pages-12, 2024.

61. Abitha A., Swetha C., Ramesh P., Aby Joseph, Sreeranjini S. V., "Design and experimental investigation of Battery Management System", SCOPUS & Web of Sciences (ICRRCE-2025), IEEE International Conference on Power Electronics Drives and Energy Systems PEDES 2024, NIT, Suratkal, December 18 - 21, 2024.

62. Priya S, Jiju K., Dr. Om Krishan Singh, Viji Bharati, D. Shankar, Hari Prasad, "Testing features of the Indigenous Protocol Testing Platform for Indian Smart & Static Energy Meters", International Conference on Emerging Technologies: Micro to Nano (ETMN 2024), JMI, November 22-23, 2024.

63. Neethu K. V., Jiju K., Aby Joseph, Indhu T. R., Arun Gopi Davidson C., Mahesh T., Sherin John, "Indigenous Implementation of Advanced Metering Infrastructure, "Metering India 2024", Delhi, November 21-22, 2024.

64. Priya S., Jiju K.,Dr. Om Krishan Singh, Viji Bharati, D. Shankar, Hari Prasad, "Development of Indigenous Protocol Testing Platform for Smart & Static Energy Meters Adhering Indian Standards", International Conference on Engineering and Emerging Technologies (ICEET) 2024, ICEET, Dubai-UAE, December 27-28, 2024.

65. Neethu K. V, Jiju K., Aby Joseph, Indhu T. R., Arun Gopi, Davidson C., Mahesh T., Sherin John, "Implementation of Advanced Metering Infrastructure in the Indian Context with an Indigenous Approach", International Conference on Engineering and Emerging Technologies (ICEET) 2024, Dubai-UAE, December 27-28, 2024.

66. Jinuraj K. G., Lekshmi K. R., Athira B. P., Aby Joseph, "Addressing Low Frequency Circulating Current Challenges in Solar Grid-Connected Systems with Parallel Inverters", IEEE International Conference on Signal Processing, Informatics, Communication and Energy Systems SPICES 2024, Indian Institute of Information Technology, Kottayam, September 20 – 22, 2024.

67. Lekshmi K. R., Athira B. P., Brijesh P., Aby Joseph, "Implementation of Grid Connected Solar PV power plants with parallel inverters", 9th International Conference for Convergence in Technology (I2CT), Pune, April 5 – 7, 2024.

68. Lekshmi K. R., Athira B. P., Anoop P., Jinuraj K. G., Aby Joseph, "Mitigation of Circulating Currents in Parallel-Connected Solar PV Inverters: Real-Time Implementation and Analysis", IEEE International Conference on Power Electronics Drives and Energy Systems PEDES 2024, NIT, Suratkal, December 18-21, 2024.

69. Jayan P. P., Dr P. V. Unnikrishnan, Asok Kumar, "Green Grid Kerala: Empowering Government Buildings Through Microgrid Innovation", 50th Annual Conference of the IEEE Industrial Electronics Society IECON 2024, Chicago Illinois, November 3-6, 2024.

70. Jayan P. P., Aby Joseph, Vivek R. S., Divyamol S., "Investigating Copper and Aluminum Heat Sinks 'Thermal Performance in Power Electronic System", 2nd International Conference on Recent Innovations and Developments in Mechanical Engineering, ICRIDME 2024, NIT, November 14-16, 2024.

71. Muraleedharan, N., Rishikesh Rajendra Neve, Samar Sarkar, Balaji Rajendran, "InTrust: An Asset Monitoring, Analysis and Vulnerability Assessment System for Zero Trust Network", Lecture Notes in Computer Science, vol 15416. Springer, Cham. https://doi.org/10.1007/978-3-031-80020-7_28, Springer, Jaipur, India, 2025.

72. Solaimurugan Vellaipandiyan, "A Novel Approach to Document Similarity Retrieval Using Sentence Transformers and Vector Databases", Institute of Electrical and Electronics Engineers (IEEE), Chennai, India, 2025.

73. Dhivya G et al., "Low-Energy Zigbee Fire Detection Node: Design and Power Performance Analysis", IEEE International Conference on Consumer Electronics (ICCE 2025), IEEE, Las Vegas, USA, 2025.

74. Sunnam Venkata Srikanth, Santosh Sam Koshy, R Harin, M. Prasad, C. Murali Krishna, "Connected Vehicles Testbed for Real-Time Deployment of Use Cases at TiHAN IIT Hyderabad", IEEE Applied Sensing Conference (IEEE APSCON 2025), IEEE, Hyderabad, 2025.

75. Soumyadeb Bhattacharyya, Arindam Niyogi, Shubhajit Bhar, Koustuv Ghosh, Souvik Pal, Subhankar Mukherjee, Amitava Akuli, Bijay Kumar Behera, and Alokesh Ghosh, "Qualitative Wheat Age Testing with Relation to Amylose Content Through Image Analysis-Based Web Algorithm", International Conference on Systems and Technologies for Smart Agriculture, Springer, Kolkata, Pages 529 - 538, 2025.

76. V. Vyas, A. Pandharpatte, A. Saxena, "Variational Quantum Eigensolver for Molecular Dynamics: A Benchmark Study", Proceedings of Accelerating Biology 2025: Compute to Transcend, URL: https://cdac.in/index.aspx?id=ev_symposium_2025, January 7-9 2025, Pune, India, 2025.

77. Vinukumar A. R., Premjith A. V., Sri Ram Shankar Rajadurai, Sivakumaran Natarajan, "Implementation of OpenPLC Runtime on C-DAC VEGA RISC-V and Benchmarking of Programmable Logic Controller (PLC) functionality with equivalent Microcontrollers", IEEE digital explore library (ICMRACC 2025), IEEE, Vimal Jyothi Engineering College, Chemperi, Kannur, Page-9, 2025.

78. Vinukumar A. R., Premjith A. V., Sri Ram Shankar Rajadurai, Sivakumaran Natarajan, “Implementation of ASCON Light-Weight Cryptography block for OpenPLC and its evaluation on C-DAC VEGA RISC-V Microcontroller”, SCOPUS & Web of Sciences (ICRRCE-2025), Bentham Science, Rajarajeswari College of Engineering College, Bengaluru, Karnataka, Page 8, 2025.
79. Aniket Bembale, Nagendra Singh, Vinayaka P., Jitesh Choudhary, “Quantum Computing for Graph Optimization: An Approach to the Shortest Path Problem”, Emerging Trends and Technologies on Intelligent Systems (ETTIS 2025), Volume: V, Springer, Pages-12, C-DAC Noida, 2025.
80. Girishchandra Yendargaye, Upasana Dutta, Yogesh Kumar Singh, T S Murugesh Prabhu, “Advancing Flood Prediction Lead Time: Automated parallel Data Assimilation and High-Performance Computing”, ICARS 2025, Barcelona, Spain, 2025.
81. Yogesh Kumar Singh, Upasana Dutta, T. S. Murugesh Prabhu, Girishchandra Yendargaye, Rohini Kale, Manoj Kumar Khare, Binay Kumar, “Leveraging HPC and Advanced Hydrological Modeling for Accurate Flood Forecasting”, Energy High Performance Computing Conference, Rice University's BRC, Houston, Texas, USA, February 25-27, 2025.
82. Manish Kumar Gupta, Siddharth Dhawan, Lakshmi Panat, “FASTer: Handwritten text line segmentation using customized FAST with erode for Marwari (Heritage script)”, 12th International Conference on Signal Processing and Integrated Networks (SPIN 2025), 20-21 February 2025, Springer, ASET, Amity University, Sec-125, Noida, Delhi-NCR, India, 2025.
83. Pavithra Arcot et al., “Evaluating the Performance of IEEE 802.15.4g for Smart City Applications”, IEEE International Conference on Consumer Electronics (ICCE 2025), IEEE, Las Vegas, USA, 2025.

Invited Talks

1. Dr. S. D. Sudarsan, "Invited Speaker", Super Computing Asia (SCA2025), Singapore, March 13, 2025.
2. Dr. S. D. Sudarsan, "Invited Speaker", ATAL FDP on Supercomputing - "Challenges in Supercomputing: Scalability and Energy Efficiency", Online mode, February 21, 2025
3. Dr. S. D. Sudarsan, "Invited Speaker", 53rd WWRF Conference- Future of Chip Design Session, BITS, PILANI Hyderabad, February 20, 2025.
4. Dr. S. D. Sudarsan, "Key Note Speaker", Indocrypt Tutorial, Chennai, December 20, 2024.
5. Dr. S. D. Sudarsan, "Key Note Speaker", International Symposium of Quantum Computing-ISQCI 2024, STPI, Kolkata, December 18, 2024.
6. Dr. S. D. Sudarsan, "Key Note Speaker", ICISS, Jaipur, December 16, 2020.
7. Dr. S. D. Sudarsan, "PULSE 2024", NASSCOM–DSCI Annual Information Security Summit (AISS), Hotel Pullman, Aerocity, New Delhi, December 06, 2024.
8. Dr. S. D. Sudarsan, "Chief Guest", DST-NGP Sponsored Winter School, Chennai institute of Technology, November 4, 2024.
9. Dr. S. D. Sudarsan, "Chief Guest", Empowering CXO 2024, Taj Santa Cruz, Mumbai, April 02, 2024.
10. Dr. S.D. Sudarsan, "Chief Guest", 2nd IEEE International Conference on Network &Communication-ICNWC 2024, SRM Institute of Science & Technology, Kattankulathur, Chennai, April 3, 2024.
11. Deepika H V and Ashish Bisht, "SYCL programming", Device Agnostic Programming Models Training Series - SyCL, Chapel, and OpenACC Lecture, NCI, Australia (online), May 29, 2024.
12. Deepika H V, "Introduction to Parallel Computing", Master trainer Programme for AICTE, Bangalore, June 3, 2024.
13. Vandana K, "Introduction to GPU and OpenACC Programming", Master trainer Programme for AICTE, Bangalore, June 3, 2024.
14. Prachi Pandey, "Automatic parallelizer and its Challenges", ADAC Working Group, Online, September 03, 2024.
15. Shamjith K V and Henry Sukumar, "HPC-Quantum-and-Beyond-Initiative-CDAC", HiPC International Conference 2024, Bengaluru, December 19, 2024.
16. Deepika H V, "Deep Dive into Supercomputing: Architecture, Parallel Processing and Real-World Impact", ATAL FDP on Supercomputing, Amrita Vishwa Vidyapeetham (online), February 17, 2025.
17. Deepika H V, "HPC & System Software", Supercomputing Asia 2025 conference (SCA 2025), Singapore, March 13, 2025.
18. Dr. Muraleedharan N, "Software based Packet processing", Industry, Research & User Symposium (IRUS) as part of the 31st IEEE International Conference on High Performance Computing, Data, and Analytics (HiPC), Bangalore, December 21, 2024.
19. Dr. Muraleedharan N, "Next Generation Defence: Unleashing Design thinking for Cyber security and Digital Forensics", Ramaiah Institute of Technology, Bangalore, Bangalore, February 19, 2024.
20. Surabhi Dwivedi, "Generative AI as a Catalyst for Business Growth", NOVA 2024: Data to Dollars Business Conclave, Christ University Bangalore, November 23, 2024.
21. Surabhi Dwivedi, "Generative AI and Education", NOVA 2024: Data to Dollars, SBM Christ Bangalore, Christ University Bangalore, June 4, 2024.
22. Jitendra Kumar, "A Tutorial on Post Quantum CA Software", Workshop on Post Quantum Cryptography, LNMIIT, Jaipur, December 16, 2024.
23. Sumit Kumar Saurav, "Navigating the performance optimization, scalability, and sustainability challenges of urban modelling and simulations using Param Utkarsh", AICTE Master Trainer Programme on HPC, C-DAC,

Knowledge Park Bangalore, June 3 -14, 2024.

24. Lagineni Mahendra, "IEC 62351 SmartGrid Security Standards", Cyber Jaagrookta Diwas, Online Conducted by SRLDC, August 7, 2024.
25. R K Senthil Kumar, "HPC", Student association ACE (Association of Computing Engineers), Online – SASTRA, August 26, 2024.
26. M Siddharth Rao, "OT-SOC", Cyber Security Awareness program for Power & Energy Sector utilities as part of National Cyber Security Awareness Month (NCSAM)-2024 by NCIIPC, Online, NCIIPC, Delhi, October 14, 2024.
27. Raja Vasudevan, "Security Operations Centre", Cyber Security training programme for Power system professionals, NPTI, Bangalore, December 12, 2024 and February 13, 2025.
28. Venkatareddy Kolagatla & Vivian Desalphine, "Efficient Digital, Analog/Mixed Signal Design Flow with 180nm PDK", Tutorial at the 28th International Symposium on VLSI Design and Test (VDAT), VIT, Vellore, September 01-03, 2024.
29. Raghavendra S. Patil, "Cryptology in Password-Based Systems", Faculty Updation Program (FDP), R.C. Bose Centre for Cryptology & Security, Indian Statistical Institute, Kolkata, December 27, 2024.
30. Solaimurugan Vellaipandiyan, Shib Kumar Saraf, "Generative AI and its Usage in Real-Life", SRM-ASI Student Chapter, in association with Analytics Society of India (ASI) : startup ideas in AIx/ML, SRM Institute of Science and Technology (SRMIST), Chennai, India, February 4, 2025.
31. Gokul Swaminathan, "Keynote talk at UbuCon Asia 2024 (BOSS AND FOSS)", UbuCon Asia 2024, JECRC Foundation, Jaipur, India, December 11, 2024.
32. Dr. Priyanka Jain, "Future of Neurosciences - Changing Paradigm & Solutions", DNACON-27th Annual Conference Delhi Neuro Association, February 2, 2025.
33. Arun Kumar, "Navigating the Digital Highway: Safeguarding Your Online Journey", Internet Safer Day, Departments of Science and Technology, New Delhi, February 11, 2025.
34. Sunil Kumar P, "Mobile Threat Landscape Trends, Forecasts & Mitigations", Cyber Security Awareness Workshop, Vignana Bharathi Institute of Technology (VBIT), Online, February 12, 2025
35. Sandeep Romana, "The Curious Case of XZ Backdoor", 17th National Workshop on RECENT TRENDS IN SOFTWARE TESTING (RTST - 2024), NIT Warangal, December 1, 2024.
36. Jyostna Grandhi, "Blockchain Anatomy", Asian Productivity Organization (APO) online Training Programme", Online, April 2, 2024.
37. Jyostna Grandhi, "From Concept to Reality: Applications Powered by the National Blockchain Framework", 2nd IEEE India Blockchain Forum 2024 (IIBF), Online, September 20, 2024.
38. Himanshu Sahu, "Mobile Security: Android Decompiling and Recompiling", Android Bootcamp National Institute of Technology, Trichy, Online, September 04, 2024.
39. Himanshu Sahu, "Introduction to Mobile App Security, Hands ON security session", Programme on Application Security, IDRBT, Hyderabad, December 11, 2024.
40. Himanshu Sahu, "Mobile Security and fintech", FinTech security Bootcamp - IIT BHILAI, Online, February 05, 2025.
41. Himanshu Sahu, "Mobile Security and Fintech", FinTech security Bootcamp - IIT BHILAI, Online, February 28, 2025.
42. Himanshu Sahu, "Mobile Security, Threat Modelling, SAST and DAST", Bootcamp on FinTech Security - NIT WARANGAL, Online, March 4, 2025.
43. Tapas Saini, "Responsible AI", Advanced ATAL Faculty Development Program: Enhancing Diagnostic Precision: A Deep Learning-Powered Intelligent System for Retinal Vein Occlusion Diagnosis, Narayanamma Institute of Technology & Science (GNITS), Hyderabad, December 10, 2024.
44. Tapas Saini, "Uses of AI in Deepfake", Conference on AI in Policing, CDTI, Hyderabad, February 19, 2025.

45. Vivek Nainwal, "Introduction to Quantum Computing and QSim", Quantum Aaccelerated Computing Symposium and Workshop, Symbiosis Institute of Technology (SIT) Pune, October 16, 2024.
46. Vivek Nainwal, "Quantum Accelerated Computing, Presentation and Demo on QSim", Confluence 2024, Industry-Academia Meet, Rajagiri School of Engineering and Technology, Kochi, Kerala, November 6, 2024.
47. Vivek Nainwal, "Technical session on QSim (Quantum Computer Simulator Toolkit)", Quantum Computing Explained: From Qubits to Quantum Algorithms, Kolkata, December 14, 2024.
48. Dr. Sunnam Venkata Srikanth, "IoT Applications in Agri Sector", ECHO AI and IoT Applications in agri and allied sectors, Extension Education Institute, Hyderabad, August 6, 2024.
49. Dr. Sunnam Venkata Srikanth, "An Advance IoT Initiatives", ECHO Digital Marketing Strategies for Agri and Allied Sectors, Extension Education Institute, Hyderabad, February 5, 2025.
50. Dr. Sunnam Venkata Srikanth, "IoT in Agriculture", International ITEC Training Programme on 'Integration of Remote Sensing, GIS, Drones and AI in Agriculture Extension', MANAGE, Hyderabad, March 3, 2025.
51. Santosh Sam Koshy, "IoT Applications in Agriculture - Need, Case Studies & Challenges", Smart Digital Tools for Sustainable Agriculture, ICAR-CRIDA, October 16, 2024.
52. Indraveni Ch, "ISMS Awareness for TSNPDCL employees", Cyber Security awareness training program, Telangana State Northern Power Distribution Company Limited (TSNPDCL), June 7, 2024.
53. Indraveni. Ch, "MFA and Secure Online Transactions", Central Industrial Security Force (CISF) Trainees Batch, NISA, Hakimpet, June 19-24, 2024.
54. Indraveni. Ch, "Risk Assessment to BHEL Vigilance Officers", Vigilance Awareness Week Talks, Bharat Heavy Electricals Limited (BHEL), Hyderabad, July 26, 2024.
55. Indraveni. Ch., "Cyber Security Lifecycle", Guest Lecture in their Cyber Commando Training Program, The Sardar Vallabhbhai Patel National Police Academy (SVPNPA), September 11, 2024.
56. Indraveni. Ch., "Data sharing policy and GIGW guidelines", Guest Lecture, Annual meet of Officers, Survey of India, September 29, 2024.
57. Indraveni. Ch., "Identification of Vulnerabilities and mitigation from Cyber Attacks", Invited Speaker, Annual Conference, Electronics Corporation of India Limited (ECIL), October 8, 2024.
58. Indraveni. Ch., "Cyber Threats and Attacks", Guest Lecture, Cyber Commando Training Program,

The Sardar Vallabhbhai Patel National Police Academy (SVPNPA), Hyderabad, October 22, 2024.

