रॉ डैक
CDAC

Meri Sadak
Citizen Feedback System

PRADHAN MA
GRAM SADAK Y

Smart City
MISSION TRANSFORM-NATION

SMART CITY SOLUTIONS

SMART CITY MISSION

A Smart City can be viewed as an urban innovation and transformation that aims to harness physical infrastructures, Information and Communication Technologies (ICT), knowledge resources, and social infrastructures for economic regeneration, social cohesion, better city administration, and infrastructure management.

Smart Cities Mission is an urban renewal and retrofitting program by the Government of India with a mission to develop 100 cities all over the country making them citizen friendly and sustainable.
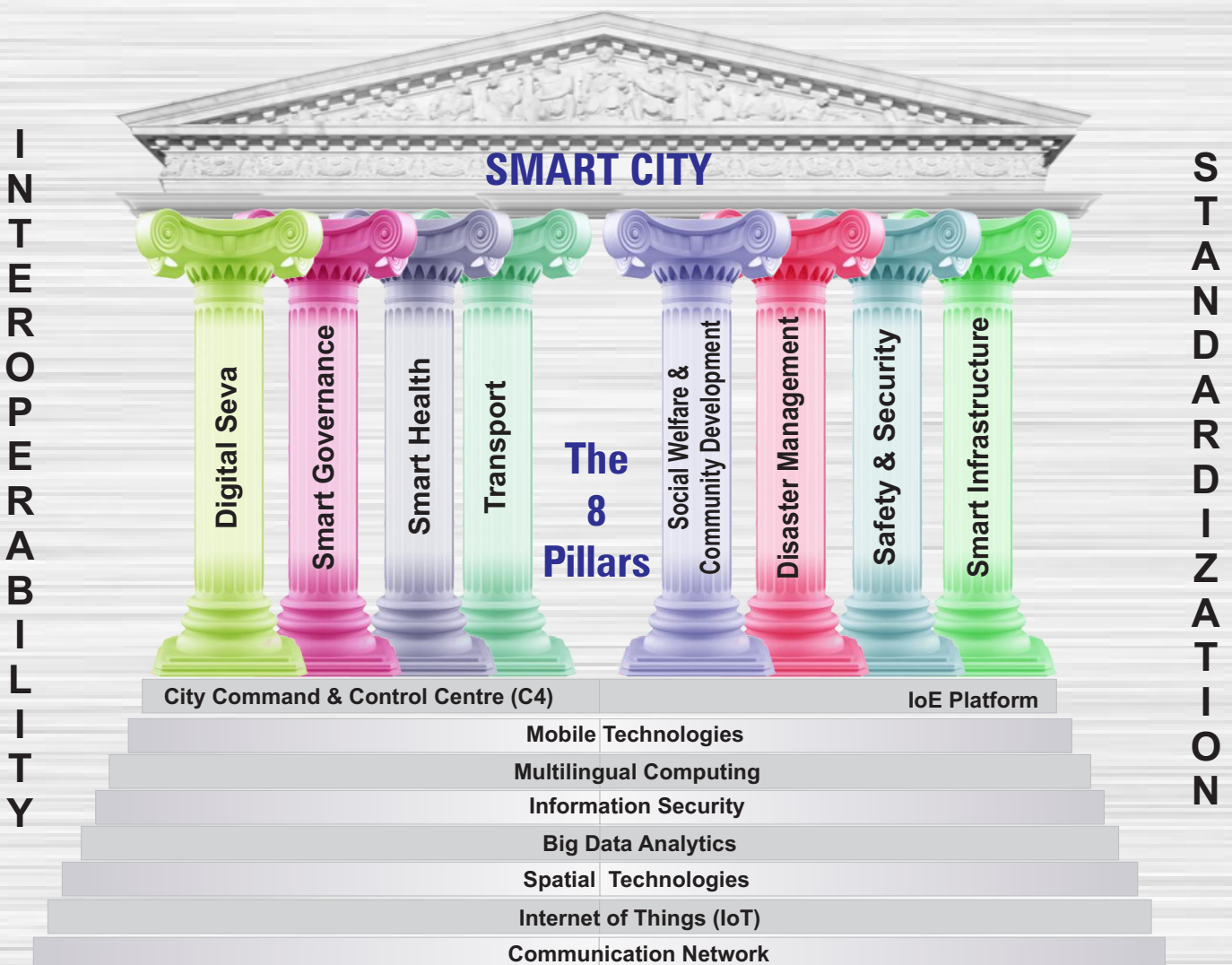
The Union Ministry of Urban Development is responsible for implementing the mission in collaboration with the state governments of the respective cities. The government of India under Prime Minister Narendra Modi has a vision of developing 100 smart cities as satellite towns of larger cities and by modernizing the existing mid-sized cities.

The 100 potential smart cities were nominated by all the states and union territories based on Stage 1 criteria, prepared smart city plans which were evaluated in stage 2 of the competition for prioritizing cities for financing. In the first round of this stage, 20 top scorers were chosen for financing during 2015-16.

Next set of 13 cities have made it to the Fast Track round. With the third batch of 27 cities, the total number of Smart Cities chosen rises to 60. The process for selection of the remaining 40 cities would start in January.

The Smart City implementation is now spread to 27 states and Union Territories. The new cities are from 12 states and have proposed to invest a total of Rs. 66,883 crore under their respective Smart City plans. The amount includes Rs. 42,524 crore in Area-based development and Rs. 11,379 crore in Pan city solutions.

SMART CITY PILLARS

DIGITAL SEVA

"Digital Seva" aims at making services available to the citizens electronically with optimised usage of resources, enhanced quality of life, connected, transparent public services and a better environment by improving online infrastructure, increasing internet connectivity and providing quick and efficient services delivered Online through Web portals and Mobile.