59. Indraveni. Ch., "Vulnerability Assessment and Mitigation", Two-week training program to Bank employees", Institute for Development and Research in Banking Technology (IDRBT), December 10, 2024.
60. Indraveni. Ch., "Auditing Critical Information Infrastructures", Invited Speaker, National Awareness Month Session, National Cyber Security Awareness Month (NCSAM) 2024, National Critical Information Infrastructure Protection Centre (NCIIPC), October 28, 2024.
61. Indraveni. Ch., "Auditing Critical Information Infrastructure specific to transport security", Invited Speaker for National Awareness Month Session, National Critical Information Infrastructure Protection Centre (NCIIPC), October 16, 2024.
62. Vijayalakshmi B., "Use of AI for augmentation of citizen-centric digital resources - Vikaspedia as a case", Digital tools for management of knowledge resources for rural development, National Institute of Rural Development and Panchayati Raj, Hyderabad, September 13, 2024.
63. Vijayalakshmi B., "Use of Vikaspedia in agriculture extension", Smart Digital Tools for Sustainable Agriculture, ICAR-Central Research Institute for Dryland Agriculture, Hyderabad, October 16, 2024.
64. Vijayalakshmi B., "Vikaspedia as a resourceful Community media", Indigenous languages and Community media, UNESCO Chair for Community Media, University of Hyderabad, December 3, 2024.
65. M. Kumar, "Securing the Future: Integrating Cybersecurity & AI into IoT Systems - Emerging Trends and Best Practices", ATAL FDP on Implementing Cybersecurity and IoT in AI: Recent Trends, Sri Durga Malleswara

Siddhartha Mahila Kalasala, Vijayawada, Andhra Pradesh, September 10, 2024.

66. M. Kumar, "Digital Innovations in Agriculture", International ITEC training program on "Applications of ICTs in Agriculture", ICAR-MANAGE, Hyderabad, November 19, 2024.
67. M. Kumar, "Shaping Your Career in Cyber Security", C-DAC's Skill Development Opportunities, RGUKT (IIIT), Nuzvid, December 13, 2024.
68. Dr. Amitava Akuli, "AI Based Imaging Solution for Detection of Pest Attack in Tea Leaves using Aerial Imaging", Annual Conference of UPASI", UPASI, Coonoor, Tamil Nadu, September 17, 2024.
69. Dr. Amitava Akuli, "Electronic Trading of Agriculture Commodities with Special Reference on ENAM", ICTs in Agricultural Marketing, UPASI, Coonoor, Tamil Nadu, October 10, 2024.
70. Dr. Subhankar Mukherjee, "Bioelectronic systems: present and future", University of Engineering & Management, Kolkata (UEM), University Area, Plot No. III, University of Engineering & Management, New Town, B/5, New Town Rd, Action Area III, New Town, West Bengal, Online, September 23, 2024.
71. Dr. Subhankar Mukherjee, "Digitalisation and information technology in healthcare: C-DAC initiatives", CME cum Workshop (Hybrid Mode) on use Of Digital Platform for Prescription Analysis for Rational Therapeutics and Controlling Anti-Microbial Resistance, SVS Medical College, Mahbubnagar, August 23, 2024.
72. Sourav Mitra, "DPDP Act overview and impact", DISA, Online, August 28, 2024
73. Dr. Asok Bandyopadhyay, "Cyber Hygiene and Security", Cyber Hygiene Workshop as part of Vigilance awareness week, Haldia Dock Complex (HDC), Guest house Lounge at Haldia, August 29, 2024.
74. Dr. Asok Bandyopadhyay, "Cyber Hygiene and Security", Cyber Hygiene Workshop, National Institute of Fashion Technology (NIFT), Kolkata, September 24, 2024.
75. Sourav Mitra, "Cyber Security", Cyber Hygiene Workshop", National Jute Board Headquarter, Rajarhat, October 29, 2024.
76. Sourav Mitra, "DPDP Act", National Programme for Training of Scientists & Technologists Working in Government Sector, Mohali, Online, November 21, 2024
77. Bibekananda Kundu, "AI and Machine Learning", Industrial Seminar on Artificial Intelligence and Machine Learning, IEM, Kolkata, September 19, 2024.
78. Dr. Asok Bandyopadhyay, "An Overview of Artificial Intelligence", To impart Training for foundation course for ISDS Officer Trainee, Central Staff Training & Research Institute (CSTARI), Kolkata, January 2, 2025.
79. Barnali Pal, "Trustworthy & Responsible AI", Technical Session for IES newly appointed officers, Central Staff Training & Research Institute, Kolkata, January 2, 2025.
80. Barnali Pal, "R&D Activities of C-DAC", Anwesha Science Magazine Program, Science Session, All India Radio, Kolkata, Broadcasted, January 30, 2025.
81. Dr. Sanjay Sood, "eSanjeevani: Enhancing Access to Medical Care through Technology", Dakshin Workshop, Telehealth - Transformative Digital Health Solution, DAKSHIN – Global South Centre of Excellence (GSCE), New Delhi, August 8, 2024.
82. Dr. Sanjay Sood, "eSanjeevani", Building a Digital Future for Healthcare with Digital Public Goods (1st Regional Workshop - Punjab), Indian Institute of Technology (IIT) Ropar, August 13, 2024.
83. Dr. Sanjay Sood, "Approaches to delivering disability-inclusive", VirtuCare Policy and Practice Forum: Approaches to delivering disability-inclusive, virtual healthcare, Mumbai, September 13, 2024.
84. Dr. Sanjay Sood, "Government Initiatives in Digital Health", Immersion Programme (Contact Programme) for Post-Graduate Certificate Programme in Digital Health (PGCPDH) Batch-II & Executive Leadership, Indian Institute of Management, Raipur, November 24, 2024.
85. Dr. Mandeep Singh, "Developing Technology Products, Technology Identification and Assessment, TRLs", DST Sponsored Training Program on "Technology Innovation and Intellectual Property Management, Mohali, December 11, 2024.

86. Dr. Gurmohan Singh, “Quantum Gates and Circuits”, 03 Day Workshop on 'Quantum Computing Explained: From Qubits to Quantum Algorithms', Kolkata, December 14, 2024
87. Dr. Gurmohan Singh & Dr. Tarun Kumar, “Introduction to Quantum Machine Learning”, 03-day workshop on "Quantum Computing Explained: From Qubits to Quantum Algorithms”, Kolkata, December 14, 2024.
88. Dr. Gurmohan Singh, “Quantum Machine Learning”, AICTE Training and Learning (ATAL) Academy Faculty Development Program on ‘Next-Gen Computing: Advances in HPC and Quantum Technologies for Data-Driven Insights’, Online, December 14, 2024.
89. Dr. Gurmohan Singh, “Quantum Computing and Post-Quantum Cryptography”, Faculty Development Programme on “Quantum Computing and Post-Quantum Cryptography”, University of Delhi, Organized by Electronics and ICT Academy, NIT Patna, and the University of Delhi, February 06, 2025.
90. Chetan Manchanda, “Idea to Asset - IP Management", Workshop on IPR and IP Management for startups, CEC Landran Mohali, August 27, 2024.
91. Dr. Balwinder Singh, “Hardware Security Concerns in VLSI Systems”, Faculty Development Program on AI ML Approaches for efficient VLSI Circuit design”, Noida, December 5, 2024.
92. Dr. Balwinder Singh, “AI-Driven Solution: Agriculture, Healthcare and Beyond”, international Conference on Computing Advances in AI and Machine Learning (ICCAAIML 2024), Chandigarh, December 17, 2024.
93. Dr. Balwinder Singh, “SEMICONDUCTOR INDUSTRY Trends, Challenges & opportunities for India”, Refresher Course on ICT, Online, November 28, 2024.
94. Dr. Balwinder Singh, “Sand to System on Chip: VLSI Design, Fabrication & Testing Flow”, Expert Lecture for B. Tech. and PG Students, Online, Madanapalle Institute of Technology & Science, Angallu, Madanapalle, April 7, 2024.
95. Nirmala Salam, “Blockchain/ Hyperledger Fabric”, Masterclass programme in Emerging Technology, Mukesh Patel School of Technology Management and Engineering, NMIMS, September 25-27, 2024.
96. Dr. Pravin Bhaskar Ramteke, “Advanced Supervised Learning: Introduction to LLMs”, ATAL Online Faculty Development Programme on AI Revolution: From Machine Learning to Generative AI, Yashwantrao Bhonsale Institute of Technology, Sawant wadi, Maharashtra, January 6, 2025.
97. Manish Kumar Verma, “Building Trust in Digital India: Applied Cryptography in Government”, CRYPTOS 2025: 1st Applied Cryptography Workshop, IIT Bhilai, March 10, 2025.
98. Amarjeet Singh Cheema, “Reshaping the world through AI”, National Science Day 2025, AMITY Noida, February 28, 2025
99. Amarjeet Singh Cheema, “Novel AI Initiatives in Health Informatics”, Indian Conference on Medtech Innovations-2025, All India Institute of Medical Science (AIIMS) Jodhpur, February 17, 2025.
100. Amarjeet Singh Cheema, “Digital Transformation in Healthcare”, PHASECON 2025, PGI Chandigarh, February 8, 2025
101. Amarjeet Singh Cheema, “Role of Technology in Digital Health”, Primus and UNDP workshop on Improving public health outcomes: Towards a Health Digital Public Infrastructure (Health-DPI)” for Bhutan, Online, September 27, 2024.
102. Jitendra Singh,”Digital Health and EMR”, iGOT platform Digital Health Foundation Course (DHFC), Online, December 30, 2024.
103. Partha P. Chattaraj, “Effectively Tracking and Monitoring Expendable and Non-Expendable Items using eAushadhi and eUpkaran updates”, 2025 Conference at AH (R & R) by AFMSD Delhi, -AH (R & R) by DGAFMS, January 9, 2025.
104. Dr. Sunita Prasad, “Emerging Trends: A Roadmap to Future”, International Conference on Entrepreneurship, Innovation and Leadership (ICEIL) 2024, Amity University, Sector 125, Noida, October 8, 2024.
105. Dr. Sunita Prasad, “IoT Data Collection & Preprocessing”, AICTE sponsored FDP on Enhancing IoT with Machine

Learning - Innovations & Applications, Vivekananda Institute of Professional Studies - Technical Campus, December 17, 2024.

106. Dr. Lakshmi Kalyani, "e-content development: Authoring tools", Refresher Programme on 'Design, Development and Delivery of MOOCs' under Malaviya Mission Teacher Training Programme (MMTTP) from 02-14 September 2024, Online, September 6, 2024.
107. Dr. Lakshmi Kalyani, "The impact of AI: Trends and Threats", ICCC (International Conference on CyberLaw, Cybercrime & Cybersecurity), Scope Convention Centre, New Delhi, November 14, 2024.
108. Lakshmi Panat, "Trends in AIoT for Viksit Bharat", Third IEEE Conference on AI for IoT, 2024, VIT Vellore (Pre conference Lecture), Vellore, April 18, 2024.
109. Lakshmi Panat, "Trends in AI for Viksit Bharat", Artificial Intelligence Symposium 2024, Organized by Ganapat University, Gujarat, October 21, 2024.
110. Dr. Ganesh Karajkhede, "AyuSoft based diet planning in Chronic Renal Failure", Ayurveda Prachin Gurukul, Baramati, May 1, 2024.
111. Neha Gupta, "Role of "Internationalized Domain Names (IDNs) and Universal Acceptance (UA)" in internet governance", Internet Governance Workshop, C-DAC Pune, February 13, 2025.
112. Vainateya Koratkar, "Localization", Internet Governance Workshop, C-DAC Pune, February 13, 2025
113. Mahesh Bhargava, "Exploring the Landscape of AI and ANNs", Institute's Innovation Council (IIC) at IIIT Nagpur, Indian Institute of Information Technology Nagpur (IIC-IIITN), February 24, 2025.
114. Mahesh Bhargava, "Bridging the Gap Industry Expectation VS. Campus Readiness", Industry Conclave 2025, Symbiosis Institute of Technology, Pune, February 21, 2025.
115. Mahesh Bhargava, "Unified Intelligence: Exploring AI Technologies and Their Applications in Diverse Domains", Expert Industry TechTalk", DYP COE, Pimpari, Pune, February 4, 2025.
116. Mahesh Bhargava, Sibadatta Sasmal, "Reinforcement Learning Trends in Cyber Security", Expert Lecture, MITWPU, Pune, November 21, 2024.
117. Ruma Banerjee, "Reference mapping and variant calling", Faculty Development Programme at SIU, Pune, Symbiosis International University, Pune, April 17-18, 2024.
118. Dr. Sucheta Patil, "NGS file formats and quality control, Differential expression analysis", Faculty Development Programme at SIU, Pune, Symbiosis International University, Pune, April 17-18, 2024.
119. Ruma Banerjee, "Career paths available after a post graduate degree in Life Sciences", Employment prospects in the Computational Biology sector, Symbiosis School of Biological Sciences (SSBS), November 14, 2024.
120. Ruma Banerjee, "Precision Medicine Today: Emerging Trends, Challenges and Career Opportunities for future innovators", Industry Academia meet - Perspective on challenges and opportunities, School of Biotechnology & Bioinformatics, D. Y. Patil University, Navi Mumbai, February 15, 2024.
121. Dr. Sunitha M Kasibhatla, "Bioinformatics overview and Activities at C-DAC", Faculty Development Programme organised by Symbiosis Center for Research and Innovation (SCRI), Symbiosis International University, Pune, April 17-18, 2024.
122. Dr. Sunitha M Kasibhatla, "Overview of Bioinformatics", Bioinformatics: Coding Workshop organized by AFMC, Pune, AFMC, Pune, June 19, 2024.
123. Dr. Sucheta Patil, "Introduction to genomics file formats with practical exercises using Jupiter notebooks", Bioinformatics: Coding Workshop organized by AFMC, Pune, AFMC, Pune, June 19, 2024.
124. Dr. Sunitha M Kasibhatla, "Multi-ensemble machine learning framework for omics data integration: A case study using breast cancer samples", 5th Annual Meeting of the Indian Cancer Genome Atlas (ICGA), "Unlocking Insights: Data-Driven Discovery in the Indian Cancer Landscape, NII, New Delhi, September 20 - 22, 2024.
125. Dr. Sunitha M Kasibhatla, "Virus Bioinformatics approaches to understand evolutionary dynamics", Faculty Development Programme on Computational Genomics: Theory and Application organised by NIT-Warangal,

Online, December 19, 2024.

126. Dr. Sunitha M Kasibhatla, "Virus Bioinformatics approaches to understand evolutionary dynamics", Orientation and Hands-On Training on Illumina Next Generation Sequencing using the Virus Surveillance Panel (VSP) organized by NIV, Pune, NIV, Pune, January 10, 2025.
127. Dr. Sunitha M Kasibhatla, "Virus Bioinformatics approaches to understand evolutionary dynamics", National Mpox sequencing workshop organized by NIV, Pune, Online, February 13, 2025.
128. Aneesh Kotipalli, "Parallel Programming in HPC Applications", NM-AIST, ARUSHA, Tanzania, May 20-24, 2024.
129. Aneesh Kotipalli, "National Seminar on Ayurvedic Drug Development", Central Ayurveda Research Institute, Jhansi, November 21-22, 2024.
130. Shruti Koulgi, "Lecture delivered and demonstration given on molecular dynamics simulations", Symbiosis International University, Pune, April 2024.
131. Shruti Koulgi, "Application of Markov State Modeling Analysis in Workshop on Emerging technologies in molecular modeling", National Chemical Laboratory, Pune, January 2025.
132. Vinod Jani, "Lecture delivered and demonstration given on Basic of structural biology", Symbiosis International University, Pune, April 2024.
133. Vinod Jani, "Markov State Modeling Analysis in Workshop on Emerging technologies in molecular modeling", National Chemical Laboratory, Pune, January 2025.
134. Mallikarjuna Chari UVN, "Lecture delivered and demonstration give Role of Molecular docking in computational drug discovery", Symbiosis International University, Pune, April 2024.
135. Vivek Gavane, "Integrated Computing Environment (Ice): A Platform for Biological Data Storage and Analytics", Accelerated Data Analytics and Computing Institute (ADAC), Online, August 23, 2024.
136. Dr. Suresh Sharma, "Digital Health Standards in Nursing Informatics: Working with SNOMED CT and NANDA", TNAI 2nd State Annual Nursing Convergence-2024, Goa, May 10-11, 2024.
137. Dr. Suresh Sharma, "Digital Health Standards Adoption in Nursing Practice and Documentation", International Conference by R.K. Institute of Medical Sciences, IMA Hall, Bareilly, June 19, 2024.
138. Dr. Suresh Sharma, "Digital health standards and Nursing education and clinical practice", National Conference on Digital Transformation in Nursing: Clinical Judgement and Documentation, Matoshri Auditorium, Lata Mangeshkar Hospital, Nagpur, June 27-28, 2024.
139. Manisha Mantri, "Standardizing Electronic Health Records: NRCeS Initiatives and Best Practices", Specialised Training Programme for Digital Health Interventions in Primary Healthcare for Developing Countries, under the ITEC programme of the Ministry of External Affairs, Govt. of India, Virtual, July 29, 2024.
140. Manisha Mantri, "Achieving Seamless Data Exchange: Role of EHR Interoperability and Digital Health Standards", Specialized Training Programme on Digital Health for Nigeria under the ITEC program of the Ministry of External Affairs, Govt. of India hosted by C-DAC Mohali, Virtual, September 05, 2024.
141. Manisha Mantri, "Achieving Seamless Data Exchange: Role of EHR Interoperability and Digital Health Standards", Specialized Training Programme on Digital Health for the participants from 11 countries under the ITEC programme of the Ministry of External Affairs, Govt. of India hosted by C-DAC Mohali, Virtual, September 26, 2024.
142. Manisha Mantri, "India AYUSH Terminology Development, at Traditional Medicine Symposium", SNOMED International Business Meetings & Expo 2024, Seoul, Republic of Korea, October 23, 2024.
143. Sayali Satokar, "Understand National Health Claim Exchanged", The FHIR India Community October Meetup 2024, Virtual, October 26, 2024.
144. Gaur Sunder, "Interoperability in Digital Health and ABDM", TELEMEDICON 2024 International conference of Telemedicine Society of India, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, November 28-30, 2024.

145. Dr. Suresh Sharma, “Nursing Document Standards, Understanding SNOMED CT and applying it in Practice”, TELEMEDICON 2024 Internation conference of Telemedicine Society of India, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh, November 28-30, 2024.
146. Gaur Sunder, “Standards to access healthcare security and privacy framework”, NASSCOM-DSCI Annual Information Security Summit (AISS)| Healthcare Sub Summit, Hotel Pullman Aerocity, New Delhi, December 04, 2024.
147. Dr. Manoj K. Khare, “Climate Change impacts on Natural Disasters and Solutions”, Workshop on Disaster Management Using Remote Sensing & GIS, Savitribai Phule Pune University, Pune, March 06, 2025
148. Dr. Manoj K. Khare, “Climate Change Threat to Society: Solution for Natural Hazards”, 150 Years IMD Celebration, IMD, Pune, January 14, 2025.
149. Dr. Manoj K. Khare, “Flood Inundation Mapping in Mahanadi Basin”, National Workshop on

Integrated Flood Risk Management, Central Water Commission, New Delhi, November 26, 2024.