- Grievance Redressal System
- Universal Identity (Aadhaar)
- Multi-purpose Smart card
- Utility Services
- Public & Digital Library
- Women & Child Safety
- Assistive living for differently abled
- Property Tax
- Registrations & Certification
- License Facilities
- Tourism & Heritage

DIGITAL SEVA

- **Grievance Redressal System**
  - Meri Sadak

- **Legal Management**
  - e-Goshwara: Digital Preservation System Court Records

- **Tourism & Heritage**
  - Virtual Museum Builder (JATAN)
  - DARSHAK Mobile App
  - DIGITĀLAYA (डजिटालय)

- **Aadhaar based Systems**
  - Identity & Attendance Management System
  - Multilingual Tourist Information Management system (TourMate)
  - Surakshith Mobile App

Grievance Redressal System

Meri Sadak

"Meri Sadak" is a mobile app to enable users to give their feedback regarding pace of works, quality of works etc. of PMGSY roads to the Nodal Departments in the State Governments / National Rural Roads Development Agency (NRRDA). The user can take photographs at the site and submit along with feedback.

After submission of feedback, the user can monitor the redressal of his / her feedback through this app. The respective State Quality Coordinators (SQCs) of the Nodal Department implementing PMGSY will provide an interim response to the user.

Register ———— Capture Photo ———— Enter Feedback ——➤ Submit Feedback

Availability: Available on Google Play.

Legal Management

e-Goshwara: Digital Preservation System Court Records

The main aim of this project is to create Trustworthy Digital Repository (TDR) a long term digital preservation environment for the disposed case records through adaptation of Open Archival Information System [OAIS (ISO14721:2003)] developed by Consultative Committee for Space Data Systems (CCSDS).

The information package containing disposed case records will be transferred to the central archive system for long term preservation. These records will be maintained and preserved for longer period of time with the appropriate preservation policies applied on them and keep them available and accessible to designated community irrespective of hardware, software & technology changes.

Tourism & Heritage

Virtual Museum Builder (JATAN)

JATAN is a digital collection management system for Indian museums. It provides features such as image cropping, watermarking, unique numbering, management of digital objects with multimedia representations, Dublin core metadata compliance, collaborative framework for museum curators and historians, search and retrieval, access control for the portal, user administration, conservation reports, 3D virtual galleries and public access through web, mobile or touch screen kiosks.

Standardized by Ministry of Culture, Government of India for National Museums

Key Features:

- Scanning Infrastructure for Digitization of the Collections of Libraries, Archives and Museums
- Terabyte Data Storage Facility
- Automated Microfilm Processing Lab to convert Digital Content into Microfilm
- Gramophone Records Digitization Technology Solution
- Software Module for Repository and Retrieval system conforming to OAIS Framework
- Repository of more than One Lac Rare and Copy-right Free Books and Manuscripts comprising to 40 Million pages
- Online Retrieval of Digitized Books through www.dli.ernet.in portal

Website**:** https://cdac.in/index.aspx?id=mc_hc_jatan_virtual_museum

DARSHAK Mobile App

QR Code based DARSHAK Mobile app offers instant information about museum objects for visitors.

DIGITALAYA (डिजिटालय)

DIGITALAYA (डिजिटालय) is a generic software solution for management and archival of electronic records for Government Organizations.

Salient features:

- Client-server architecture enables the record producers to deposit e-records from their workplaces
- Caters to preservation of born digital as well as digitized records produced by government offices
- Archival strategies for commonly used file formats in offices including e-mail
- Built-in searchable database of record retention schedules by DARPG, CVC, GFR, UPCS, Banking to help in preserving for the required duration
- Comprehensive preservation metadata as per eGOV-PID standard notified by DeitY
- Encryption of private records and configurable access control to e-records
- Captures digital evidences for legal admissibility
- Comprehensive ingest process with text extraction, technical metadata extraction, integrity assurance
- Transfer packaging and controlled harvestability of e-records (into central digital repository)
- Management of storage, users, archival fonts, activity codes, record types, etc.
- Complies with requirements specified in IT ACT and Records Management / Archival ISO standards
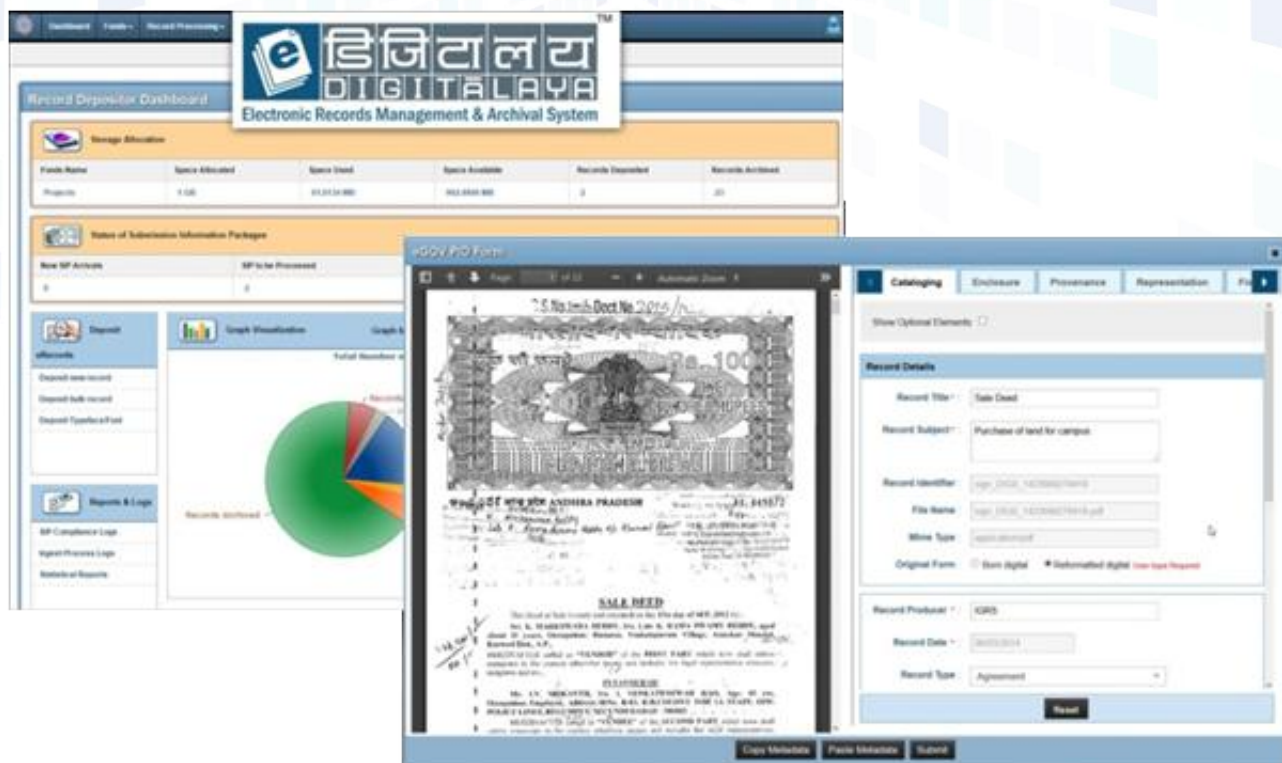
Aadhaar based Systems