150. Dr. Manoj K. Khare, “Urban Integrated Environment Services for Indian City”, International Science Workshop on High-Resolution Thermal Earth Observation, Space Applications Centre (SAC) Ahmedabad, November 21, 2024.
151. Dr. Manoj K. Khare, “HPC based Disaster Management System”, NESAC User Interaction Meet (NeUIM-2024), North Eastern Space Applications Centre (NESAC), Shillong, September 6, 2024.
152. Dr. Manoj K. Khare, “Climate Change Threat to Society: Solution for Agriculture and Natural Hazards”, International Conference on Sustainable Agriculture Development with Climate Smart System, S’O’A (Deemed to be University) Bhubaneswar, July 18, 2024.
153. Prabu I., “GIS for Drone and Anti Drone System”, 10 Days training programme on Drone & Anti Drone Technologies for Officers from Army, Airforce and Assam Rifles, C-DAC & IIT Guwahati Joint Centre on Defence and National Security, IIT Guwahati, April 22, 2024.
154. Prabu I, “Geospatial Analysis”, Capacity Building Programme for Faculty concerning Curriculum, Christ University, Bengaluru, September 24, 2024.
155. Prabu I., “Mapping the future; Unveiling hidden insights through geospatial analysis”, Webinar of the Department of statistics and data science, Christ University, Bengaluru, September 29, 2024.
156. Prabu I., “eFOREST Concepts”, Workshop on Collaborative approaches for Sustainable Forest Management in Himachal Pradesh organised by GIZ”, Hotel Peterhoff, Shimla, October 08, 2024.
157. Dr. Yogesh Kumar Singh, “Flood modelling”, Talk Series for Master’s Program, SIG, September 28, 2024
158. Dr. Yogesh Kumar Singh, “Space science as a career”, DST Inspire Program, KMV, Jalandhar, October 19, 2024.
159. Dr. Binay Kumar, “Optimal Design of GLOF Early Warning System”, NDMA - DoWR's GLOF Risk Reduction Workshop, India habitat Centre, New Delhi, November 11 & 12, 2024.
160. Dr. Binay Kumar, “HPC based Disaster Management Solutions”, International Conference on Lightning and Extreme Weather Events, Doctor Ambedkar International Centre (DAIC), Janpath, New Delhi, December 9-10, 2024.
161. Kedar N. Ghogale, “Deep Learning for Remote Sensing Data", Faculty Development Programme, organized by Government Polytechnic, Pune, August 13, 2024.
162. Sajeevan G., “Data - Driven Innovation: New Edge Use Cases in Earth Observation”, Panel member for "Data - Driven Innovation: New Edge Use Cases in Earth Observation" at national symposium on "Empowering National Development: Leveraging Earth Observation Intelligence", CEPT University, Ahmedabad, October 14, 2024.
163. Sajeevan G., “Enhancing Urban Land Records”, Panel member for Enhancing Urban Land Records at 8th India Land and Development Conference (ILDC) 2024, FLAME University, Pune, November 5, 2024.
164. Dr. Manish P. Kale, “Forest Fire Simulation Modelling”, EVSM 402: Disaster Management, Savitribai Phule Pune University, Pune, March 6, 2025.

165. Dr. Manish P. Kale, “Forest Fire Spread Modeling”, One-week compulsory training course for Indian Forest Service Officers, Dehradun, Forest Research Institute (FRI) Dehradun, November 19, 2024.
166. Dr. Manoj Chavan, “Aquifer characterisation in Sikkim”, Workshop on ‘Disaster Management using GIS and Remote Sensing’, Organized by Department of Environmental Sciences Savitribai Phule Pune University in collaboration with Indian Society of Geomatics (ISG) Pune Chapter, Department of Environmental Sciences, Savitribai Phule Pune University, Pune, March 6, 2025.
167. Satish Pardeshi, “Above ground Carbon estimation in Mangroves”, Workshop on ‘Disaster Management using GIS and Remote Sensing’, Organized by Department of Environmental Sciences Savitribai Phule Pune University in collaboration with Indian Society of Geomatics (ISG) Pune Chapter, Department of Environmental Sciences, Savitribai Phule Pune University, Pune, March 7, 2025.
168. Sahidul Islam, “NSM project output”, International Conference on “Sustainable Agricultural Development with Climate Smart Systems” (SADCSS-2024), S’O’A (Deemed to be University) Bhubaneswar, India, July 18-20, 2024.
169. Palash Sinha, Sahidul Islam, Sumita Kedia, Ketaki Belange, T.S. Saikrishna, Neelesh Kharkar, and Manoj Khare, “Heatwave Predictions and Decision Support System for Advisory”, Heatwave Predictions and Decision Support System for Advisory, TROPMET 2024, NIT Rourkela, December 10-12, 2024.
170. Vikas Kumar, “Computational Fluid Dynamics (CFD)” Quality Improvement Program (QIP) for faculty members, AICTE approved Institutions, November 21-22, 2025.
171. Dr. Anindita Banerjee, “Introduction to Quantum Tech and Research Fields”, Quantum Tech: Impact on Future Warfare and Way Forward, Headquarters Southern Command, March 26, 2025.
172. Dr. Anindita Banerjee, “Celebrating quantum entanglement”, IUCAA National Science Day Public Talk, IUCAA Pune, February 28, 2025.
173. Dr. Anindita Banerjee, “Quantum Technology and its applications”, Department of Computing and Data Sciences, Flame University, Pune, January 12, 2025.
174. Dr. Anindita Banerjee, “Quantum Technologies at C-DAC”, Indo-German Frontiers of Engineering Symposium 2024 (INDOGFOE24), Mumbai, December 5-8, 2024.
175. Dr. Anindita Banerjee, "Safegaurding the QKD: Identification & Mitigation Vulnerabilities", Training on "Primitives of Quantum Technologies, DRDO Delhi, November 7, 2024.
176. Dr. Anindita Banerjee, “Quantum Technologies at C-DAC”, Workshop on PQC in UCLA, Los Angeles, UCLA, Los Angeles, online, September 16-20, 2024.
177. Aditya Kumar Sinha, “Role of AI in understanding and modeling consciousness”, Conference on “Science of Consciousness”, Jadavpur University, Kolkata, August 10, 2024.
178. Prem Krishnan N., “C-DAC’s perspective in the session titled “Next-Gen Engineering: Leveraging Industrial Capabilities for India’s Next-Gen Launch Vehicles”, India Space Congress 2024, New Delhi, June 26 - 28, 2024.
179. Hemant Jeevan Magadum, Standardized based platform for smart city and agriculture, 2024 IEEE 10th World Forum on Internet of Things (WF-IoT 2024), Ottawa, Canada under IoT Data Standards Landscape and Gap Analysis as a part of Industry forum and panel session, Online in WF-IoT 2024, November 12, 2024.
180. Senthilkumar K. B., “Digital Personal Data Protection Act”, 92nd Sivagiri Theerthadana Mahamaham, Varkala, Thiruvananthapuram, December 31, 2024.
181. Senthilkumar K. B., “Cyber SAFE Journey”, Cyber Security Awareness Month at Centre for Materials for Electronics Technology (CMET)”, Online, October 16, 2024.
182. Senthilkumar K. B., “Cyber (World) Hygiene for safer Online Journey”, Cyber Security Awareness Month at Indian Railways Institute of Signal Engineering & Telecommunications (IRISET), Online, October 22, 2024.
183. Dr. Dittin Andrews, “Safe Internet-Cyber Hygiene and Security in the context of Indian IT Act”, Preventive Vigilance Campaign, IREL, Department of Atomic Energy, August 28, 2024.

Outreach Initiatives

Products Services & Outreach team enables C-DAC centers for comprehensive dissemination and leveraging of novel business opportunities through efficient outreach. Its mandate is to steer multi center consortia projects of commercial nature, curate effective strategies and methodologies to go to market so as to unravel the immense wealth generation potential.

To enhance C-DAC's foot print various engagement models have been conceived keeping the commercialization policy approved by governing council in mind which will catalyze all centers to take their products and services to the market in a systematic and organized manner. This will reap rich dividends and ensure successful monetization of our research and innovations. The models used for the purpose are

- Collaborative Innovation Model
- Transfer of Technology
- Contract R&D
- Request for Proposal
- Product and Services Sales through GEM

Collaborative Innovation Model

Intent of Association for Collaborative Innovation with private entities including startups which are enabling to take our research output to the market after suitably finishing the product as per the market demands. C-DAC has successfully collaborated with VVDN Technologies for AMD based Rudra Server Development, Avalon Technologies for Intel based Rudra Server Development, Applied Materials India Pvt. Ltd for development of RISC-V based chiplets (CPU, GPU, AI Accelerators), photonic interconnects and systems/cluster for HPC and AI workloads.

Transfer of Technologies

Science and Technology organizations of the Government of India are required to maximize transfer of know-how developed by them to industry and thereby make their contributions to technological self-reliance, industrial and economic growth and development of the country. It is imperative to disseminate the fruits of their enterprise to various sectors of the economy and generate mechanisms for effective transfer, and the returns to the nation as a whole would whereby creating a synergistic impact. It is therefore obligatory on premier R&D organizations in the country like C-DAC to effect maximum technology transfer to Indian Industry. C-DAC undertook ToT for

- Traffic Signal Monitoring and Management Software - Enhanced Version (TraMM-EnV)
- C-DAC Urban Traffic Control Equipment (CUTE)
- Adaptive Traffic Control System Software Composite Signal Control Strategy - Enhanced Version (CoSiCoSt-EnV)
- General Purpose Thermal Camera
- Thermal Vision Sensor for Road Traffic application
- SMARTFARM System
- Smart Energy Meters
- 5G C-V2X Platform
- 1.5KW wireless charger

Product & Services Sales through Gem

Since the inception of PS&O team, a special focus has been given for publishing the products on GeM platform. It is our pleasure to inform you that we have published 74 products and services on GeM platform and achieved a business turnover of INR 400 Lakhs. Some of the products published are C-DAC SIEM (Security Incident and Event Management Software), Secure BOSS Linux OS and associated software's, Ultrasonic Solid Propellent Burn Rate Measurement System, Hydrographic Echo Sounder Remote Controlled Boat , e-Pramaan (SSO with password, OTP, Digital Signature, Biometric), IOT Research Lab Kits, USB Pratirodh, M-Prabandh, VAPT Audit Services, Annadarpan (Rice Grain Analyzer), PRAN V2, True Imager, AivaBOT(AI conversation platform), ARIES IoT V2.0 & V3.0, MeghSikshak (E-Learning platform), Revival (Backup and Recovery Software), Aadhar Multifactor Authentication System, E-Hastakshar (e-Sign services), COPS SCADA Lab Kit, Indigenized EMLOG System for Submarines, Meghdoot Cloud Suite, Interface Board for Raspberry Pi, Portable Autonomous Surface Vessel, Aadhar Data Vault, Parikshan etc.

Outreach Activities thro Exibitions

C-DAC participated in Aero India Exhibition Bengaluru, Bharat Pride Expo Hyderabad, Conscientia 2024 Thiruvananthapuram, Digi Next Summit 2024 Thiruvananthapuram, Digital Health Summit Mumbai, India Mobile Congress Delhi, INDIASOFT 2025 Delhi, International Conference on Smart Mobility System Delhi, Infra Medi Expo Udaipur, Rise in Jammu and Kashmir, NVIDIA India AI Summit'2024 Mumbai, Pratigya~2024 Haryana, Exhibition for visit of Hon'ble Minister of Railways, Information and Broadcasting and Electronics and Information Technology in C-DAC Innovation Park Pune, 27th National Conference on e-Governance 2024 Mumbai, Bengaluru Tech Summit 2024, TELEMEDICON 2024 Chandigarh, CII DigiNext Summit 2024 TVM to name a few for exhibiting state of the art technologies and products.

New Technologies viz ParaS Compiler - Code Once, Execute on All, Qniverse - Simulating Quantum algorithms using classical accelerators, Rudra III - Indigenous Supercomputing Server for Advanced HPC and AI Applications, Secure Boss PXE Appliance for CBT Exams were launched on the occasion of 38th Foundation Day of C-DAC so that scientific community can use the same for the benefit of Indian Citizens.

This has resulted in added impetus to business activities.

Human Resource Development

Key Initiatives Taken by HRD in C-DAC during the year 2024-25

In the financial year 2024–25, Corporate HRD undertook several employee-centric initiatives in addition to its core responsibilities of ensuring the provision of quality manpower to the organization. These initiatives include:

1. **e-service Book enabled with e-signature functionality.**

   An Office Memorandum has been issued to streamline the maintenance of service books in electronic format. Corporate HRD, in collaboration with C-DAC's in-house technical team, has developed an e-Service Book integrated with e-signature, marking a significant step towards the digitalization of employee records.

2. **APAR Representation Redressal Mechanism:**

   To streamline the process of addressing representations related to APARs, Corporate HRD has constituted a Standing Committee for redressal of APAR mark-related representations. This initiative is a significant step towards ensuring timely and uniform resolution of such cases. A transparent process has been established, wherein employees are also informed about the names of the committee members, ruling out the possibility of biasness.

3. **Implementation of FR 56(j) / (l):**

   C-DAC has adopted the policy of premature retirement of employees under the provisions of FR 56(j)/(l) in alignment with Government directives. This measure aims to enhance organizational efficiency by identifying and retiring employees whose performance is not in line with the required standards.

4. **Capacity Building:**

   In line with Government guidelines, C-DAC established a Capacity Building Unit and undertook initiatives to promote the iGOT platform among its employees, with the aim of fostering continuous learning and skill enhancement.

5. **Inclusive Workplace Initiatives for PwD Employees:**

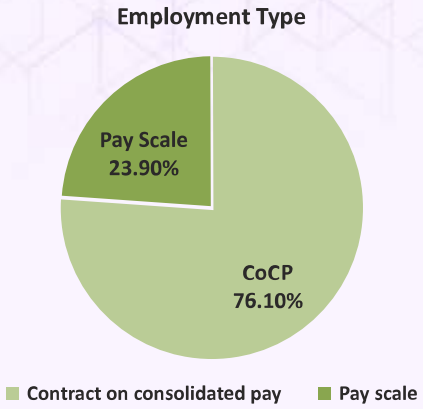
   To foster inclusivity and address the concerns of persons with disabilities (PwD), C-DAC has nominated Centre-wise Grievance Officers specifically for handling issues related to PwD employees. This initiative reflects C-DAC's commitment to creating an equitable and supportive work environment for all, including the underrepresented sections of society.

6. **Adoption of NPS by C-DAC**

   C-DAC adopted the National Pension System (NPS) with the approval of its Governing Council, in alignment with the directives and guidelines issued by the Government of India.

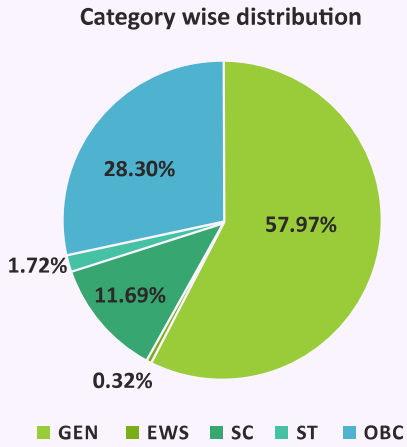
Distribution of Manpower

Type of Employment



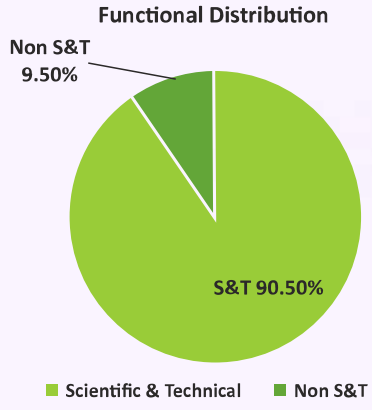
C-DAC's workforce largely comprises personnel engaged on a contract basis with consolidated pay, rather than regular appointments. This structure helps maintain a dynamic organisational balance by continuously infusing fresh talent and innovative ideas. Given the national and international significance of its projects, C-DAC follows a "Just in Time" recruitment model. Under this approach, Corporate HRD issues centralised recruitment advertisements every four months, ensuring that no centre or project is deprived of manpower aligned with contemporary requirements.

Category wise Distribution



Despite being exempted from reservation in certain categories, C-DAC has consistently upheld the principles of fairness and equal opportunity. The organisation has a significant representation from such categories , demonstrating its strong commitment to inclusivity, diversity, and social equity.

Functional Distribution



C-DAC, being a research-driven organisation, primarily requires and is therefore predominantly represented by Scientific and Technical (S&T) manpower. However, despite the relatively smaller number of Non-S&T personnel, their role is integral to the organisation. They work in close coordination with the S&T staff, ensuring seamless support across functions such as administration, infrastructure, finance, and other critical areas. This synergy helps maintain organisational equilibrium and ensures that no project or scientific activity is hindered due to lack of support.

Recruitments:

Providing the right manpower at the right time has always been considered one of the most critical factors in ensuring the success of any project and adherence to its timelines. The HRD section plays a pivotal role in this regard by extending timely support through its "Just in Time" (JIT) recruitment model. Additionally, by delegating adequate powers to individual centres, HRD ensures operational flexibility, enabling centres to meet their manpower requirements efficiently and without delay.

Legal

Corporate Legal is effectively the single point of contact for all the legal issues of the 12 centres, most of whom does not have a legal officer at the centre and need support and guidance at regular intervals for all their legal issues.

Legal being critical with regard to impact, corporate legal has always striven hard to deliver effectively and efficiently in continuing to handle a multitude of activities with various stakeholders.

Some of the most important and critical assignments handled by Corporate legal has been vetting and re-vetting of the various MOUs and agreements being executed by C-DAC in pursuance of various projects whether sponsored/funded and/or business.

Apart from the above, legal has also been at the forefront in terms of providing legal opinion or resolving queries of the centres pertaining to various issues involving litigation, HR issues, as also in several Project execution matters

The Key Activities of the Corporate Legal are as follows:

- All centres of C-DAC and Corporate office has a Legal Department, which take up all the Legal issues relating to C-DAC.

- During the financial year (April 24- March 25) approx. 31 court cases (total number of cases pending - 90 approx.) were dealt at various CATs, High Courts, Tribunals, Courts and Arbitrators etc. These cases are mostly related to service matters of C-DAC centres.
- In addition to above, Legal department also drafted/vetted various MoUs/Agreements to be signed with various stake holders. During the period (April 2024- March 2025), approx. 540 MoUs /Agreements were vetted /drafted and re-vetted by the Corporate Legal Department. Apart from this, 56 legal opinions were given in various matters.
- Corporate Legal Department coordinates with MeitY, the Advocates appearing on behalf of C-DAC and the various C-DAC Centres for the court cases and provides critical inputs supported by relevant judgements pronounced by various courts of India.
- In addition to this, Corporate Legal department conducted training / sessions on Disciplinary Proceedings at Kolkata and Various aspects of Procurement at Thiruvananthapuram for employees of C-DAC.
- A Centralized Repository System for all legal cases of C-DAC has been successfully implemented which was envisioned to bring in consistency in the stand taken by C-DAC in all similar cases handled by different centres of C-DAC.

RTI

C-DAC is a Public Authority as provided in section 2(h) of the RTI Act. Request for information under RTI Act can either be filed at any of the locations of C-DAC or can be submitted online through the portal rtionline.gov.in. Mandatory disclosures as per the guidelines of section Sec 4(1)(b) have been published in the RTI module on C-DAC's website. The same is updated on monthly basis.

During the calendar year 2024, total 539 applications were received which were duly processed.

Vigilance Activities – 2024-2025

For the purpose of compilation and finalization of C-DAC's Annual Report on Vigilance activity for the period 2024-25, the major tasks pertaining to C-DAC, Vigilance matters undertaken during period 2024-25 are elaborated below:

Vigilance Matters taken up during the year 2024-25:

Total 07 complaints have been received in this year. 10 complaints were disposed off during the year.

Vigilance Operations and Functions:

As per the guidelines of the Central Vigilance Commission, Vigilance Awareness Week was observed in all C-DAC Centres during 28th October, 2024 to 3rd November 2024. The observation of Vigilance Awareness Week commenced in all centres on 28th October, 2024 with 1070 employees, 119 customers and 209 citizens taking the integrity pledge with the theme of "Culture of Integrity for Nation's Prosperity". Moreover, students and families of staff joined in through online for taking pledge. All C-DAC Centres observed the Vigilance Week with overwhelming response by displaying Banners and posters related to vigilance awareness. Lecture sessions, essay writing competitions, quiz competitions, talks, panel discussions were also organized to create awareness.

In C-DAC Mohali, a quiz competition was organized on 29th October, 2024 for staff and students respectively. The 21 staff members and 18 students participated in this competition under respective categories. Quiz questions related to vigilance/corruption/PIDPI/general knowledge were asked in this competition. Essay writing competition was organized for staff and students. Expert Talk on Preventive Vigilance (Ethics in Public Policy) was delivered by Sh. Dharam Dutt Ternach (IAS retd.), Chandigarh.

Banners on Vigilance Awareness Week were displayed all over C-DAC Mumbai premises. Integrity pledges for citizens as well as organizations under Vigilance Awareness Week were displayed at all applicable places all over C-DAC Mumbai premises for the reference of all concerned. Notices were displayed at all digital notice boards all over C-DAC Mumbai premises.

In C-DAC, Patna the week was marked by a series of activities designed to foster awareness about vigilance and promote integrity among employees and the public in. To make the theme more relatable and foster participation, various competitions were organized like Essay Writing Competition, Online Quiz Competition etc. To extend the message beyond the organization, banners were displayed in strategic locations within the premises and outside the office. These banners highlighted the importance of vigilance and integrity, creating awareness among visitors and passers-by.

C-DAC Bangalore used Social Media to spread awareness about Vigilance Awareness Week 2024. Information about Vigilance Awareness Week was posted, in Facebook, LinkedIn and X (formerly Twitter) handles of C-DAC Bangalore. In addition, Vigilance Awareness Week e-banner was also displayed at / near the receptions of Knowledge Park and Electronic City - 1 campuses, in addition to Jingles.

In C-DAC Kolkata, Banner was displayed in the main entrance of the Centre. Vigilance Awareness Standee, messages & Posters were displayed in all prominent places of the Centre. All the banners, posters & messages were displayed depicting the evils of corruption and promoting ethical values and integrity. Bulk e-mails to all the employees, were forwarded by AVO of the Centre to create awareness and to encourage all employees to take E-Pledge along with their family members and acquaintances. Special lecture sessions and a poster-making competition was organized for all employees at the Centre.

Vigilance awareness week was observed with great dedication and enthusiasm in C-DAC Chennai. Clients of C-DAC were advised of the importance of Vigilance awareness week and alertness has been given in all the activities of the Centre to eradicate corruption.

In C-DAC, Noida Vigilance Awareness week commenced with integrity pledge by employees of C-DAC Noida. integrity pledge was also took by visiting the website: “https://cvc.gov.in/. To observe Vigilance Awareness Week C-DAC Noida also organized a Drawing Competition for all its Employees & their family members. Theme for Drawing Competition was “Culture of Integrity for Nation’s Prosperity. Banners and Posters were also displayed.

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Finance

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Komandoor & Co
Chartered Accountants

Independent Auditor's Report

To the Members of Governing Council
Centre for Development of Advanced Computing
Corporate, Pune
Report on the Audit of the Standalone Financial Statements of Corporate of 'Centre for Development of Advanced Computing'

Opinion

We have audited the accompanying financial statements of **Centre for Development of Advanced Computing (Corporate Pune)**, which comprises the Balance Sheet as at 31st March 2025, the Income and Expenditure Account, the Receipt and Payment Account for the year ended 31st March 2025 and notes to financial Statement including summary of significant accounting policies and other explanatory information (hereinafter referred to as the "financial statements").

In our opinion and to the best of our information and according to the explanations given to us, the aforesaid financial statements give the information required by relevant statutes in the manner so required and give a true and fair view in conformity with the Accounting principles generally accepted in India

- In case of Balance Sheet, of the state of affairs of the entity as at 31st March,2025;
- In case of the Income and Expenditure Account, of the surplus for the year ended on that date; and
- In case of Receipts and Payments Account ,of the receipts and payments for the year ended on that date

Basis of Opinion

We conducted our audit of the financial statements in accordance with the Standards on Auditing ("SA" s) specified under section 143(10) of the Act. Our responsibilities under those Standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are independent of the Company in accordance with the Code of Ethics issued by the Institute of Chartered Accountants of India ("ICAI") together with the ethical requirements that are relevant to our audit of the financial statements under the provisions of the Act and the Rules made thereunder, and we have fulfilled our other ethical responsibilities in accordance with these requirements and the ICAI's Code of Ethics. We believe that the audit evidence obtained by us is sufficient and appropriate to provide a basis for our audit opinion on the financial statements.

Information Other than the Standalone Financial Statements and Auditor's Report Thereon

The Governing Council is responsible for the other information. The other information comprises the information included in the Governing Council Report , but does not include the standalone financial statements and our auditor's report thereon.

Our opinion on the standalone financial statements does not cover the other information and we do not express any form of assurance conclusion thereon.

required to report that fact. We have nothing to report in this regard.

KOMANDOOR & CO LLP F.R.NO. 001420S/ S200034 CHARTERED ACCOUNTANTS

Komandoor & Co
Chartered Accountants

Management's Responsibility for the Financial Statements

The Management is responsible for the preparation of these financial statements that present a true and fair view of the financial position in accordance with the Accounting Standards and other accounting principles generally accepted in India. This responsibility also includes maintenance of adequate accounting records in accordance with the provisions of the statutes for safeguarding the assets of the entity and for preventing and detecting frauds and other irregularities; selection and application of appropriate accounting policies; making judgments and estimates that are reasonable and prudent; and design, implementation and maintenance of adequate internal financial controls, that were operating effectively for ensuring the accuracy and completeness of the accounting records, relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management and governing council is responsible for assessing the entity's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the entity or to cease operations, or has no realistic alternative but to do so.

The Governing Council is also responsible for overseeing the entity's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with SAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with SAs, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal controls relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of such controls.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the management.

- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the entity's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the entity to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the standalone financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

Materiality is the magnitude of misstatements in the financial statements that, individually or in the aggregate, makes it probable that the economic decisions of a reasonably knowledgeable user of the financial statements may be influenced. We consider quantitative materiality and qualitative factors in -

(i) planning the scope of our audit work and in evaluating the results of our work; and
(ii) to evaluate the effect of any identified misstatements in the financial statements.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit. .

We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

Report on Other Legal and Regulatory Requirements

1. Based on our audit procedures followed, we report that:

   (a) We have sought and obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purposes of our audit.
   (b) In our opinion, proper books of account as required by law have been kept by the Company so far as it appears from our examination of those books.

(c) The Balance Sheet, Income and Expenditure Account and Receipts and Payments Account dealt with by this Report are in agreement with the books of account.

(d) In our opinion, the accounting policies adopted are appropriate and have been consistently applied.

(e) The Centre has Complied with the provisions of the relevant laws and regulations applicable to such institutions to the extent applicable.

For Komandoor and Co.
Chartered Accountants
(Firm's Registration No.001420S/S200034)

CA Deepak Kabra
Partner
(M. No. 143252)
UDIN:25143252BMIWAP4109
Place: Pune
Date: 11th August 2025

CONSOLIDATED BALANCE SHEET AS AT 31st March 2025

Amount in ₹

Particulars	Schedule	2024-25	2023-24
CORPUS/CAPITAL FUND AND LIABILITIES			
Corpus/Capital Fund	1	12,93,70,92,516	10,56,90,23,268
Reserves and Surplus	2	9,95,65,03,607	3,89,54,17,213
Earmarked and Endowment Funds	3	1,88,45,52,620	1,52,90,34,907
Secured Loan from Bank		-	-
Current Liabilities and Provisions	4	7,65,07,24,677	7,70,14,11,468
Total		**32,42,88,73,420**	**23,69,48,86,856**
ASSETS			
Fixed Assets			
Acquired out of Own Funds	5	76,85,86,924	60,69,46,076
Acquired out of Grant in Aid	6	1,63,37,74,115	1,78,87,47,210
Acquired out of Project Grants	7	8,32,27,29,493	2,10,66,70,004
Investments-Others		-	-
Current Assets, Loans & Advances	8	21,70,37,82,888	19,19,25,23,566
Total		**32,42,88,73,420**	**23,69,48,86,856**
		-	-

Significant Accounting Policies, Notes to Accounts and Schedules form an integral part of the Financial Statements.

Indira Pasupathy
Director Finance

Niranjan Vaishnaw
Registrar

Magesh Ethirajan
Director General

AS PER OUR REPORT OF EVEN DATE
FOR AND ON BEHALF OF
For : M/s. Komandoor and Co. (FRN: 001420S/S200034)
Chartered Accountants

CA Deepak Kabra
Partner (Membership No. 143252)
UDIN: 00000000000000000
Place : Pune , Date : 12th August, 2024

CONSOLIDATED INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDING 31st March 2025

Amount in ₹

Particulars	Schedule	2024-25	2023-24
INCOME			
Income from Sales/Services	9	8,51,09,01,420	7,53,80,12,191
Grants/Subsidies	10	2,71,93,86,302	2,68,77,58,456
Fees/Subscription	11	84,91,22,539	90,58,90,372
Interest Earned	12	81,74,53,804	55,39,26,217
Other Income	13	4,07,92,001	8,75,92,935
Prior Period Income		2,11,49,161	(1,37,05,582)
Increase/(decrease) in stock of Finished Goods and Work-in-progress	14	(31,47,48,632)	19,55,63,915
TOTAL (A)		**12,64,40,56,595**	**11,95,50,38,504**
EXPENDITURE			
Establishment Expenses	15	5,32,19,84,748	4,53,74,13,693
Purchases	16	2,23,13,30,765	2,62,38,85,848
Direct Expenses	17	1,06,93,53,419	1,04,72,90,272
Expenses on Courses	18	36,51,19,688	38,84,48,736
Other Administrative Expenses	19	74,10,05,456	68,33,75,215
Prior Period Expenses		83,19,451	1,10,86,504
Depreciation (corresponding to Schedule 5)		21,16,31,338	13,92,47,469
TOTAL (B)		**9,94,87,44,865**	**9,43,07,47,737**
Transferred to / (from) Balance of Mission Grants		3,00,06,788	(13,94,769)
BALANCE BEING SURPLUS/(DEFICIT) CARRIED TO CORPUS/CAPITAL FUND		**2,66,53,04,942**	**2,52,56,85,536**
SIGNIFICANT ACCOUNTING POLICIES	20		
NOTES TO ACCOUNTS	21		

Significant Accounting Policies, Notes to Accounts and Schedules form an integral part of the Financial Statements.

Indira Pasupathy
Director Finance

Niranjan Vaishnaw
Registrar

Magesh Ethirajan
Director General

AS PER OUR REPORT OF EVEN DATE
FOR AND ON BEHALF OF
For : M/s. Komandoor and Co. (FRN: 001420S/S200034)
Chartered Accountants

CA Deepak Kabra
Partner (Membership No. 143252)
UDIN: 00000000000000000
Place : Pune , Date : 12th August, 2024

Amount in ₹

Particulars	2024-25	2023-24
Schedule 1 - Corpus/Capital Fund		
Balance as at the beginning of the year	10,56,90,23,268	8,00,33,37,367
Add: Surplus as per Income & Expenditure Account	2,66,53,04,942	2,52,56,85,535
Less : Own contribution to Core / Projects and Other Adjustments / Transfers	29,72,35,695	(4,00,00,366)
Less : Corporate Office Contribution	-	-
Balance as at the year - end	**12,93,70,92,515**	**10,56,90,23,268**
Schedule 2 - Reserves and Surplus		
1. Capital Reserve :		
As per last Account	3,89,54,17,213	4,02,56,23,568
Addition during the year	7,54,09,99,404	1,00,43,69,552
Less : Deductions during the year	1,47,99,13,010	1,13,45,75,907
Total	**9,95,65,03,607**	**3,89,54,17,213**
Schedule 3 - Earmarked/Endowment Funds		
1. Balance of Core Grants		
a) Opening balance of the funds	2,86,32,531	3,00,23,680
b) Additions to the Funds		
I) Donations/Grants	2,69,97,17,799	2,70,00,00,000
II) Income from Investments made on account of funds	-	-
III) Other additions (C-DAC Contribution and Other Income)	4,92,91,935	3,88,67,235
Total (b)	2,74,90,09,734	2,73,88,67,235
Total (a)+(b)	2,77,76,42,265	2,76,88,90,915
c) Utilization/Expenditure towards objectives of funds		
I) Capital Expenditure		
Fixed Assets	3,03,81,701	5,09,37,925
Others	-	-
Total I	3,03,81,701	5,09,37,925
II) Revenue Expenditure		
Salaries, Wages and Allowances etc.	2,56,25,90,975	2,42,52,37,852
Componants, Consumables and Other Direct Expenses	17,96,117	30,52,805
Travel	1,58,38,628	2,38,39,826
Contingencies, Overheads and Other Administrative Expenditure	10,91,53,793	23,71,89,976
Total II	2,68,93,79,513	2,68,93,20,459
Total (c)	2,71,97,61,214	2,74,02,58,384
Net Balance as at Year - End (a+b-c) Total 1	5,78,81,051	2,86,32,531
Projects wise Allocated Core Grant Projects (Details as per Annexure 1)		
d) Opening balance	(11,09,94,889)	(11,24,75,293)
e) Additions to the Funds		
I) Donations/Grants	-	-
II) Income from Investments made on account of	-	-
III) Other additions (C-DAC Contribution and Other	1,83,99,337	78,18,167
Total (e)	1,83,99,337	78,18,167
Total (d)+(e)	(9,25,95,552)	(10,46,57,126)

Amount in ₹

Particulars	2024-25	2023-24
f) Utilization/Expenditure towards objectives of		
I) Capital Expenditure		
Fixed Assets	1,83,99,337	63,37,763
Others	-	-
Total I	1,83,99,337	63,37,763
II) Revenue Expenditure		
Salaries, Wages and Allowances etc.	-	-
Componants, Consumables and Other Direct Expenses	-	-
Travel	-	-
Contingencies, Overheads and Other Administrative Expenditure	-	-
Total II	-	-
Total Expenditure (f)	1,83,99,337	63,37,763
g) Refund / Transfer and Other Adjustments	-	-
Net Balance as at Year - End (d+e-f-g) Total 2	(11,09,94,889)	(11,09,94,889)
Core Grant Balance as at Year - End (Total 1 + Total 2) Total 3	(5,31,13,838)	(8,23,62,358)
2. Grants for Funded Projects (Details as per Annexure 2)		
a) Opening balance of the funds	1,60,40,32,852	2,30,40,75,318
b) Additions to the Funds		
I) Donations/Grants	17,34,17,31,223	9,28,73,40,445
II) Income from Investments made on account of funds	5,59,47,898	5,20,66,165
III) Other additions (C-DAC Contribution and Other Income)	2,61,09,710	21,14,773
Total (b)	17,42,37,88,831	9,34,15,21,383
Total (a)+(b)	19,02,78,21,683	11,64,55,96,701
c) Utilization/Expenditure towards objectives of funds		
I) Capital Expenditure		
Fixed Assets	7,49,56,39,366	94,45,87,164
Others	-	-
Total I	7,49,56,39,366	94,45,87,164
II) Revenue Expenditure		
Salaries, Wages and Allowances etc.	2,08,17,23,253	1,68,64,13,084
Componants, Consumables and Other Direct Expenses	4,03,12,81,542	3,74,27,73,404
Travel	19,57,97,758	14,27,10,529
Contingencies, Overheads and Other Administrative Expenditure	1,95,96,51,600	1,02,17,61,328
Total II	8,26,84,54,153	6,59,36,58,345
Total (c)	15,76,40,93,519	7,53,82,45,509
d) Refund / Transfer and Other Adjustments	1,33,36,58,843	2,50,33,18,340
Net Balance as at Year - End (a+b-c-d) Total 4	1,93,00,69,321	1,60,40,32,852
3. Employee and Other Funds:		
As per last Account	73,64,412	71,50,957
Addition during the year	2,32,725	2,13,455
Less : Deductions during the year	-	-
Total 5	75,97,137	73,64,412
Grand Total (Total 3+ Total 4+Total 5)	**1,88,45,52,620**	**1,52,90,34,907**

Annexure 1 of Schedule 3 **Projects wise Allocated Core Grant**

(Attached to and forming an integral part of Balance Sheet)

Amount in ₹

Sr.No.	Name of the Project	Opening Balance	Grants Received During the year	Interest Earned	Other Income & CDAC's Contribution During the year	Capital Expenditure	Salary, Wages Allowances etc.	Components, Consumables and Other Direct Expenses	Travel	Contingencies, Overheads and Other Administrative Expenditure	Total Expenses	Refund / Transfer & Other Adjustments	Closing Balance
1	Building Fund	(11,09,94,889)	-	-	1,83,99,337	1,83,99,337	-	-	-	-	1,83,99,337	-	(11,09,94,889)
2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total	**(11,09,94,889)**	**-**	**-**	**1,83,99,337**	**1,83,99,337**	**-**	**-**	**-**	**-**	**1,83,99,337**	**-**	**(11,09,94,889)**

Centre for Development of Advanced Computing, Pune
CONSOLIDATED ANNUAL ACCOUNTS 2024-25

Annexure 2 of Schedule 3 **Funded Projects**
(Attached to and forming an integral part of Balance Sheet)