Identity & Attendance Management System

The main objective of the system is to gather employee's attendance by using smart card.
It involves Biometrics in taking attendance so that the system may be made secure. This is to curb proxy in marking attendance. Also the cards will be inter-department operable i.e. if an employee moves from one location to other, his/her attendance will be taken care of, irrespective of the location of the centre.

This system makes use of the Access Control and Time and Attendance System with the following features:

- Contactless Smart Card.
- One time use of Aadhar verification
- Intelligent Access Terminal.
- Biometric enabled.
- TCP/IP enabled.
- Online/Offline operation.
- Auto Data Synchronization to any ODBC compliant data store.
- View attendance records directly on the web.
- Capture of Image during swipe
- Control access to security areas.

The system uses Unique advanced configurable Rule Engine to enforce security based on the profile information.The solution has multiple usages like attendance, payment, access control, canteen etc.

Multilingual Tourist Information Management system (TourMate)

TourMate is a mobile (Android, iOS, Blackberry) based Tourist Information Management system with interactive environment that provides tour guide, routing, searching, nearby places of attraction and information related to local events in local languages. The users can provide feedback and ratings so that the users can gain from shared experiences and ratings.

Surakshith Mobile App

Surakshith App is a major initiative towards enabling children learn Body SafetyRules, Safe - Unsafe Touch and how to identify Safe Adults. This App offers an easy to access, tried and tested comprehensive information on Personal Safety for children of age 6-18 years. It has no age restriction. It allows the child to learn personal safety without creating fear of people. Repeated use can help transform this knowledge about being safe into instinctive behaviour as the user gets familiar with the concepts of personal safety.

Surakshith App is available in 11 Indian languages – English, Hindi, Telugu, Tamil, Kannada, Malayalam, Marathi, Gujarati, Punjabi, Bengali and Oriya and is absolutely free of cost.

SMART GOVERNANCE

SMART captures the important attributes of Good Governance i.e. Simple, Measurable, Accountable, Responsive and Transparent governance. Smart Governance aims at engaging Citizens in the process of governance, improve delivery of services to Citizens, Business & Employees results in saving huge amount of resources by cutting costs on operations, enhanced transparency, convenience and empowerment, less corruption, revenue growth etc.

- Stamp Duty & Registration
- Online Management Monitoring and Accounting System
- Works & Account Management System
- Web based Land Management System
- Human Resource Management System
- Virtual Museum Builder
- Biometric Attendance System
- Legal Management
- Document Management System

SMART GOVERNANCE

- Digital Signature (e-Sign)
- Smart City Dashboard
- Stamp Duty & Registration (GAURI, KAVERI, SARITA)
- Online Management Monitoring and Accounting System (OMMAS)
- Works & Account Management System (WAMIS)
- Web based Land Management System (Web LMS)
- GIS enabled Road information Management & Monitoring System (GRIMMS)
- Document & Workflow Management System
- C-DAC BOL
- eSangam
- iHRMS
- Unicode Software (Intelligent Script Manager)

- E-Vidur: Sentiment Analysis
- pAkhbaar
- Shrutlekhan – Rajbhasha (Speech to Text)
- MANTRA – Rajbhasha
- Localization Projects Management Framework
- Go Translate
- BOSS Alfresco Document Management System
- Integrated Library Management System
- e-Auction
- USCAS: Ubiquitous Speech Collection & Analysis System
- PTS: Postal tracking System
- OCR for printed documents in Indian script

Digital Signature (e-Sign)

e-Hastakshar offers on-line platform to citizens for instant signing of their documents securely in a legally acceptable form, under the Indian IT Act 2000 and various Rules and Regulations therein.

eSign is an online electronic signature service which can be integrated with service delivery applications via an open API to facilitate an Aadhaar holder to digitally sign a document. Using authentication of the Aadhaar holder through Aadhaar e-KYC service, online electronic signature service is facilitated.

The objective of eSign service is to offer on-line service to citizens for instant signing of their documents securely in a legally acceptable form. C-DAC through its e-Hastakshar initiative enables citizens with valid Aadhaar ID and registered mobile number to carryout digital signing of their documents on-line.

C-DAC utilizes the service of Unique Identification Authority of India (UIDAI) for on-line e-authentication and Aadhaar eKYC Service.

Website: https://esign.cdac.in/

Smart City Dashboard

A city operations Dash board allows city officials and citizens to visualize entire city data, commands and analyze the problems of city via sensor data. Dashboard provides various interfaces for city officials and citizens.

The information displayed in dashboard includes Traffic information, Live Video Surveillance, Pollution info in City, Emergency Events and Alerts, Garbage Collection Planning, Sewage Management, Water Management Information etc. The visual data can be in the form of charts, maps, graphs and statistics.