Amount in ₹

Sr.No.	Name of the Project	Opening Balance	Grants Received During the year	Interest Earned	Other Income & CDAC's Contribution During the year	Capital Expenditure	Salary, Wages Allowances etc.	Components, Consumables and Other Direct Expenses	Travel	Contingencies, Overheads and Other Administrative Expenditure	Total Expenses	Refund / Transfer & Other Adjustments	Closing Balance
1	**Bangalore Centre**												
	MeitY Projects	(4,00,01,532)	1,21,16,70,017	-	-	23,98,69,549	17,21,58,152	16,31,20,577	1,86,88,780	37,18,86,761	96,57,23,799	26,23,44,242	(5,63,99,556)
	Other Agency Projects	13,44,914	30,47,06,981	-	-	59,42,947	67,17,656	23,08,505	50,000	2,72,537	1,52,91,645	-	29,07,60,250
	Total Bangalore Centre	(3,86,56,618)	1,51,63,76,998	-	-	24,58,12,496	17,88,75,808	16,54,29,082	1,87,38,780	37,21,59,298	98,10,15,444	26,23,44,242	23,43,60,694
2	**Chennai Centre**												
	MeitY Projects	-	3,56,92,500	-	-	7,50,000	3,18,79,500	3,07,774	13,00,000	7,63,000	3,50,00,274	6,92,226	-
	Other Agency Projects	-	-	-	-	-	-	-	-	-	-	-	-
	Total Chennai Centre	-	3,56,92,500	-	-	7,50,000	3,18,79,500	3,07,774	13,00,000	7,63,000	3,50,00,274	6,92,226	-
3	**Corporate Office**												
	MeitY Projects	-	-	-	-	-	-	-	-	-	-	-	-
	Other Agency Projects	-	-	-	-	-	-	-	-	-	-	-	-
	Total Corporate Office	-	-	-	-	-	-	-	-	-	-	-	-
4	**Delhi Centre**												
	MeitY Projects	(12,64,390)	3,99,16,500	-	-	-	2,86,90,513	84,75,110	13,94,857	39,62,391	4,25,22,871	20,067	(38,90,628)
	Other Agency Projects	4,56,67,065	91,84,569	-	-	-	1,12,77,843	51,38,987	17,75,425	-	1,81,92,256	-	3,66,59,378
	Total Delhi Centre	4,44,02,675	4,91,01,069	-	-	-	3,99,68,356	1,36,14,097	31,70,283	39,62,391	6,07,14,927	20,067	3,27,68,750
5	**Hyderabad Centre**												
	MeitY Projects	4,49,75,748	62,80,69,129	8,53,302	-	26,61,74,768	20,02,92,263	2,73,74,748	1,56,86,602	3,11,69,089	54,06,97,468	12,54,68,089	77,12,624
	Other Agency Projects	(4,59,78,835)	8,47,18,100	2,45,636	-	75,43,986	2,12,15,745	29,17,267	9,92,050	39,36,965	3,65,06,013	20,445	23,56,443
	Total Hyderabad Centre	(10,03,086)	71,27,87,229	10,98,938	-	27,37,18,754	22,15,08,008	3,02,92,013	1,66,78,652	3,51,06,054	57,73,03,481	12,55,08,533	1,00,69,067
6	**Kolkata Centre**												
	MeitY Projects	-	37,49,20,213	-	-	77,36,837	5,10,18,081	27,30,89,310	39,43,046	1,67,34,211	35,25,21,485	2,23,98,728	-
	Other Agency Projects	74,80,214	1,55,72,898	13,732	-	-	1,48,36,959	31,33,414	9,37,053	15,74,058	2,04,81,484	11,006	25,74,354
	Total Kolkata Centre	74,80,214	39,04,93,111	13,732	-	77,36,837	6,58,55,040	27,62,22,724	48,80,099	1,83,08,269	37,30,02,969	2,24,09,734	25,74,354
7	**Mohali Centre**												
	MeitY Projects	(5,20,978)	24,71,61,000	-	-	85,76,788	6,37,13,404	10,65,47,044	79,47,817	3,86,33,344	22,54,18,377	2,16,46,915	(4,25,270)
	Other Agency Projects	(1,07,691)	25,11,08,410	4,99,730	-	13,07,813	3,74,10,629	8,63,457	15,28,283	18,16,67,605	22,27,77,787	49,11,104	2,38,11,558
	Total Mohali Centre	(6,28,669)	49,82,69,410	4,99,730	-	98,84,581	10,11,24,033	10,74,10,501	94,76,100	22,03,00,949	44,81,96,164	2,65,58,019	2,33,86,288
8	**Mumbai Centre**												
	MeitY Projects	(44,35,626)	16,57,29,000	-	-	1,64,79,306	7,67,69,270	1,31,18,988	57,84,839	3,22,41,650	14,43,94,053	1,68,99,323	(2)
	Other Agency Projects	3,29,467	57,26,000	18,657	-	-	81,66,048	71,891	1,78,036	12,63,992	96,79,967	2,63,829	(38,69,672)
	Total Mumbai Centre	(41,06,159)	17,14,55,000	18,657	-	1,64,79,306	8,49,35,318	1,31,90,879	59,62,875	3,35,05,642	15,40,74,020	1,71,63,152	(38,69,674)
9	**Noida Centre**												
	MeitY Projects	15,40,999	1,24,01,07,540	-	-	2,87,93,620	30,32,05,294	1,84,16,689	85,57,207	60,16,46,560	96,06,19,370	25,88,74,170	1,21,54,999
	Other Agency Projects	1,14,37,000	5,56,41,400	6,04,794	-	-	5,61,69,500	29,68,900	3,008	70,66,992	6,62,08,400	5,32,228	9,42,566
	Total Noida Centre	1,29,77,999	1,29,57,48,940	6,04,794	-	2,87,93,620	35,93,74,794	2,13,85,589	85,60,215	60,87,13,552	1,02,68,27,770	26,94,06,398	1,30,97,565
10	**Patna Centre**												
	MeitY Projects	-	10,46,78,900	-	-	3,94,03,524	3,67,59,631	45,13,313	52,10,500	93,26,289	9,52,13,257	92,15,643	2,50,000
	Other Agency Projects	-	-	-	-	-	-	-	-	-	-	-	-
	Total Patna Centre	-	10,46,78,900	-	-	3,94,03,524	3,67,59,631	45,13,313	52,10,500	93,26,289	9,52,13,257	92,15,643	2,50,000
11	**Pune Centre**												
	MeitY Projects	21,01,89,232	6,83,05,10,038	19,531	422	3,70,72,64,573	49,10,74,189	2,49,89,89,046	8,50,42,968	40,55,77,351	7,18,79,48,127	21,98,30,795	(36,70,59,698)
	Other Agency Projects	1,21,73,64,355	4,91,91,65,882	5,13,46,675	-	3,02,63,96,747	10,46,43,629	79,38,97,016	66,77,969	15,77,75,842	4,08,93,91,253	19,49,22,687	1,90,35,62,972
	Total Pune Centre	1,42,75,53,587	11,74,96,75,920	5,13,66,206	422	6,73,36,61,320	59,57,17,868	3,29,28,86,062	9,17,20,937	56,33,53,193	11,27,73,39,380	41,47,53,482	1,53,65,03,274
12	**Silchar Centre**												
	MeitY Projects	-	1,10,62,000	-	-	30,70,040	54,52,000	10,36,000	5,64,000	9,39,960	1,10,62,000	-	-
	Other Agency Projects	-	-	-	-	-	-	-	-	-	-	-	-
	Total Silchar Centre	-	1,10,62,000	-	-	30,70,040	54,52,000	10,36,000	5,64,000	9,39,960	1,10,62,000	-	-
13	**Thiruvananthapuram Centre**												
	MeitY Projects	10,68,22,554	76,31,36,255	1,88,246	2,61,09,288	13,09,90,531	32,12,29,528	9,60,31,391	2,45,12,028	8,86,41,295	66,14,04,773	18,33,86,839	5,14,64,730
	Other Agency Projects	4,91,90,355	4,32,53,891	21,59,595	-	53,38,357	3,90,43,369	89,62,117	50,23,509	45,71,706	6,29,39,060	22,00,508	2,94,64,273
	Total Thiruvananthapuram Centre	15,60,12,909	80,63,90,146	23,47,841	2,61,09,288	13,63,28,888	36,02,72,897	10,49,93,508	2,95,35,537	9,32,13,001	72,43,43,833	18,55,87,347	8,09,29,003
	Total MeitY Projects	**31,73,06,008**	**11,68,26,53,092**	**10,61,079**	**2,61,09,710**	**4,44,91,09,516**	**1,78,32,44,825**	**3,31,10,19,988**	**17,86,32,424**	**1,60,15,21,901**	**11,32,25,25,654**	**1,13,07,97,036**	**(35,61,92,801)**
	Total Other Agency Projects	**1,28,67,26,844**	**5,68,90,78,131**	**5,48,86,819**	**-**	**3,04,65,29,850**	**29,94,81,426**	**82,02,61,554**	**1,71,65,334**	**35,81,29,699**	**4,54,15,67,865**	**20,28,61,807**	**2,28,62,62,122**
	Grand Total	**1,60,40,32,852**	**17,34,17,31,223**	**5,59,47,898**	**2,61,09,710**	**7,49,56,39,366**	**2,08,17,21,251**	**4,03,12,81,542**	**19,57,97,758**	**1,95,96,51,600**	**15,76,40,93,519**	**1,33,36,58,843**	**1,93,00,69,321**

Amount in ₹

Particulars	2024-25	2023-24
Schedule 4 - Current Liabilities and Provisions		
A. Current Liabilities		
1. Trade Payables (For Goods and Others)	2,70,88,48,398	1,89,08,17,387
2. Advances Received		
a) Advances Received from Parties	2,75,38,21,061	3,93,68,43,524
b) Fees Received in Advance	-	-
c) AMC Charges Received in Advance	12,800	-
d) Other Income Received in Advance	24,55,80,244	30,84,55,782
3. Statutory Liabilities		
a) Members CPF Recovery Payable	3,04,86,059	2,01,26,089
b) Members VPF Payable	12,44,059	15,11,565
c) Members CPF Loan Recovery Payable	-	-
d) Members Benevolent Fund Payable	10,48,457	4,72,767
e) Members CGEIS/Group Insurance Payable	30,098	59,517
f) Members Other Recoveries Payable	9,16,614	11,37,648
g) C-DAC's Contribution to CPF Payable	3,48,95,186	2,54,86,284
h) Gratuity Payable	5,54,16,271	8,90,60,390
i) Leave Salary and Pension Contribution Payable	53,20,57,976	50,89,44,495
j) Members Income Tax Payable	3,32,15,129	3,74,68,002
k) Tax Deducted at Source Payable	12,06,34,258	9,53,40,357
l) Profession Tax Payable	2,75,224	2,90,495
m) Service Tax Payable	-	-
n) CGST Payable	7,43,64,767	1,17,66,217
o) SGST Payable	1,74,98,324	83,59,952
p) IGST Payable	25,40,42,289	14,76,18,696
q) UTGST Payable	32,424	-
r) Reverse charge GST Payable	8,65,209	7,23,581
4. Other Current Liabilities		
a) Unpaid Salaries	92,22,069	1,04,91,401
b) Library Deposits Payable	77,300	83,500
c) Other Security Deposits Payable	8,69,92,299	5,88,86,854
d) Earnest Money Deposit Contractors Payable	7,21,90,780	2,97,55,275
e) Retention Deposit Contractors	2,61,85,831	88,34,394
f) Refund of Course Fees Due	40,88,543	23,85,131
g) ATC's & Others Share In Fees Payable	410	410
h) Other Current Liabilities	10,78,02,930	12,63,02,995
Total (A)	7,17,18,45,009	7,32,12,22,708
B. Provisions		
1. Others (Specify)		
a) Provisions / Accrued Liabilities for Expenses	47,88,79,668	38,01,88,760
Total (B)	47,88,79,668	38,01,88,760
Total (A)+(B)	**7,65,07,24,677**	**7,70,14,11,468**

Schedule-5 FIXED ASSETS Acquired out of own funds
(Attached to and forming an integral part of Balance Sheet)

Amount in ₹

Sr. No.	Particulars	Gross Block						Depreciation					Net Block	
		Cost/Valuation as on beginning of the year	Additions During the Year: On or Before 30th September	Additions During the Year: After 30th September	Additions During the Year: Total Additions during the year	Deletion/Adjustments During the Year	Cost/Valuation as on end of the year	Depreciation as at beginning of the year	Depreciation Written Back	Depreciation Rate	Depreciation for Current Year	Total Depreciation up to the year end	WDV (Closing)	WDV (Opening)
A	B		D	E	F	G	H	I	J	K	L	M	N	O
1	Land													
	a) Freehold	3,21,67,475	-	-	-	-	3,21,67,475	-	-	0%	-	-	3,21,67,475	3,21,67,475
	b) Leasehold	17,21,96,625	-	-	-	-	17,21,96,625	2,37,09,259	-	0%	6,97,292	2,44,06,551	14,77,90,074	14,84,87,366
2	Building													
	a) On Freehold Land	91,18,277	-	-	-	-	91,18,277	69,15,254	-	10%	2,20,302	71,35,556	19,82,721	22,03,023
	b) On Leasehold Land	11,07,19,021	1,29,40,869	12,97,200	1,42,38,069	-	12,49,57,090	9,54,21,926	-	10%	29,53,516	9,83,75,442	2,65,81,648	1,52,97,095
	c) Ownership Flats/Premises	3,97,26,295	1,89,92,483	-	1,89,92,483	-	5,87,18,778	3,54,53,314	-	10%	23,26,846	3,77,81,660	2,09,37,118	42,70,981
	d) Superstructures on Land not belonging to the entity	1,34,26,841	-	-	-	-	1,34,26,841	1,26,66,330	-	10%	76,051	1,27,42,381	6,84,460	7,60,511
3	Plant, Machinery and Equipments	10,25,71,749	-	-	-	-	10,25,71,749	6,41,30,898	-	15%	57,66,128	6,98,97,026	3,26,74,723	3,84,40,851
4	Vehicles	2,99,31,473	44,14,776	11,80,160	55,94,936	11,28,817	3,43,97,592	1,53,55,794	10,68,269	15%	30,16,509	1,73,04,043	1,70,93,549	1,45,75,678
5	Furniture & Fixtures	13,01,02,059	63,39,062	1,61,28,528	2,24,67,590	56,26,894	14,69,42,755	8,47,08,476	51,64,411	10%	67,39,869	8,62,83,934	6,06,58,821	4,53,93,583
6	Office Equipments	6,29,12,169	45,57,485	76,92,449	1,22,49,934	4,18,718	7,47,43,385	4,11,88,319	2,99,369	15%	50,78,163	4,59,67,122	2,87,76,263	2,17,23,848
7	Air Conditioning Equipments	4,10,94,994	9,08,478	24,88,768	33,97,246	-	4,44,92,240	3,10,01,655	-	15%	20,23,588	3,30,25,243	1,14,66,997	1,00,93,339
8	Computer Peripherals	75,92,68,354	4,81,03,196	22,42,86,122	27,23,89,318	22,71,934	1,02,93,85,738	59,46,85,159	22,49,882	40%	17,47,80,181	76,72,15,458	26,21,70,273	16,45,83,189
9	Electrical Installations	8,59,80,571	13,87,849	2,78,223	16,66,072	-	8,76,46,643	5,74,77,257	-	10%	30,16,939	6,04,94,196	2,71,52,447	2,85,03,314
10	Electronic Tools & Lab Equipments	2,18,76,247	25,79,344	61,64,308	87,43,652	-	3,06,19,899	1,22,37,461	-	15%	27,57,365	1,49,94,826	1,56,25,073	96,38,786
11	Library Books	1,54,85,930	32,454	2,35,311	2,67,765	4,432	1,57,49,263	1,50,61,165	4,431	40%	2,77,011	1,53,33,745	4,15,518	4,24,765
12	Copyright Know-how	66,950	-	-	-	-	66,950	66,577	-	25%	93	- 66,670	280	373
13	Other Fixed Assets	1,40,76,399	1,24,489	59,88,609	61,13,078	-	2,01,89,477	75,09,575	-	15%	19,01,965	94,11,560	1,07,77,917	65,66,823
	Total	**1,64,07,21,429**	**10,03,89,485**	**28,57,39,678**	**38,61,29,163**	**94,50,795**	**1,99,73,90,777**	**1,09,75,90,419**	**87,86,344**		**21,16,31,338**	**1,30,04,35,413**	**69,69,55,357**	**54,31,31,000**
	Capital Work-in-progress	**6,38,15,076**	**2,25,69,548**	**1,78,04,295**	**4,03,73,843**	**3,25,57,352**	**7,16,31,567**	-	-		-	-	**7,16,31,567**	**6,38,15,076**
	Grand Total	**1,70,45,36,505**	**12,29,59,013**	**28,35,43,973**	**40,64,93,986**	**4,20,08,147**	**2,06,90,22,344**	**1,09,75,90,419**	**87,86,344**	-	**21,16,31,338**	**1,30,04,35,413**	**76,85,86,924**	**60,69,46,076**
	Previous Year	**1,44,78,57,640**	**10,69,90,389**	**15,54,89,432**	**26,24,79,821**	**58,00,961**	**1,70,45,36,505**	**96,37,18,761**	**53,75,806**	-	**13,92,47,469**	**1,09,75,90,419**	**60,69,46,076**	**48,41,38,879**

Schedule-6 FIXED ASSETS Acquired out of Grant-In-Aid
(Attached to and forming an integral part of Balance Sheet)

Amount in ₹

Sr. No.	Particulars	Gross Block						Depreciation					Net Block	
		Cost/Valuation as on beginning of the year	Additions During the Year			Deletion/Adjustments During the Year	Cost/Valuation as on end of the year	Depreciation as at beginning of the year	Depreciation Written Back	Depreciation Rate	Depreciation for Current Year	Total Depreciation up to the year end	WDV (Closing)	WDV (Opening)
			On or Before 30th September	After 30th September	Total Additions during the year									
A	B		D	E	F	G	H	I	J	K	L	M	N	O
1	Land													
	a) Freehold	49,04,850	-	-	-	-	49,04,850	-	-	0%	-	-	49,04,850	49,04,850
	b) Leasehold	1,67,45,711	-	-	-	-	1,67,45,711	35,53,582	-	0%	1,71,770	37,25,352	1,30,20,359	1,31,92,129
2	Building													
	a) On Freehold Land	22,52,95,362	-	-	-	-	22,52,95,362	15,56,23,121	-	10%	69,67,224	16,25,90,345	6,27,05,017	6,96,72,241
	b) On Leasehold Land	98,81,92,264	2,37,94,286	75,00,000	3,12,94,286	-	1,01,94,86,550	29,38,58,494	-	10%	7,25,62,806	36,64,21,300	65,30,65,250	69,43,33,770
	c) Ownership Flats/Premises	10,50,015	-	55,30,36,660	55,30,36,660	-	55,40,86,675	9,40,261	-	10%	5,53,14,641	5,62,54,902	49,78,31,773	1,09,754
	d) Superstructures on Land not belonging to the entity	53,89,260	-	-	-	-	53,89,260	18,53,366	-	10%	3,53,589	22,06,955	31,82,305	35,35,894
3	Plant, Machinery and Equipments	8,89,90,819	-	-	-	4,62,950	8,85,27,869	8,30,14,496	3,83,169	15%	8,84,481	8,35,15,808	50,12,061	59,76,323
4	Vehicles	49,03,108	-	-	-	-	49,03,108	47,23,671	-	15%	26,915	47,50,586	1,52,522	1,79,437
5	Furniture & Fixtures	15,40,95,821	1,55,559	11,85,76,025	11,87,31,584	2,39,014	27,25,88,391	11,21,61,978	1,38,744	10%	1,60,56,516	12,80,79,750	14,45,08,641	4,19,33,843
6	Office Equipments	5,77,01,891	44,497	2,81,20,172	2,81,64,669	2,15,487	8,56,51,073	4,98,53,800	1,70,963	15%	53,95,238	5,50,78,075	3,05,72,998	78,48,091
7	Air Conditioning Equipments	5,09,79,192	-	3,84,48,914	3,84,48,914	1,09,927	8,93,18,179	4,31,50,970	87,516	15%	69,38,208	5,00,01,662	3,93,16,517	78,28,222
8	Computer Peripherals	1,19,61,09,896	5,88,132	1,67,54,548	1,73,42,680	5,47,012	1,21,29,05,564	1,16,56,33,646	5,45,071	40%	1,91,26,799	1,18,42,15,374	2,86,90,190	3,04,76,250
9	Electrical Installations	8,12,90,941	42,89,582	13,05,33,649	13,48,23,231	26,059	21,60,88,113	5,95,82,410	17,286	10%	1,56,52,300	7,52,17,424	14,08,70,689	2,17,08,531
10	Electronic Tools & Lab Equipments	10,35,37,104	-	14,495	14,495	61,361	10,34,90,238	9,53,17,300	49,281	15%	12,33,333	9,65,01,352	69,88,887	82,19,804
11	Library Books	3,82,14,789	-	-	-	-	3,82,14,789	3,81,11,845	-	40%	41,178	3,81,53,023	61,766	1,02,944
12	Copyright Know-how	4,40,660	-	-	-	-	4,40,660	4,40,656	-	25%	1	4,40,657	3	4
13	Other Fixed Assets	73,49,653	-	-	-	63,834	72,85,819	67,91,983	51,178	15%	81,751	68,22,556	4,63,263	5,57,670
	Total	**3,02,51,91,336**	**2,88,72,056**	**89,29,84,463**	**92,18,56,519**	**17,25,644**	**3,94,53,22,211**	**2,11,46,11,579**	**14,43,208**		**20,08,06,750**	**2,31,39,75,121**	**1,63,13,47,091**	**91,05,79,757**
	Capital Work-in-progress	87,81,67,453	24,40,854	18,77,024	43,17,878	88,00,58,307	**24,27,024**	-	-		-	-	24,27,024	87,81,67,453
	Grand Total	**3,90,33,58,789**	**3,13,12,910**	**89,48,61,487**	**92,61,74,397**	**88,17,83,951**	**3,94,77,49,235**	**2,11,46,11,579**	**14,43,208**		**20,08,06,750**	**2,31,39,75,121**	**1,63,37,74,115**	**1,78,87,47,210**
	Previous Year	3,84,66,53,015	32,70,80,314	3,94,36,623	36,65,16,937	30,98,11,164	3,90,33,58,789	1,99,97,58,208	34,72,220		11,83,25,591	2,11,46,11,579	1,78,87,47,210	1,84,68,94,807

Centre for Development of Advanced Computing, Pune
CONSOLIDATED ANNUAL ACCOUNTS 2024-25

Schedule-7 FIXED ASSETS Acquired out of Project Grants
(Attached to and forming an integral part of Balance Sheet)

Amount in ₹

Sr. No.	Particulars	Gross Block						Depreciation					Net Block	
		Cost/Valuation as on beginning of the year	Additions During the Year		Total Additions during the year	Deletion/Adjustments During the Year	Cost/Valuation as on end of the year	Depreciation as at beginning of the year	Depreciation Written Back	Depreciation Rate	Depreciation for Current Year	Total Depreciation up to the year end	WDV (Closing)	WDV (Opening)
			On or Before 30th September	After 30th September										
A	B		D	E	F	G	H	I	J	K	L	M	N	O
1	Bangalore Centre Project Assets	43,75,45,707	-	24,58,12,496	24,58,12,496	-	68,33,58,203	38,46,83,326	-		11,64,12,846	50,10,96,172	18,22,62,031	5,28,62,382
2	Chennai Centre Project Assets	9,85,57,018	-	7,50,000	7,50,000	-	9,93,07,018	9,35,26,191	-		12,78,150	9,48,04,341	45,02,677	50,30,827
3	Corporate Project Assets	-	-	-	-	-	-	-	-		-	-	-	-
4	Delhi Centre Project Assets	15,72,623	-	-	-	-	15,72,623	15,69,653	-		454	15,70,107	2,516	2,970
5	Hyderabad Centre Project Assets	55,57,05,354	72,78,273	26,64,40,481	27,37,18,754	90,000	82,93,34,108	45,77,26,369	36,000		14,54,99,401	60,31,89,770	22,61,44,339	9,79,78,986
6	Kolkata Centre Project Assets	6,61,32,215	-	77,36,837	77,36,837	30,52,909	7,08,16,143	5,34,60,916	30,20,256		81,50,193	5,85,90,853	1,22,25,290	1,26,71,299
7	Mohali Centre Project Assets	19,10,60,378	9,11,839	89,72,742	98,84,581	-	20,09,44,959	15,60,40,025	-		1,50,46,808	17,10,86,833	2,98,58,126	3,50,20,353
8	Mumbai Centre Project Assets	40,11,69,586	11,19,218	1,53,60,088	1,64,79,306	-	41,76,48,892	36,23,14,044	-		1,96,64,596	38,19,78,640	3,56,70,252	3,88,55,542
9	Noida Centre Project Assets	24,79,98,427	5,44,499	2,82,49,121	2,87,93,620	-	27,67,92,047	15,61,20,124	-		2,61,90,039	18,23,10,163	9,44,81,884	9,18,78,302
10	Patna Centre Project Assets	1,91,26,153	95,99,044	2,98,04,480	3,94,03,524	-	5,85,29,677	76,50,461	-		2,34,11,871	3,10,62,332	2,74,67,345	1,14,75,692
11	Pune Centre Project Assets	4,14,80,60,527	3,52,44,727	82,48,09,578	86,00,54,304	-	5,00,81,14,831	3,18,51,44,000	-		72,86,84,205	3,91,38,28,205	1,09,42,86,626	96,29,16,528
12	Silchar Centre Project Assets	-	-	30,70,040	30,70,040	-	30,70,040	-	-		12,28,017	12,28,017	18,42,023	-
13	Thiruvananthapuram Centre Project Assets	1,91,12,01,344	94,18,593	12,69,10,295	13,63,28,888	10,74,901	2,04,64,55,331	1,11,32,24,221	6,87,937		19,35,39,679	1,30,60,75,963	74,03,79,368	79,79,77,123
	Total	**8,07,81,29,332**	**6,41,16,193**	**1,55,79,16,158**	**1,62,20,32,358**	**42,17,810**	**9,69,59,43,872**	**5,97,14,59,330**	**37,44,193**		**1,27,91,06,259**	**7,24,68,21,396**	**2,44,91,22,477**	**2,10,66,70,004**
	Capital Work-in-progress	-	**33,83,35,549**	**5,53,52,71,467**	**5,87,36,07,016**	-	**5,87,36,07,016**	-	-		-	-	**5,87,36,07,016**	-
	Grand Total	**8,07,81,29,332**	**40,24,51,742**	**7,09,31,87,625**	**7,49,56,39,366**	**42,17,810**	**15,56,95,50,888**	**5,97,14,59,330**	**37,44,193**		**1,27,91,06,259**	**7,24,68,21,396**	**8,32,27,29,493**	**2,10,66,70,004**
	Previous Year	**7,13,52,54,788**	**14,65,11,197**	**79,86,75,967**	**94,45,87,164**	**17,12,621**	**8,07,81,29,332**	**4,95,65,26,027**	**13,17,015**		**1,01,62,50,317**	**5,97,14,59,330**	**2,10,66,70,004**	**2,17,87,28,761**

Amount in ₹

Particulars	2024-25	2023-24
Schedule 8 - Current Assets, Loans and Advances		
A. Current Assets		
1. Inventories :		
a) Stock in trade		
Finished Goods	75,61,551	75,61,551
Work-in-progress	55,13,26,000	86,47,78,000
Raw Material	20,05,816	16,29,517
b) Stock of Course Material	10,67,389	27,40,320
2. Sundry Debtors		
Trade Receivables	2,60,51,61,878	2,44,21,14,965
Less: Provision for Bad and Doubtful Debts	34,75,72,051	34,43,38,688
	2,25,75,89,827	2,09,77,76,277
3. Cash balances in hand (including cheques/drafts and imprest)	769	259
4. Bank Balances		
a) With Scheduled Banks		
On Deposit Accounts (includes margin money)	10,63,10,70,911	9,36,39,61,412
On Savings/Current Account	5,69,40,87,813	3,95,90,99,556
b) Funds/Goods in Transit	40,32,562	4,15,20,331
5. Post Office-Savings Accounts	7,451	7,228
Total (A)	19,14,87,50,089	16,33,90,74,451
B. Loans, Advances and Other Assets		
1. Loans		
a) Staff	31,26,168	32,55,083
b) Other (Specify)	27,75,453	15,70,678
2. Advances and other amounts recoverable in cash or in kind or for value to be received		
a) On Capital Account	-	-
b) Prepayments (Advances to Suppliers)	86,02,24,577	1,27,87,36,247
c) To Employees	1,41,34,732	78,71,663
d) To Others	38,55,794	76,88,793
3. Income Accrued		
a) On Investments from Earmarked/Endowment Funds	-	-
b) On Bank Deposits	35,59,30,768	33,99,51,008
c) Others		
I) Course Fee Receivable	22,28,900	33,09,170
II) Receivable from Guest House Receipts	-	-
III) Other Grants Receivables	-	-
4. Claims Receivable		
a) Insurance Claims Lodged but not received	-	-
b) Claims due but not received	-	-
c) Income Tax Deducted at Source	38,34,16,427	38,94,60,849
d) Sales Tax / VAT Refund Due	-	-
e) CGST Receivable	1,03,99,727	73,23,296
f) SGST Receivable	1,03,99,727	73,23,295
g) IGST Receivable	11,79,85,737	5,25,99,681
h) UTGST Receivable	-	-
I) Reverse Charge GST Receivable	6,054	-
J) Input Tax Credit GST Receivable	5,23,75,308	2,93,03,310
k) GST Paid on Advance Receipt	27,58,43,601	32,87,20,713
l) Receivable from PF Trust	8,328	8,328
m) Other Receivables	20,52,846	15,77,92,437
5. Prepaid Expenses		
a) Insurance	5,60,081	20,44,787
b) Other Expenses	5,15,63,697	6,71,04,255
6. Deposits (Assets)		
a) Telephone Deposit	11,72,123	12,45,715
b) Lease Rent Deposit	1,08,58,962	43,61,112
c) Other Deposits	7,02,13,706	6,82,67,017
d) Security Deposit	1,97,09,203	1,58,43,161
e) EMD / Tender Deposit	6,54,84,529	3,71,05,254
7. Deferred Expenses		
a) Unutilised Modvat / Cenvat	-	-
b) Deferred Expenses on Projects	24,07,06,351	4,25,63,263
Total (B)	2,55,50,32,799	2,85,34,49,115
Total (A+B)	**21,70,37,82,888**	**19,19,25,23,566**

Amount in ₹

Particulars	2024-25	2023-24
Schedule 9 - Income from Sales/Services	(5,37,45,84,151)	
1. Income from Sales		
a) Sale of Finished Goods	1,66,30,73,453	2,35,90,93,521
b) Sale of Raw Material	13,68,155	-
c) Sale of Scraps	15,77,767	8,89,730
2. Income from Services		
a) Software Development Charges	1,63,25,21,050	1,19,94,33,682
b) Others (Specify)	-	-
AMC Charges Received	24,23,32,170	16,54,10,927
Consultancy Charges / Service Charges	4,65,19,61,023	3,53,86,14,680
1	71,12,500	74,96,610
Royalty Received	70,43,771	1,00,27,370
Data Charges	30,35,11,531	25,70,45,671
3. Inter Unit / Inter Branch Sales / (Purchases)	4,00,000	-
Total	**8,51,09,01,420**	**7,53,80,12,191**
Schedule 10 - Grants/Subsdies		
1. Central Government	2,69,97,17,799	2,70,00,00,000
2. Others (Specify)		
a) C-DAC's own Contribution and Other Adjustments	5,00,50,439	3,87,00,000
3. Less : Amount utilised for Capital Expenditure in the current year transferred to Capital Reserve	3,03,81,936	5,09,41,544
Total	**2,71,93,86,302**	**2,68,77,58,456**
Schedule 11 - Fees/Subscriptions		
1. Entrance Fees	-	-
2. Course Fees	77,40,78,702	80,22,51,170
3. Corporate Training Fees	2,70,74,627	4,47,60,901
4. Annual Fees/Subscriptions	58,68,484	75,75,350
5. Authorization Fees	12,41,443	12,32,252
6. Others (Specify)	-	-
a) Virtual Centre Processing Fees	-	-
b) Admission Cancellation Fees	-	38,03,525
c) Examination Fees	2,61,28,170	3,40,98,068
d) Late Fee	8,788	24,711
e) Registration Fees / Project Fee	9,11,033	6,68,093
f) Students Hostel Fees	1,38,11,292	1,14,76,302
TOTAL	**84,91,22,539**	**90,58,90,372**
Schedule 12 - Interest Received		
1. On Term Deposits		
a) With Scheduled Banks	73,70,46,473	49,69,59,838
2. On Savings Accounts		
a) With Scheduled Banks	7,22,43,041	5,52,93,964
3. On Loans		
a) Employees/Staff	81,64,290	16,72,415
Total	**81,74,53,804**	**55,39,26,217**
Schedule 13 - Other Income		
1. Profit on Sale/Disposal of Assets		
a) Owned Assets	38,441	3,14,232
b) Assets acquired out of grants, or received free of cost	-	1,67,235
2. Exports Incentives Realized	-	-
3. Fees for Miscellaneous Services	24,56,884	46,95,192
4. Miscellaneous Income	3,82,96,676	8,24,16,276
Total	**4,07,92,001**	**8,75,92,935**

Amount in ₹

Particulars	2024-25	2023-24
Schedule 14 - Increase/(Decrease) In Stock of Finished Goods & Work-In-Progress		
a) Closing Stock		
Finished Goods	75,61,551	75,61,551
Work-in-progress	55,13,26,000	86,47,78,000
Raw Material	20,05,816	16,29,517
Loose Tools	-	-
Course Material Stock	10,67,389	27,40,320
b) Less : Opening Stock		
Finished Goods	75,61,551	94,42,011
Work-in-progress	86,47,78,000	66,75,39,000
Raw Material	16,29,517	17,21,324
Loose Tools	-	-
Course Material Stock	27,40,320	24,43,138
Total (a-b)	**(31,47,48,632)**	**19,55,63,915**
Schedule 15 - Establishment Expenses		
a) Salaries & Wages	3,97,25,12,908	3,44,36,75,561
b) Allowances & Bonus		
Awards & Prizes	8,92,352	3,70,103
Bonus	-	-
Canteen Facility	4,61,52,162	3,20,89,914
Hire Charges - Contractual Services	41,10,18,106	28,31,57,539
Lease Rent for Employees Quarters	-	-
Leave Travel Concession	1,98,83,688	93,47,774
Medical Reimbursement	16,35,21,603	17,09,89,921
Members Medical & Accident Insurance Expenses	15,89,750	7,09,854
Misc. Allowances and Other Reimbursements	2,81,50,173	2,97,85,485
Staff Recruitment Expenses	46,20,868	56,47,180
Staff Training Expenses	1,09,88,416	1,02,28,620
Transfer & Relocation Expenses	12,13,213	2,57,520
c) Contribution to Provident Fund	29,69,34,648	27,03,29,738
d) Staff Welfare Expenses	83,05,290	94,16,538
e) Expenses on Employees Retirement and Terminal Benefits	-	-
Gratuity	7,57,60,073	9,22,26,868
Leave Encashment	20,72,96,196	13,46,60,010
Leave Salary & Pension Contribution	7,31,45,302	4,45,21,068
f) Others	-	-
Total	**5,32,19,84,748**	**4,53,74,13,693**
Schedule 16 - Purchases		
Purchases	-	-
Hardware Components	1,57,37,92,732	2,31,90,77,287
Software Components	47,82,72,655	11,99,70,144
Fabrication & In-Fleet Components	38,71,107	61,35,472
Consumables	9,12,80,857	4,01,15,579
Others	8,41,13,414	13,85,87,366
	-	-
Total	**2,23,13,30,765**	**2,62,38,85,848**

Amount in ₹

Particulars	2024-25	2023-24
Schedule 17 - Direct Expenses		
Consumables	1,41,68,323	2,23,12,858
Design and Development Charges	4,92,899	-
Excise/Custom Duty/Service Tax Paid	10,96,965	13,40,146
Freight and Handling Expenses	3,95,136	11,73,823
Labour Charges	1,48,535	-
Liquidated Damages	-	-
Material Insurance Expenses	-	-
Other Packing Charges	-	-
Royalty and Support Fees	-	1,80,000
Software Development Consultancy Charges	1,65,28,856	1,42,59,960
Technical Service Charges	1,03,65,22,705	1,00,80,23,485
Warehouse Charges	-	-
Total	**1,06,93,53,419**	**1,04,72,90,272**
Schedule 18 - Expenses on Courses		
Advertisement Expenses	89,77,954	1,26,09,954
ATC's Share In Fees	25,10,97,686	24,63,26,134
Awards & Prizes	1,03,000	62,688
Campus Interview Expenses	21,19,250	42,29,152
Course Material Production Expenses	1,92,40,584	2,08,06,420
Data Entry & Scanning Expenses	-	-
Examination Expenses	89,30,464	1,55,02,581
Faculty Members Expenses	3,56,08,508	4,12,69,198
Other Course Related Expenses	3,86,09,028	4,74,60,684
Printing of Forms & Prospectus	6,750	31,680
Students Hostel Expenses	4,26,464	1,50,245
Total	**36,51,19,688**	**38,84,48,736**
Schedule 19 - Other Administrative Expenses		
a) Administrative Expenses		
Administrative Charges on Provident Fund	1,96,26,311	1,60,77,733
Asset Hire Charges	33,75,903	33,12,775
Auditors Remuneration	14,13,029	9,54,587
Bank Charges and Commission	20,70,919	27,76,324
C-DAC's Contribution to Funded Projects	1,94,58,729	28,90,404
Cultural Program Expenses	35,11,716	27,73,425
Development Contracts and Spon. Project Expenses	-	-
Electricity, Power and Water Charges	7,12,85,654	10,80,32,941
Entertainment/Hospitality Expenses	63,98,591	62,12,103
Foreign Exchange Fluctuation	(4,609)	(8,096)
Gifts and Presentation	22,83,968	7,46,092
Insurance	46,03,320	33,99,129
Interest Paid	33,37,523	42,51,112
Irrecoverable Balances Written-off/(Written-back)	(6,26,251)	1,07,76,492
Legal & Professional Charges	2,97,92,533	1,97,64,227
Miscellaneous Expenses	69,42,318	68,15,579
Office Expenses	3,06,52,427	2,29,12,612
Postage, Telephone & Communication Charges	1,46,11,649	1,67,02,716
Printing and Stationery	90,71,132	87,20,839
Provision for Bad and Doubtful Debts/Advances	2,44,84,879	1,17,88,683
Rent, Rates and Taxes	4,57,21,046	3,11,45,627
CGST Paid	-	2,44,563
SGST Paid	-	2,44,563
IGST Paid	-	3,60,212
UTGST Paid	-	-
Reverse Charge GST Paid	-	-
Service Hire Charges	14,85,16,503	15,38,84,580
Subscription of Periodicals & Newspapers	38,16,018	16,45,000
Tender Expenses	1,47,765	8,89,941
Training Expenses	6,55,088	13,96,591
Transit Quarter & Guest House Expenses	23,85,626	26,60,604
Transportation Charges	1,12,983	1,55,910
Vehicles Hire, Running and Maintenance	2,03,08,479	1,75,57,498

Amount in ₹

Particulars	2024-25	2023-24
b) Repairs and Maintenance		
Air Conditioning Equipments	46,74,385	75,21,033
Building	1,63,13,042	1,90,01,963
Computers	3,24,57,755	1,12,76,255
Electrical Fittings	2,20,12,604	1,97,68,196
Furniture and Fixtures	23,76,266	19,94,566
Garden Maintenance	9,73,486	11,17,674
Lab Equipments	2,16,293	2,57,477
Office Equipments	22,84,252	15,22,565
Other Assets	38,97,845	57,66,294
c) Travelling and Conveyance Expenses	-	-
Inland Travel Expenses	-	-
Director	76,69,071	74,50,823
Members	14,94,77,411	13,17,99,972
Others	58,90,951	40,05,027
Foreign Travel Expenses	-	-
Director	2,35,764	2,79,382
Members	11,81,966	12,24,606
Others	-	-
Conveyance Expenses	8,44,778	11,47,430
d) Selling Distribution and Business Promotion Expenses	-	-
Advertisement Expenses	14,82,500	13,52,036
Expenses on Exhibition, Seminars/Workshops	1,50,53,430	81,87,482
Distribution Expenses	243	1,470
Product Literature & Brochures Expenses	-	-
Other Sales Promotion Expenses	10,165	6,16,198
e) Other Expenses	-	-
Total Other Administrative Expenses	**74,10,05,456**	**68,33,75,215**

Schedule 20: Significant Accounting Policies:

1. **Accounting Convention**

The financial statements are prepared under the historical cost convention C-DAC follows Mercantile System of Accounting and recognizes Income and Expenditure on Accrual basis except otherwise stated, and the following items, due to their peculiar nature are recognized otherwise:

1.1. The course fees of Diploma in Advanced Computing and other Courses commencing before the end of financial year and the duration of which falls beyond the financial year are recognized entirely in the year under audit. In respect of these courses, entire expenditure of course material and agreed proportionate share of the Authorized Training Centers (ATCs) is also accounted for in the year under audit.