Citizen can view the data provided by dashboard. Also they can interact with the dashboard for complaint registration, voting for polls, providing feedback or any specific functionality associated with the dashboard component.

City Officials: City Officials can post information, view information and perform intercommunication using dashboard. Administrators can create new dashboard interfaces, configure and validate dashboard interfaces and also configure data connections for Smart City Application functionality.

Features:

- Dashboard is configurable - change the position of the widgets, color of the graphs, real-time refresh rate etc., and user customized visualization options
- Live Information
- Plug and Play interface for various applications.
- Hierarchical and Role based access – sign-up/sign-in facility for users to provide role based access
- Mobile Application provides feeds to dashboard and helps to visualize data.
- Grievance Registration and Status Display.
- Security enabled by https
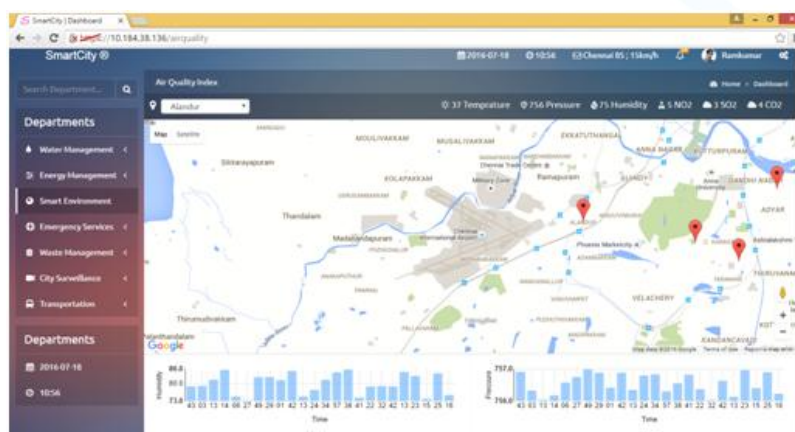
Stamp Duty & Registration (GAURI, KAVERI, SARITA)

A model of the BPR to reorient the Department of Registration & Stamps towards 100% automation in the registration process and speedy delivery of registered documents to the citizens.

The application suite consists of:

- Registration Module
- Valuation Module
- Reports Module
- Vendor Management System (VMS)
- Utilities Module
- Societies, Firms and Marriage Registration Module
- Scan-Archival Module
- Data Transmission Module
- Website

Website: https://cdac.in/index.aspx?id=st_egov_egovernance_mgovernance

Online Management Monitoring and Accounting System (OMMAS)

OMMAS is a web based online system for the monitoring of schemes related to PMGSY being implemented across the Country. All the information related to Release of Funds, Utilization of Funds, Status of Progress of work and quality monitoring reports are available to citizens & govt. officials for viewing & analysis.

Online Management Monitoring and Accounting System (OMMAS)

OMMAS assists the department officials in:

- Maintaining the District Rural Road Plan (DRRP)
- Preparing the Proposal from the Core Network, scrutinizing by the State Technical Agency (STA) and sanction from MoRD
- Capture the monthly physical and financial progress of the work
- Monitor the quality of the work under three stages i.e., In-Progress, Competed and Maintenance by State Quality Monitors (SQM) and National Quality Monitors (NQM)
- Quality of work is monitored using the Mobile based application enabling the monitor to upload the real time photographs of the roads right from the insapection site.
- Accounting modules helps to manage the funds transferred from Ministry of Rural Development to the State Executing Agency and PIU, and account for the usage of funds in the implementation
- Accounting module also enables to capture the work wise expenditure
- All the accounting reports like Cash Book, Ledgers, Balance Sheet, Schedules, Registers and Monthly Account as per the PMGSY Accounting Manual are generated after monthly closing based on simply posting Receipts and Vouchers.
- Works under maintenance can also be monitored based on periodic inspection of the Pavement Condition Index of the roads.

Website: https://cdac.in/index.aspx?id=st_egov_egovernance_mgovernance

Works & Account Management System (WAMIS)

WAMIS is a generic public Infrastructure project Management and Monitoring framework which has been designed and developed with a view to aid the line departments involved in the creation and maintenance of public infrastructure assets towards enhancing their planning & operational efficiency leading to effective service delivery.

# Works & Account Management System (WAMIS)

Key Features:

- To generate electronically Contractors Bills, Budget estimates, Monthly Accounts and book keeping as per the statutory governmental procedures.
- Tracking, Processing, Consolidating and Reporting of Financial transactions
- Near real-time Assessment of Expenditure against the Grants/Allotment received as per the budget
- Assess Physical progress of various projects undertaken by the department with regards to the financials.
- Increase the efficiency of individual functional wings of the department.
- Achieve integration with the systems of other line departments/Nodal Agencies such as the AG and the treasuries for submission of data digitally and achieve online reconciliation.

Website: https://cdac.in/index.aspx?id=st_egov_egovernance_mgovernance

Web based Land Management System (Web LMS)
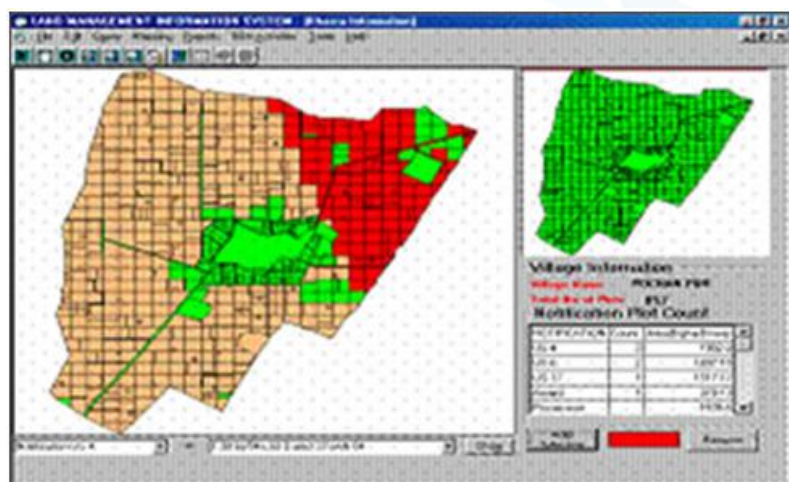
Web-based enterprise GIS solution which enables the Authorities / Government, Landowners and Public to access and share requisite information with high level of security and data integrity.