1.2. Bonus is accounted for on Cash Basis.

1.3. Expenditure incurred on incomplete Software Development Projects is expensed out in the year of incurrence.

2. **Revenue Recognition**

2.1. Sales are recognized as net of Trade Discount, Sales Returns, Excise Duty and Goods & Services Tax.

2.2. Software Development Charges are recognized on the basis of Terms of Individual Contract and / or as per Phases of completion.

2.3. The income in respect of Annual Maintenance Contract is recognized on accrual basis and as per the terms of individual contracts entered into with parties.

2.4. Income in respect of consultancy charges/service charges is recognized on accrual basis and on the basis of terms of individual contracts entered into with the parties.

2.5. Grants in aid received from the government are treated as Income to the extent of net of capital expenditure incurred during the year.

2.6. Interest and other miscellaneous incomes are accounted for on accrual basis.

3. **Fixed Assets**

3.1 Actual cost of fixed assets acquired is accounted for as per the terms of purchase order; any recovery is netted off to the cost of the asset and all expenses directly attributable to the acquisition and installation of the fixed assets are capitalized.

3.2 Fixed Assets are stated at Cost less Accumulated Depreciation.

3.3 Direct Material Cost with respect to major Fixed Assets developed in-house is capitalized along with manpower and Overhead costs. The Manpower and Overhead costs are charged on basis of man-days spent on the development of Assets as ascertained by the Management. Cost of prototype incurred in the process is charged to Revenue.

3.4 Costs incurred on Assets, which are in process of acquisition, or installation or development is treated as Capital WIP.

3.5 Fixed Assets created out of Sponsored Project Grants and lying at project site are not capitalized and shown as consumables under revenue expenditure.

4. **Depreciation**

4.1. The ownership of assets acquired out of Mission Grants & Sponsored Projects Grants rests with the respective funding agencies. However, depreciation is charged on the WDV basis on all assets including on those acquired out of Mission and Sponsored Project Grants. The Written-Down Value of the said assets is represented by an equivalent amount of Capital Reserve.

4.2. All additions to Fixed Assets are depreciated at full rates irrespective of the date of acquisition. Depreciation is charged at the rates prescribed by the Income Tax Act 1961.

5. Inventory Valuation

The inventories are valued and certified by the Management as under –

5.1. Components, Raw Materials and Loose Tools in stock are valued at cost or net realizable value whichever is lower.

5.2. Work in Progress and Finished Goods are valued at cost.

5.3. Course Material stock is valued at landed cost. The course material, which is outdated due to change in the syllabus, is shown at nil value.

6. Deferred Expenditure on Projects

The expenditure incurred on incomplete business projects for which income is to be recognized in the ensuing period is deferred.

7. Foreign Currency Transaction

7.1. Transactions denominated in foreign currency are accounted at the exchange rate prevailing on the date of transaction and difference between the date of transaction and payment/receipt are accounted for as income or expenditure as the case may be.

7.2. Current assets and current liabilities denominated in foreign currency are converted at the exchange rate prevailing as at the year-end and the resultant gain/loss is adjusted to revenue account. Contingent liabilities denominated in foreign currency are converted at the exchange rate prevailing as at the year-end.

8. Retirement Benefits

Retirement benefits in respect of Provident Fund, Pension Fund, Gratuity and Leave Encashment has been provided for on accrual basis.

9. Other Policies

All other Accounting Policies are generally consistent with normally accepted accounting practices.

Indira Pasupathy Director Finance	**Niranjan Vaishnaw** Registrar	**Magesh Ethirajan** Director General

For M/s.Komandoor & Co. (FRN: 001420S/S200034)
Chartered Accountants

CA Deepak Kabra
Partner (M.No. 143252)
UDIN : 25143252BMIWAT6979

Date : 12th August, 2025
Place : Pune

Schedule 21: Notes to Accounts

1. Capital Commitment

Capital Commitments not provided for ₹₹8,140.20 Lakhs (Previous Year ₹10,176.02 Lakhs).

2. Sponsored Projects

Balance of Core Grant Projects as per Annexure 1 of Schedule 3 to the Balance Sheet includes unutilized grants amounting to ₹0.00 Lakhs (Previous Year ₹0.00 Lakhs) and ₹1,109.95 Lakhs (Previous Year ₹1,109.95 Lakhs) grants receivable on account of expenditure incurred in anticipation of release of grants on projects.

Balance of unutilized Funded Projects grants as per Annexure 2 of Schedule 3 to the Balance Sheet includes unutilized grants amounting to ₹27,252.88 Lakhs (Previous Year ₹18,029.92 Lakhs) and ₹7952.18 Lakhs (Previous Year ₹1,989.59 Lakhs) grants receivable on account of expenditure incurred in anticipation of release of grants on projects.

3. Contingent Liabilities

3.1. Against Bank Guarantees: ₹3339.95 Lakhs. (Previous Year ₹1230.89 Lakhs)
3.2. Against Letter of Credit is ₹0.19 Lakhs (Previous Year is Nil)
3.3. Against Liquidated Damages is Nil (Previous Year is Nil)
3.4. Against Sales Tax: ₹3.26 Lakhs (Previous Year ₹0.00 Lakhs)
3.5. Against GST: ₹146.04 Lakhs (Previous Year ₹7.97 Lakhs)
3.6. Against Service Tax: ₹11,870.40 Lakhs (Previous Year ₹11,679.35 Lakhs)
3.7. Against Disputed Matters: ₹322.99 Lakhs (Previous Year ₹0.00 Lakhs)
3.8. Cases related to staff for Various Centre's are pending at various levels for which liability cannot be assessed.
3.9. Goods and Services Tax Assessments are pending for assessment and therefore liability cannot be assessed. GST is under reconciliation for the FY2024-25.

4. Statutory Liabilities

The entire income of C-DAC is exempt u/s 10(21) being a scientific research association notified under section 35(1)(ii) of the Income Tax Act, 1961. Hence no provision for income tax has been made.

5. Foreign Currency Transactions

5.1 **Imports:** Total Rupee value of imports (CIF) during the year is as follows:

(₹ in Lakhs)

Centre	Raw Material / Components	Capital Goods	Total
Current Year	359.10	0.43	359.53
Previous Year	1686.91	14.34	1701.25

5.2 **Expenditure in foreign currency for Travel:** ₹130.32 Lakhs. (Previous Year ₹57.21 Lakhs)
5.3 **Other Expenditure in foreign currency:** ₹917.96 Lakhs (Previous Year ₹785.83 Lakhs)
5.4 **Earnings in Foreign Exchange:** Total Earnings in Foreign Exchange during the year are as follows :

Currency	Current Year	Previous Year
US Dollars	0.00	0.00
Euro	81905.00	0.00
Total Value in ₹ (In Lakhs)	**73.76**	**0.00**

6. Remuneration to Statutory Auditors (Including Branch Auditors)

(₹ in Lakhs)

Particulars	Current Year	Previous Year
Audit Fees (Exclusive of GST)	12.00	4.15

7. Interest received on grants is treated as liability. Expenditure on the Core/Sponsored Projects are charged to respective project and not routed through Income & Expenditure Account.

8. Fixed Assets: The depreciation on the assets purchased out of grants is debited to Capital Reserve.

9. Current Assets and Current Liabilities

9.1 Balances of Debtors, Creditors, Receivables and Payables are subject to adjustments, writing off and confirmation and reconciliation from parties.

9.2 An amount of ₹3,475.72 Lakhs (Previous Year ₹3,443.39 Lakhs) up to 31st March, 2025, debtors outstanding for more than three years has been provided for as Bad and Doubtful debts except the amount realized till date & the amount realizable from the existing customers. In the opinion of Management the said provision is adequate.

9.3 Age wise Analysis of Sundry Debtors as on 31st March, 2025 is as follows:

(₹ in Lakhs)

Centre Name	Less than 6 Months	More Than 6 Months	More Than 1 Year	More Than 2 Years	More Than 3 Years	Total
Bengaluru	256.76	13.97	25.78	5.13	80.82	382.46
Chennai	487.81	20.52	396.12	43.26	3.28	950.99
Delhi	12.27	0.00	39.17	0.04	126.31	177.79
Hyderabad	1082.59	30.42	9.91	4.17	7.48	1134.57
Kolkata	296.49	44.97	61.74	0.06	0.13	403.39
Mohali	235.12	50.00	18.86	212.56	217.47	734.01
Mumbai	388.19	100.47	0.00	56.24	709.5	1254.4
Noida	4718.09	981.98	919.72	201.32	1085.61	7906.72
Patna	2.34	0.36	30.56	0.00	0.00	33.26
Pune	1564.09	1330.08	3843.89	78.22	861.26	7677.54
Silchar	205.06	73.66	74.50	0.00	25.09	378.31
Thiruvananthapuram	1836.48	946.48	853.13	1023.32	358.77	5018.18
Total	**11085.29**	**3592.91**	**6273.38**	**1624.32**	**3475.72**	**26051.62**
Previous Year	**15463.57**	**1422.62**	**3193.23**	**898.34**	**3443.39**	**24421.15**

10. Physical Verification

Physical verification & related reconciliations has been completed up to the FY 2024-25.

11. Internal Audit / Internal Control Systems

C-DAC has an internal control system, which is commensurate with the size and financial transactions. Internal audit is being conducted by external auditors during the year.

12. Prior Period Items and Changes in Accounting Policies-AS5

Prior Period Items of Income and Expenses are disclosed in Income and Expenditure account separately and there is no Change in the Accounting Policies during the Financial Year 2024-25 as per Accounting Standard 5.

13. Government Grants

Accounting of grants is made on accrual basis. The Core Grants & expenditure related to Core Grants (Net off Capital Expenditure) is routed through Income & Expenditure account as per Accounting Standard 12 Accounting for Government Grants.

14. Employee Benefits

Employees benefits with respect to Gratuity and Leave encashment has been paid/provided as per provisions of Accounting Standard 15 Employee Benefits based on the actuarial valuation /demand as per policy except as given in notes to accounts of centers.

15. Lease Obligations

Lease rent of ₹46.80 Lakhs (Previous Year ₹0.00 Lakhs) for various premises are debited under the various heads of Income and Expenditure Account for the period under audit as per the Accounting Standard 19 Leases.

16. Intangible Assets

Reconciliation of the carrying amount at the beginning and end of the periods are reviewed for intangible Assets such as Technical know-how, copy rights and licenses as per Accounting Standard 26 Intangible Assets.

17. Impairment of Assets

As per Accounting Standard 28 Impairment of Assets, fixed assets are reviewed for impairment and there is no impairment of assets during the year, as the carrying amount of the assets are less than the realizable value.

18. Other Discloser Requirements

The Management of C-DAC is of the opinion that C-DAC being a scientific society and not a listed company and therefore the reporting requirements as per Accounting Standard 14 Accounting for Amalgamations, Accounting Standard 16 on Borrowing Cost, Accounting Standard 18 on Related Party Disclosures, Accounting Standard 22 in respect of Accounting for Taxes on Income and Accounting Standard 27 Financial Reporting of Interests in Joint Ventures are not applicable.

19. Advances paid to employees include ₹1.02 Lakhs as advances paid to Director General (Previous Year ₹0.00 Lakhs).

20. Inter unit /Inter Centre Sales(Purchases)

Inter unit/ Inter Centre Sales/Services and Purchases is showing ₹4.00 Lakhs (Previous Year ₹0.00 Lakhs) as per Schedule-9 (Net of Sales/Services and Purchases between the C-DAC Centre's).

21. Centre Specific Notes

21.1. Delhi Centre

21.1.1. No liability has been provided for in respect of civil suit of recovery for ₹322.98 Lakhs filed by M/s IBILT Technology Ltd in DIPP's IPO Project with an outlay of ₹2,340/- Lakhs, since the case is under examination with Hon'ble High Court, Delhi.

21.2. Kolkata Centre

21.2.1. An amount of ₹ 39.71Lakhs included in advance received from parties (Current Liabilities) is more than 3 year old. Billing against the same is yet to be done.

21.3. Mumbai Centre

21.3.1. Total outstanding liability in respect of Pension Fund amounting to ₹5,631.20 Lakhs (Previous Year ₹5,216.15 Lakhs), has been provided in the books of accounts as per the Actuarial Valuation. The Fund Value ₹1,135.43 Lakhs plus Cumulative Provision ₹4,495.77 Lakhs as on 31st March 2025. There is no shortfall in provision for this year.

21.3.2. Conveyance Deed for the office and residential buildings in Mumbai has not been executed by the Bombay Housing & Area Development Board (BH&ADB), though the Centre has made the payment towards the acquisition of the said assets. The possession for the office building and the residential buildings has been obtained from BH&ADB from 1st April, 1986 and 1st June, 1986, respectively.

21.3.3. The Centre has Bulk SMS activity under MEGD Project. Under this activity, the Centre purchases a certain number of Bulk SMS from service providers (Airtel, Vodafone, etc.) and credits the same to various Govt. & Non Govt. parties as per their demands and raises invoices to the parties. Furthermore, the service providers raises the bills on the Centre as per the actual SMS consumed by the parties. All the utilized SMS till 31st March, 2024 have been billed by the Centre. The amount equivalent to ₹1765.35 Lakhs (Previous Year ₹1851.06 Lakhs) is available with the Centre as on 31st March, 2025 towards unutilized SMS by the parties. The said amount is transferred to "Advance Received from Party".

21.3.4. The Centre has undertaken Software Development Project of ECGC ERP Revamp (2nd Phase) from ECGC Limited at a total project cost of ₹11,000 Lakhs (Excluding GST) for a period of 3 years w.e.f., March-2019. The Centre has raised 2nd Invoice for an amount of ₹1,650.00 Lakhs (15% of project cost) on "SRS & Design document for Phase 1 Modules" and money has been received on 3/6/2022. The total Invoices raised on ECGC Ltd. for the above project is ₹7,274.50 Lakhs. During the current financial year, C-DAC Mumbai has received ₹.2,846.38 Lakhs against the total expenditure of ₹1,661.64 Lakhs and the net amount of deficit in ECGC Project for ₹1184.74 Lakhs been shown as 'Work-In-Progress" under Other Receivables in Current Assets.

21.4. Noida Centre

21.4.1. Earmarked fund includes expenses of ₹5972.36 Lakhs on sponsored project DLI as a reimbursement to start up, ₹60.99 lakhs issued to CDAC, Bangalore for manpower and others as per allocation in the project by the Government of India.

21.5. Thiruvananthapuram Centre

21.5.1. Work-in-Progress constitutes partially completed projects valued on incremental milestone basis considering the actual cost incurred for each milestone of the projects concerned. Total Work-In-Progress (Inventories) as on 31st March 2025 is ₹5513.26 Lakhs which includes an amount of ₹4991.50 Lakhs for the Project Modernization, Management & Operation of State Data Centre, Jammu.

22. Previous Year's figures are regrouped, rearranged and reclassified wherever necessary.

23. Figures in the Financial Statements are rounded off to nearest Indian Rupees.

Indira Pasupathy Director Finance	**Niranjan Vaishnaw** Registrar	**Magesh Ethirajan** Director General

For M/s. Komandoor & Co. (FRN: 001420S/S200034)
Chartered Accountants

CA Deepak Kabra
Partner (M.No. 143252)
UDIN : 25143252BMIWAT6979

Date : 12th August, 2025
Place : Pune

FINANCIAL PERFORMANCE OF C-DAC FOR THE FINANCIAL YEAR 2024-25 as per AS17:SEGMENT REPORTING

Schedule 21-A:

(Attached to and forming an integral part of Balance Sheet)

Amount in Lakhs

S.No	Particulars	Total	Bangalore	Chennai	Corporate	Delhi	Hyderabad	Kolkata	Mohali	Mumbai	Noida	Patna	Pune	Silchar	TVM
A	**OPENING BALANCE**														
(i)	**Grant -in- Aid: Core Grant Projects**	**(823.62)**													
	GIA General	286.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.68	5.91	278.74	0.00	0.00	0.00
	Core Grant Projects	(1109.95)	0.00	0.00	0.00	(1109.95)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(ii)	**Grant for Sponsored Projects**	**16040.31**													
	MeitY	3173.06	(400.02)	0.00	0.00	(12.64)	449.76	0.00	(5.21)	(44.36)	15.41	0.00	2101.89	0.00	1068.23
	Other Agencies	12867.25	13.45	0.00	0.00	456.67	(459.79)	74.80	(1.08)	3.29	114.37	0.00	12173.64	0.00	491.90
B	**RECEIPTS & INCOME**														
(i)	**Grant -in- Aid**	**26997.17**													
	GIA General	26997.17	3156.89	1087.70	1129.08	432.00	747.97	907.03	1276.00	1876.00	2274.00	394.97	8801.50	281.93	4632.10
	Core Grant Projects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(ii)	**Grant for Sponsored Projects**	**173417.32**													
	MeitY	116526.54	12116.70	356.98	0.00	399.17	6280.69	3749.20	2471.61	1657.29	12401.08	1046.79	68305.10	110.62	7631.36
	Other Agencies	56890.78	3047.07	0.00	0.00	91.85	847.18	155.73	2511.08	57.26	556.41	0.00	49191.66	0.00	432.54
(iii)	**Revenue Earnings**	**93600.25**													
	Training	13195.55	596.51	37.84	0.00	181.83	365.76	23.00	111.14	550.19	1815.76	14.89	9338.23	6.44	153.96
	Commercial	80404.70	1540.46	7891.47	0.00	315.66	2674.23	1835.64	1170.41	6936.24	13349.76	33.98	25353.50	276.00	19027.35
(iv)															
	Interest, Other Income & C-DAC Contribution	**676.90**													
	GIA General	492.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	(1.68)	(5.91)	500.00	0.00	0.50	0.00
	Core Grant Projects	183.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	183.99	0.00	0.00
		820.60													
	MeitY Spon Projects	271.71	0.00	0.00	0.00	0.00	8.53	0.00	0.00	0.00	0.00	0.00	0.20	0.00	262.98
	Spon. By Other Agencies	548.89	0.00	0.00	0.00	0.00	2.44	0.14	5.00	0.19	6.05	0.00	513.47	0.00	21.60
		5646.45													
	Training	2487.57	168.75	37.27	58.34	2.86	72.18	0.39	397.07	0.00	865.57	14.31	845.21	0.00	25.62
	Commercial	3158.88	178.66	161.90	101.66	113.96	311.96	100.61	2.94	129.78	1715.44	9.82	1777.56	6.40	(1451.81)
	TOTAL (A+B)	**316375.38**	**20418.47**	**9573.11**	**1289.08**	**871.41**	**11300.91**	**6846.54**	**7938.96**	**11165.88**	**33113.85**	**2293.50**	**178585.95**	**681.89**	**32295.83**
C	**REVENUE Expenditure**														
(i)	**Expenditure from Grant-In-Aid**	**26893.80**													
	GIA General	**26893.80**													
	Establishment Expenses	25625.91	3037.50	1050.00	850.00	400.00	693.00	850.00	1250.00	1775.00	2250.00	500.91	8365.50	195.00	4409.00
	Other Administrative Expenses	1267.89	89.00	29.00	260.00	32.00	25.50	25.50	26.00	51.00	24.00	67.89	436.00	13.00	189.00
	Core Grant Projects	**0.00**													
	Establishment Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Other Administrative Expenses	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(ii)	**Expenditure on Sponsored Projects**	**82684.54**													
	MeitY Total Expenses	**67734.15**													
	Establishment Expenses	17822.42	1721.58	318.80	0.00	286.91	2002.92	510.18	637.13	767.69	3032.05	367.60	4910.74	54.52	3212.30
	Other Administrative Expenses	49911.73	5536.96	23.71	0.00	138.32	742.30	2937.67	1531.28	511.45	6286.20	190.50	29896.09	25.40	2091.85
	Other Agencies Total Expenses	**14950.39**													
	Establishment Expenses	2994.83	67.18	0.00	0.00	112.78	212.16	148.37	374.11	81.66	561.70	0.00	1046.44	0.00	390.43
	Other Administrative Expenses	11955.56	26.31	0.00	0.00	69.14	78.46	56.45	1840.59	15.14	100.39	0.00	9583.51	0.00	185.57
(iii)	**Other Revenue Expenditure**	**72593.67**													
	Training Total Expenses	**9941.11**													
	Establishment Expenses	2755.99	142.80	22.88	0.00	75.32	133.87	12.71	111.41	151.88	834.79	3.44	1025.10	0.28	241.51
	Other Administrative Expenses	7185.12	192.31	41.87	1.26	108.78	112.90	3.68	75.21	106.11	457.66	3.24	6007.39	0.31	74.40
	Commercial Total Expenses	**62652.56**													
	Establishment Expenses	24837.95	64.26	982.98	122.74	223.81	767.89	1499.92	951.26	4756.72	5567.74	9.86	6046.16	153.99	3690.62
	Other Administrative Expenses	37814.61	166.65	4752.67	83.58	92.01	832.42	773.37	230.48	2106.87	1736.60	12.33	15313.70	106.55	11607.38
	TOTAL C	**182172.01**	**11044.55**	**7221.91**	**1317.58**	**1539.07**	**5601.42**	**6817.85**	**7027.47**	**10323.52**	**20851.13**	**1155.77**	**82630.63**	**549.05**	**26092.06**

FINANCIAL PERFORMANCE OF C-DAC FOR THE FINANCIAL YEAR 2024-25 as per AS17:SEGMENT REPORTING

Schedule 21-A:

(Attached to and forming an integral part of Balance Sheet)

Amount in Lakhs

S.No	Particulars	Total	Bangalore	Chennai	Corporate	Delhi	Hyderabad	Kolkata	Mohali	Mumbai	Noida	Patna	Pune	Silchar	TVM
D	**CAPITAL Expenditure**														
(i)	**Expenditure from GIA for Core R&D**	**487.81**													
	GIA General	303.82	30.39	8.70	19.08	0.00	29.47	31.53	0.00	50.00	0.00	26.11	0.00	74.44	34.10
	Core Grant Projects	183.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	183.99	0.00	0.00
(ii)	**Expenditure from GIA for Sponsored Proj.**	**74956.39**													
	MeitY	44491.10	2398.70	7.50	0.00	0.00	2661.75	77.37	85.77	164.79	287.94	394.04	37072.65	30.70	1309.91
	Other Agencies	30465.29	59.43	0.00	0.00	0.00	75.44	0.00	13.08	0.00	0.00	0.00	30263.97	0.00	53.38
(iii)	**Expenditure from Own Funds**	**4064.93**													
	Training	727.99	102.33	0.00	0.00	3.07	148.28	0.00	10.44	11.02	125.70	1.94	320.35	0.00	4.86
	Commercial	3336.94	0.32	280.52	0.00	16.50	0.00	183.10	1.15	344.83	1896.54	0.34	88.30	72.49	452.86
	TOTAL D	**79509.13**	**2591.17**	**296.72**	**19.08**	**19.57**	**2914.94**	**292.00**	**110.44**	**570.64**	**2310.18**	**422.43**	**67929.26**	**177.63**	**1855.11**
E	**REFUND / TRANSFER OTHER ADJUSTMENTS**														
(i)	**From GIA for Core R&D**	**0.00**													
	GIA General	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Core Grant Projects	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(ii)	**From Sponsored Projects**	**13336.59**													
	MeitY	11307.97	2623.44	6.92	0.00	0.20	1254.88	223.99	216.47	168.99	2688.74	92.16	2198.31	0.00	1833.87
	Other Agencies	2028.62	0.00	0.00	0.00	0.00	0.20	0.11	49.11	2.64	5.32	0.00	1949.23	0.00	22.01
	TOTAL (E)	**13336.59**	**2623.44**	**6.92**	**0.00**	**0.20**	**1255.08**	**224.10**	**265.58**	**171.63**	**2694.06**	**92.16**	**4147.54**	**0.00**	**1855.88**
F	**TOTAL Expenditure (C+D+E)**	**275017.73**	**16259.16**	**7525.55**	**1336.66**	**1558.84**	**9771.44**	**7333.95**	**7403.49**	**11065.79**	**25855.37**	**1670.36**	**154707.43**	**726.68**	**29803.05**
G	**Unspent Balance / Surplus / Deficit (A+B-F)**														
(i)	**Grant -in- Aid**	**(531.14)**													
	GIA General	578.81	(0.00)	0.00	(0.00)	0.00	0.00	(0.00)	0.00	0.00	0.00	578.81	0.00	0.00	0.00
	Core Grant Projects	(1109.95)	0.00	0.00	0.00	(1109.95)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(ii)	**Sponsored Projects**	**19300.69**													
	MeitY	(3561.93)	(564.00)	0.00	0.00	(38.90)	77.13	(0.01)	(4.25)	0.01	121.56	2.49	(3670.60)	(0.00)	514.64
	Other Agencies	22862.62	2907.60	0.00	0.00	366.60	23.57	25.74	238.11	(38.70)	9.42	0.00	19035.62	0.00	294.65
(iii)	**Other**	**26653.03**													
	Training	5742.01	430.15	10.36	57.08	0.59	191.17	7.00	321.59	292.20	1388.88	22.52	3150.95	5.85	(136.33)
	Commercial	20911.02	1488.21	2317.72	(104.66)	113.80	1385.88	(337.04)	(8.39)	202.43	7760.86	21.61	5771.20	21.86	2277.54

Schedule 21-B:

CENTRE WISE BALANCE SHEET AS AT 31st March 2025

(Attached to and forming an integral part of Balance Sheet)

Amount in Lakhs

Particulars	Total	Bangalore	Chennai	Corporate	Delhi	Hyderabad	Kolkata	Mohali	Mumbai	Noida	Patna	Pune	Silchar	TVM
CORPUS/CAPITAL FUND AND LIABILITIES														
Corpus/Capital Fund	1,29,370.93	8,053.58	5,451.93	3,935.28	2,684.81	7,311.33	509.05	7,692.79	(1,279.29)	41,622.76	420.78	41,583.13	1,181.69	10,193.10
Reserves and Surplus	99,565.04	1,967.07	82.70	31.53	2,695.30	2,933.46	355.77	356.84	637.19	1,193.98	444.77	77,572.89	115.97	11,177.56
Earmarked and Endowment Funds	18,845.53	2,345.65	1.41	0.00	(781.66)	100.69	25.74	233.86	(37.29)	130.98	581.31	15,435.55	-	809.29
Secured / Unsecured Loan from Bank	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Current Liabilities and Provisions	76,507.25	1,665.38	1,311.88	46.37	863.48	2,354.53	5,025.10	743.08	7,845.24	5,268.36	77.91	25,364.88	193.64	25,747.41
Branch & Divisions	(0.00)	(2,467.94)	(486.68)	7.31	258.46	404.10	517.90	(1,391.36)	66.79	(174.27)	22.30	1,792.64	(324.43)	1,776.19
Total	**3,24,288.73**	**11,563.73**	**6,371.25**	**4,020.50**	**5,720.39**	**13,104.09**	**6,433.55**	**7,635.22**	**7,232.65**	**48,041.80**	**1,547.06**	**1,61,749.09**	**1,166.86**	**49,702.54**
ASSETS														
Fixed Assets														
Acquired out of Own Funds	7,685.87	642.92	192.47	-	286.27	166.01	264.41	109.16	384.98	3,078.29	9.81	1,734.25	65.12	752.20
Acquired out of Grant in Aid	16,337.74	144.45	37.68	31.53	2,695.28	672.01	233.51	58.26	280.49	249.16	170.10	7,893.96	97.55	3,773.76
Acquired out of Project Grants	83,227.29	1,822.62	45.03	-	0.03	2,261.44	122.25	298.58	356.70	944.82	274.67	69,678.94	18.42	7,403.79
Current Assets, Loans, Advances etc.	2,17,037.83	8,953.74	6,096.08	3,988.96	2,738.82	10,004.63	5,813.38	7,169.22	6,210.47	43,769.53	1,092.48	82,441.95	985.78	37,772.79
Total	**3,24,288.73**	**11,563.73**	**6,371.25**	**4,020.50**	**5,720.39**	**13,104.09**	**6,433.55**	**7,635.22**	**7,232.65**	**48,041.80**	**1,547.06**	**1,61,749.09**	**1,166.86**	**49,702.54**

CENTRE WISE INCOME & EXPENDITURE ACCOUNT FOR THE YEAR ENDED 31st March 2025

Amount in Lakhs

Particulars	Total	Bangalore	Chennai	Corporate	Delhi	Hyderabad	Kolkata	Mohali	Mumbai	Noida	Patna	Pune	Silchar	TVM
INCOME														
Income from Sales/Services	85,109.01	1,537.12	7,891.47	-	323.59	2,674.23	1,835.56	1,176.14	6,986.24	14,110.00	33.94	29,282.21	276.00	19,032.53
Grants/Subsidies	27,193.86	3,126.50	1,079.00	1,110.00	432.00	718.50	875.50	1,276.00	1,826.00	2,274.00	868.86	8,801.50	208.00	4,598.00
Fees/Subscription	8,491.22	599.85	37.84	-	173.91	365.76	23.08	105.41	550.19	1,055.53	14.93	5,409.53	6.44	148.78
Interest Earned	8,174.54	347.40	172.85	158.89	113.58	360.95	93.64	365.06	103.02	2,251.42	23.33	2,661.11	6.07	1,517.23
Other Income	407.92	-	26.32	1.11	2.18	18.59	4.16	33.11	26.65	102.28	0.81	5.02	0.33	187.34
Prior Period Income	211.49	-	-	-	1.05	4.60	3.21	1.83	0.11	227.31	-	(26.63)	-	-
Goods and Work-in-progress	(3,147.49)	-	-	-	-	-	-	-	-	-	-	(16.73)	-	(3,130.76)
Total	**1,26,440.57**	**5,610.87**	**9,207.49**	**1,270.00**	**1,046.31**	**4,142.63**	**2,835.14**	**2,957.55**	**9,442.20**	**20,020.54**	**941.87**	**46,116.01**	**496.83**	**22,353.11**
EXPENDITURE														
Establishment Expenses	53,219.85	3,244.55	2,055.86	972.74	699.12	1,594.76	2,382.63	2,312.68	6,683.60	8,652.53	514.22	15,436.76	349.26	8,341.13
Purchases	22,313.31	2.88	222.06	-	-	728.42	378.07	38.71	32.35	-	-	12,587.64	-	8,313.17
Direct Expenses	10,693.53	4.73	3,647.46	14.09	-	7.34	64.99	10.42	1,460.47	54.44	3.28	3,637.14	11.42	1,777.75
Expenses on Courses	3,651.20	30.06	28.19	-	11.68	31.59	0.18	18.97	52.76	238.62	1.67	3,219.60	0.21	17.67
Other Administrative Expenses	7,410.05	288.68	806.32	328.10	196.06	136.58	260.09	225.64	638.35	938.30	76.89	1,976.47	90.93	1,447.64
Prior Period Expenses	83.19	-	-	2.65	4.37	2.35	-	12.09	3.04	(39.30)	-	94.81	-	3.20
Depreciation (corresponding to Schedule 5)	2,116.31	121.61	119.49	-	20.68	64.55	99.21	25.85	77.01	1,026.21	1.62	231.43	17.30	311.35
Total	**99,487.45**	**3,692.51**	**6,879.39**	**1,317.58**	**931.91**	**2,565.58**	**3,185.17**	**2,644.36**	**8,947.58**	**10,870.79**	**597.67**	**37,193.85**	**469.13**	**20,211.91**
Transferred to / (from) Balance of Core Grants	300.07	-	-	-	-	-	-	-	-	-	300.07	-	-	-
SURPLUS / (DEFICIT)	**26,653.05**	**1,918.36**	**2,328.10**	**(47.58)**	**114.40**	**1,577.05**	**(330.03)**	**313.19**	**494.62**	**9,149.75**	**44.13**	**8,922.16**	**27.70**	**2,141.20**

CONSOLIDATED RECEIPTS AND PAYMENTS FOR THE YEAR ENDING 31st March 2025

Amount in ₹

Receipts	2024-25	2023-24	Payments	2024-25	2023-24
I. Opening Balance			**I. Expenses**		
a) Cash on hand	259	222	a) Establishment Expenses	2,95,40,72,294	1,78,41,78,749
b) Bank Balances			b) Administrative Expenses	3,15,60,35,424	1,26,74,64,379
i) In Savings/Current Accounts	3,95,04,89,176	4,85,70,97,587	c) Payment made to Creditors for Goods and Others	9,27,85,27,669	7,66,41,48,619
II. Grants Received			**II. Payments made against funds for various projects** (Name of the Fund or Project along with the particulars of payment made for each project shown in separate schedule)	7,43,87,23,991	2,37,00,20,179
a) From Government of India	2,74,72,66,270	2,94,93,67,986			
b) Grant and Other Income Received for Projects	15,78,18,01,233	8,32,14,96,120	**III. Investments and Deposits made Progress**	7,80,25,29,678	7,11,74,88,458
III. Income from Encashment of FDRs	6,30,87,69,408	5,28,16,12,795			
IV. Interest Received			a) Purchase of Fixed Assets	31,86,93,046	19,00,32,010
a) On Bank Deposits	53,94,62,618	31,02,63,927	b) Expenditure on Capital Work In Progress	-	69,61,763
b) Loans and Advances	2,84,10,490	1,65,68,432	**V. Refund of Surplus money/loans**	-	-
V. Other Income (Specify)			**VI. Finance Charges (Interest)**	-	-
a) Previous years Income recovered	2,27,36,269	48,82,200	**VII. Other Payments (Specify)**	-	-
b) Advances Received from Customers	76,22,16,483	2,87,15,37,410	a) Deposit (Assets)	41,49,11,440	36,30,72,009
d) Fees/Subscription & Direct Income	1,52,73,05,824	1,33,86,53,171	b) Loans and Advances	43,21,78,474	27,29,53,703
e) Other Income	1,32,41,74,774	1,16,71,02,377	c) Previous years outstanding payments	2,17,06,47,486	6,68,95,18,009
f) Amount Received from Debtors	5,76,58,20,891	5,01,21,70,879	d) Prepaid Expenses	2,35,34,415	5,46,56,296
g) Loans and Advances Recovered	47,39,82,791	42,11,65,236	e) Branch and Divisions	8,88,19,14,742	4,19,59,71,536
VI. Amount Borrowed			f) Deposits (Liabilities) Refunded	20,62,59,134	16,72,63,490
Branch and Divisions	9,32,78,88,168	3,62,65,50,061	**VIII. Closing Balance**		
Bank Loan	-	-			
VII. Any Other Receipt (Give Details)			a) Cash on hand	769	259
a) Deposits (Liabilities)	13,92,91,721	(12,29,49,768)	b) Bank Balances		
b) Addition to Reserve Fund	-	-	I) In Savings Accounts	5,67,15,87,813	3,95,04,89,176
Total	**48,74,96,16,375**	**36,09,42,18,635**	**Total**	**48,74,96,16,375**	**36,09,42,18,635**
	-	-			

AS PER OUR REPORT OF EVEN DATE
FOR AND ON BEHALF OF
For : M/s. Komandoor and Co. (FRN: 001420S/S200034)
Chartered Accountants

Indira Pasupathy
Director Finance

Niranjan Vaishnaw
Registrar

Magesh Ethirajan
Director General

CA Deepak Kabra
Partner (Membership No. 143252)
UDIN: 00000000000000000
Place : Pune , Date : 12th August, 2024

Concept

The Cover Page concept Annual Report 2024–2025 reflects C-DAC's commitment to the vision of Prime Minister's "Viksit Bharat—a developed, digitally empowered, and self-reliant India." The cover design symbolizes the convergence of innovation, technology, and progress, represented through icons of C-DAC's diverse technological domains such as High Performance Computing (HPC), Quantum technology, Artificial Intelligence (AI) & Multilingual Computing, Strategic Electronics, Software Technologies, Health Informatics, Education & Training, Cyber Security and Forensics. The cityscape rising into connected digital elements illustrates India's technological growth story—where traditional foundations meet cutting-edge advancements. The upward flow of icons signifies continuous innovation, scalability, and national development through digital transformation. The harmonious blend of gradients and geometric patterns embodies C-DAC's role in shaping a technologically empowered nation and accelerating India's journey toward a Viksit Bharat.

C-DAC/Branding and Communication/Corporate Office/Annual Report 2025