The system incorporates facility to dole out compensation and enhanced compensation information along with the legalities involved in their business process.

It involves scanning, digitizing and geo-referencing of the Village Maps, Layout Plans, Master and Land use Plan. The spatial data and non-spatial data together with the developed application tools and GIS interface has helped the Administration in various aspects like perusing plot information, finding plot of land to be acquired and maintaining the detailed information with high level of integrity.

The web enabling capability has enabled the common citizen to access information related to their plot of land through the Internet.

Website: https://cdac.in/index.aspx?id=st_egov_lmis_ap

GIS enabled Road information Management & Monitoring System **(GRIMMS)**

GRIMMS Web helps in presenting information in the form of maps and tables in an integrated manner for more usability, transparency and accountability. A principal objective of GRIMMS Web is effective management and monitoring of PMGSY for construction, improvement and maintenance of rural roads.

GRIMMS Web has been designed for effective online dissemination of selected maps/information/reports to a large


number of users including various government departments and general public. This assists in improved developmental planning and public access to the progress of work under the government programme.

It includes Standalone (GRIMMS-S) and Web GIS (GRIMMS Web) applications. While the Web GIS version enables citizens to visualize and query road related information through the Internet; the standalone version helps to execute any user specific and database/compute intensive queries.

Website: https://cdac.in/index.aspx?id=st_ssdm_ssdm_grimms

Document & Workflow Management System

A Natural Language Processing based Document & Workflow Management System to manage documents data throughout their lifecycle, right from inception stage through creation, review, storage and finally disseminate all the way to their destruction.
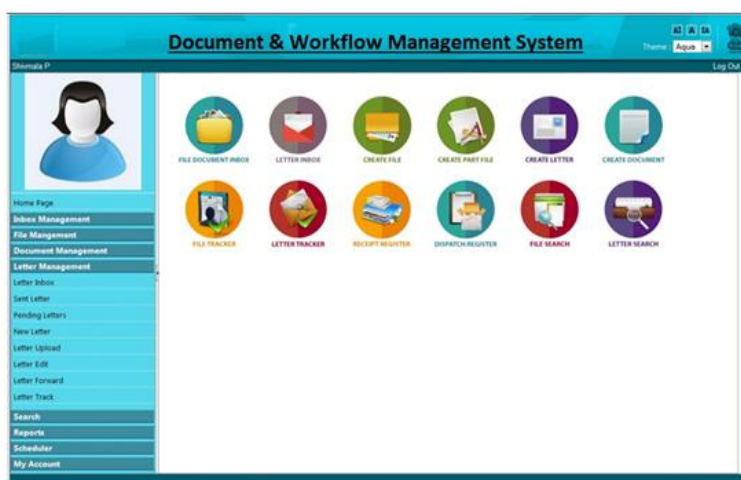
Key features:
- Tracking of workflow of documents & Users
- Correspondence Management
- Customizable Office Filing Environment
- Document Approval and Sign-off Sheet
- Document linking and annotation
- Document Monitoring
- Alerts & Reminders
- Report Generation Tool
- Access Rights Management and Control
- Profile Creation & Management
- Information Extraction, Search & Retrieval
- Graphical/Statistical representation of Information
- Automatic Summarizer
- Security Overlay

Website: https://cdac.in/index.aspx?id=mc_cli_document_management_system

C-DAC BOL (Tool for Social networking within Enterprise / Organization)

Key Features:

- Social networking for Enterprise / Organization
- Individuals, Groups, Events areas (based on templates)
- Integrated calendar, activity stream, dashboard, and more
- Communicate ideas, information, events, artefacts
- Through use of pages, blogs, forums, files (image, document, video)
- Through interactive chat
- Powerful framework to build behavior-analytics, data analytics, etc.

eSangam

eSangam, an Integrated Mission Mode Project under National eGovernance Plan (NeGP), Government of India is a constellation of National and State eGovernance Service Delivery Gateways (26 State Gateways Live as of now) providing seamless interoperability and exchange of data across the government departments with a vision to make all the government services accessible to citizen through a single service delivery outlet.

The gateways are based on Service Oriented Architecture (SOA), support Synchronous as well as Asynchronous Message Exchange Patterns, support open platform with no vendor lock-in, enable high security using Two-way SSL communication between clients and Gateway, provide business continuity with zero data loss and provide guaranteed delivery and transactions Logs.

eSangam, a Mission Mode Projects under NeGP consists of:

- SOA-based constellation of National and State eGovernance Service Delivery Gateways (26 States/UTs deployed as of now) with below features:
- Open Platform and No vendor lock-in
- Supports Synchronous as well as Asynchronous Message Exchange Patterns
- Two way SSL for Securing the message flow between Client and Gateway
- XML signature Support
- Business Continuity with zero data loss
- Guaranteed Delivery & Transaction Log

eSangam Positioning for Service Delivery
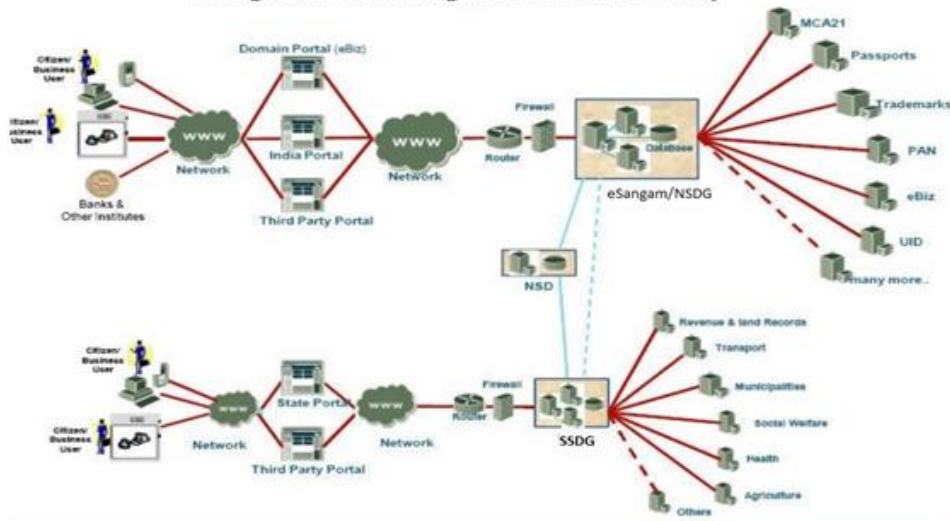
iHRMS (Human Resource Management System)

iHRMS is a comprehensive web-based solution that caters to different needs of various departments of an organization like HR, Finance and Purchase etc. It has configurable role-based security and access control.

The HR function consists of tracking existing employee data which traditionally includes personal Information, Skills, Salary, Leave, Tour Claims, Medical Claims etc. To reduce the manual workload of these administrative activities, C-DACautomated many of these processes by introducing customizedHuman Resource Management System.

HRMS has various modules like Employee profile with all his basic information Leave management, Tour Claims, Medical reimbursement, Salary, Provident Fund, Attendance integrated with Biometric system etc.

Key Features:

- Rule based Access control
- Work Flow
- Configurable Policies
- Payroll and Income Tax
- Provident Fund
- Leave Management
- Travel Bills
- Reimbursements
- Pay-slips
- Attendance tracking
- MIS Dashboards etc.
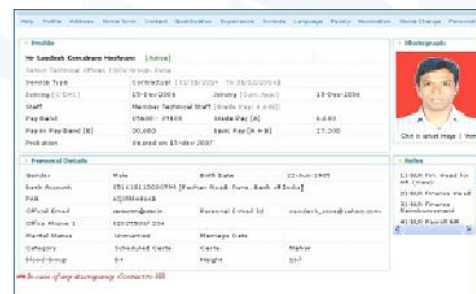
Unicode Software (Intelligent Script Manager)

ISM V6 will cater to diverse user requirements from word processing, database applications, web based applications, publishing and even custom built software. Whatever applications are available in Microsoft Word, will be available in Indian languages with this software. The keyboard for the languages will also come with a software kit which will be inbuilt.

The software supports Assamese, Bengali, Gujarati, Hindi, Kannada, Marathi, Malayalam, Oriya, Punjabi, Sanskrit, Tamil, Telugu, Manipuri, Nepali, Konkani, Bodo, Santhali, Maithili and Dogri, besides English.

# Unicode Software (Intelligent Script Manager)

Features:
- Provides the Indian language edge to existing application softwares as well as custom designed applications
- Support from Win 98 to Windows 8.1 for desktops and up to Win 2008 for Network Server for 32/64 bit
- Macros for Open Office, Libreoffice and MS-Word like find-replace, keyboard shortcut, converter, spellchecker, synonym dictionary, official language dictionary, mail merge now also available in UNICODE
- UNICODE sorting of data in Excel, Calc through macros
- Enhanced spellcheckers in Hindi, Gujarati, Bengali &Malayalam
- Features like insert date & time facility, number to word
- Easy phonetic keyboard
- Apart from BIS Enhanced INSCRIPT keyboard support for popular keyboard layouts like typewriter as well as custom designed layouts
- On screen keyboards to expedite content creation and facilitate learning
- The rupee sign is integrated on Enhanced Inscript keyboard. It is available on third layer. It can be typed using ALTGR+4.
- Documents which are created using ISM V6 are globally usable
- Convert data from various font encoding to Unicode
- nTrans is able to convert data (proper nouns) from English to Indian Language Unicode and vice versa

Website: https://cdac.in/index.aspx?id=mlc_gist_ismv6off

E-Vidur: Sentiment Analysis

Tool for data Analytics, Trend analysis, Behavior by analyzing Citizen inputs from Web e.g. Govt. websites, Social media e.g. Twitter, Facebook etc. and Dashboard for Senior Officials.

Prototype dashboard for E-Vidur, with Tag Cloud, near Real-time Interactions,Sentiment polarity charts and domain graphs:
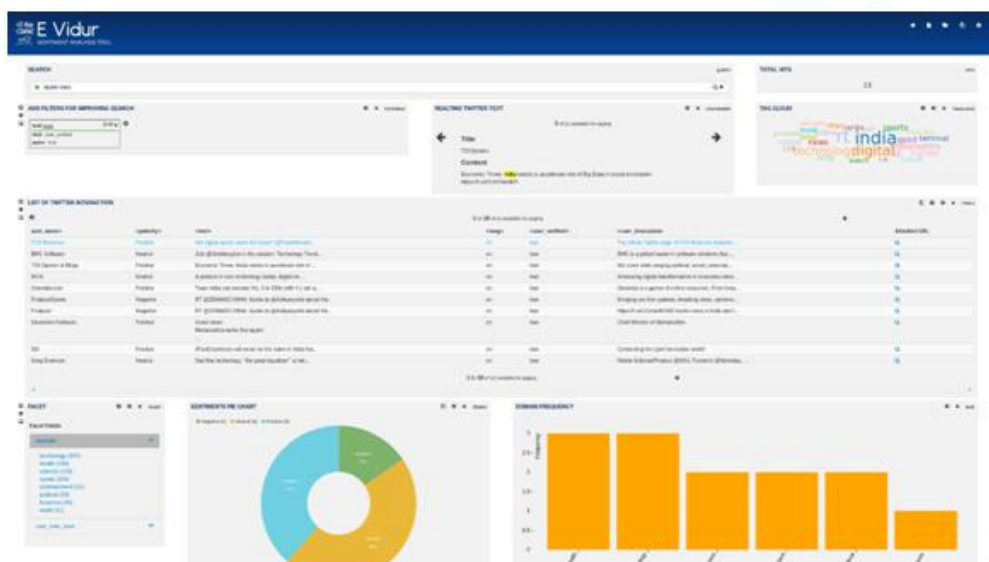
pAkhbaar

pAkhbar, an Intelligent Newspaper Clipping Extraction System,is a software to collate all the news of interest of a user from different newspapers of various languages and cluster them in topics and sub-topics of user's choice for most convenient access.

Key Features:
- Automatic content filtering to cluster based on news topic of relevance and domains.
- User customization of domains and lexicons of importance
- Both topic based which can reach cross domain and domain based auto-clustering of news across newspaper with user personalization with multilingual support for prominent Indian Languages like Hindi, Marathi, Gujarati etc. with cross-lingual transfer lexicon.
- Search facility on given topic across domain and within domain from all the selected newspapers

Intelligent Newspaper Clipping Extraction System
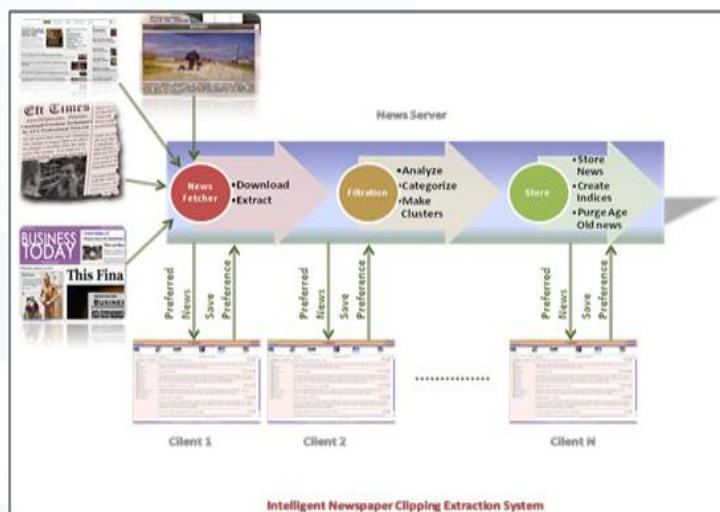
Shrutlekhan – Rajbhasha (Speech to Text)

ShrutLekhan-Rajbhasha, a Hindi speaker independent, continuous speech recognition system is a milestone in the field of Speech technology that enables a machine to recognize human speech and provide an output in Hindi Unicode.

ShrutLekhan-Rajbhasha is used as a tool in MANTRA-Rajbhasha (Machine Assisted Translation) system to correct the translated Hindi text. Recognizer improves recognition through the use of grammar (Language Module), which defines the vocabulary and syntax.
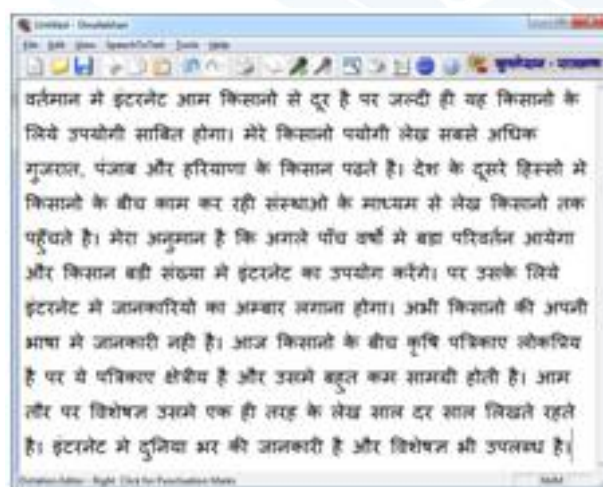
The user communicates with the application through the appropriate input device i.e. a microphone. The Recognizer converts the analog signal into digital signal for the speech processing. A stream of text is generated after the processing.

Shrutlekhan – Rajbhasha (Speech to Text)

Salient Features:
- Speaker independent, continuous speech recognition software for Hindi language
- Creates instant and accurate documents
- Generates output in UNICODE standard font
- Numbers, Dates & Currencies get converted to multiple formats at runtime
- Multiple Hindi keyboard support for typing & editing
- ShrutLekhan-Toolbar: A system plug-in for dictation in various text editors

Website: https://cdac.in/index.aspx?id=mc_st_shrutlekhan_rajbhasha

MANTRA – Rajbhasha

MANTRA-Rajbhasha is a MAchiNe assisted TRAnslation Tool, which translates documents pertaining to Personnel Administration, Finance, Small Scale Industries, Agriculture, Information Technology, HealthCare, Education and Banking domains from English to Hindi.

Mantra-Rajbhasha has been developed as Standalone, Intranet and Internet versions. MANTRA-Rajbhasha has been designed to assist the various departments and ministries of the government to procure quick and standard Hindi translations of English documents.

The MANTRA Technology is being expanded to translate English texts into other Indian official languages such as Gujarati, Bengali, and Telugu. Besides, it is also being expanded to translate Hindi text into English in the specified domain of personnel administration, as well as other domains like Banking, Transportation and Agriculture.

MANTRA uses the Lexicalized Tree Adjoining Grammar (LTAG) formalism to represent the English as well as the Hindi grammar.Besides the common translation tools such as add word, multiple output, online thesaurus and dictionary, the system is enriched with added functionalities for report generation, splitting a large document into smaller ones for distribution to more than one translator/Vetter and merging the split translated documents into one.

Website:
https://cdac.in/index.aspx?id=mc_mat_mantra_rajbhasha
https://download-rajbhasha.rb-aai.in

Localization Projects Management Framework

On the fly translation of websites Crowd source based Inline translation.

The various kinds of applications support provided by C-DAC covers web applications, desktop based applications, localized browser solutions etc.

Key Features:

· Open Office, Browser and Email client
· Framework for data (.xls, doc, database, pdf)
· Framework for Code (HTML, vb Code)
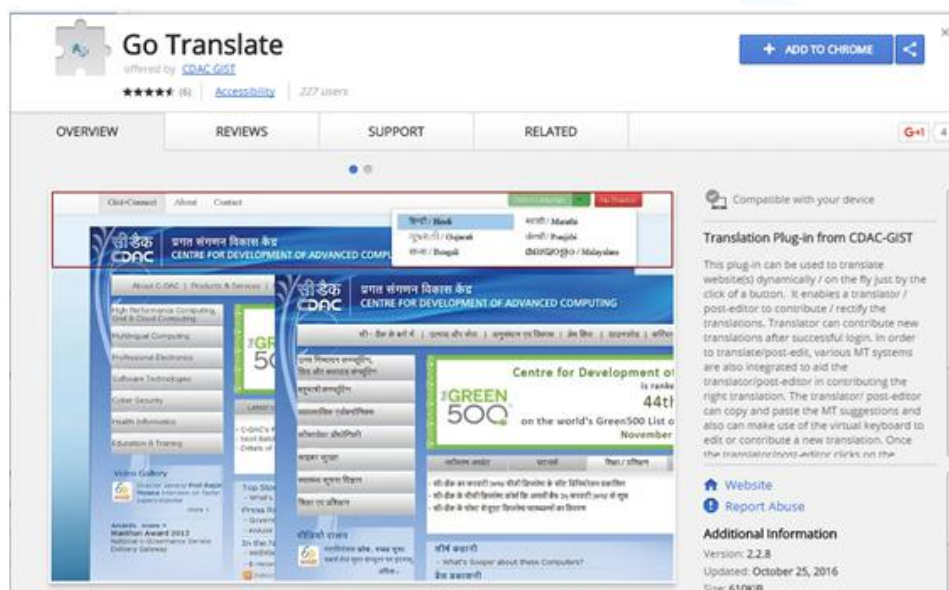· Browser
· Windows Desktop

Website: https://www.cdac.in/index.aspx?id=mlc_gist_local_frmwk

Go Translate

The "GIST Online Translation Framework" translates the website in the language of user's choice.

The framework is backed up with the requisite Natural Language Processing (NLP) tools and technologies and is based on the reuse of Translation Memories, Term Banks, and other linguistic resources including Machine Translation systems. This is a first of its kind framework which has scientific rigor and addresses the challenge of in-context translation.


Available as a plugin to Browser.

Go Translate

Salient features:

· The framework is language independent and easy to use.

· There is no need to change anything in the source code of the website(s). So it also becomes easier and hassle-free for website owners to make their content available in local languages.

· The GO-Translate framework can be used to translate website(s) dynamically and on the fly just by a click of a button.

· It enables the crowd and translators to contribute and update the translations. In order to translate/post-edit, various MT systems are also integrated to aid the translator in contributing translations.

· A virtual keyboard for all Indian scripts allows the crowd and the translators to edit or contribute a new translation.

· The translation submitted by the translator gets stored on the big-store on a centralized remote server thereby making Indian language content reusable and available for further NLP processing.

· After successful validation of the translations, if the same URL is accessed again, all the previously contributed translations can be applied to the web pages.

BOSS Alfresco Document Management System

Alfresco Document Management system is part of BOSS Enterprise Server. It is an open source Content management system. Alfresco includes a content repository, web-based user interface for managing and using standard portal content, a CIFS interface that provides file system compatibility on both Linux and Microsoft Windows operating systems.
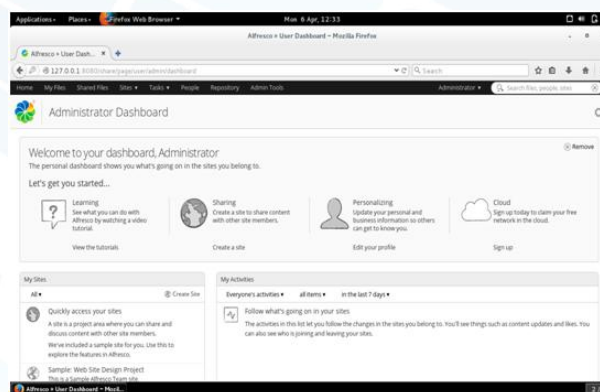
Integrated Library Management System

C-DAC's ILMS (based on Koha open source software) is a true enterprise-class ILS with comprehensive functionality including basic and advanced options.

The ILMS includes modules for acquisitions, circulation, cataloguing, serials management, authorities, flexible reporting, label printing, multi-format notices, offline circulation for when Internet access is not available. The ILMS will work for consortia of all sizes, multi-branch, and single-branch libraries.

Key Features:

- OPAC (Online Public Access Catalogue)
- Searching
- Google Cover Images
- Google Book Reviews
- New Purchase Suggestions
- Tag Cloud Email Alerts: Automatic Alert
- Librarian to User: Upcoming Events / Other
- Alerts
- User to Librarian: SMS Alerts Integration

- Virtual Shelves (Lists)
- Multi Language Support
- Facilities available for members online
- Manage how they are notified by the library of events and due dates
- System Administration & Interface
- Industry-standard database type (text, RDBMS), SQL,MYSQL
- Export and import records

e-Auction : Centralized e-Auction Portal

An "on-line auction management system", for buyers and sellers to come together and trade Fruits, Crops or agriculture products etc. in all the eight North-East States. The centralized e-Auction system has been developed / customized as per eight NE states requirements.
The e-Auction system consists of web-portal where registered users can propose new auction, place bids in order to buy the items on auction, send messages to other users and receive automatically news via e-mail.
This e-Auction portal is deployable for any type of commodities where online auction is useful.

Features:

- Registration of Seller & Bidder,
- Crop Collection from Farmers / Planters,
- Receipt of Goods,
- Placing Crops for Auction,
- Online Bidding and Notification,
- Payment (Offline/ Online),
- Goods sold out,
- Sold Goods Shipment Assistance,
- Reports generation.
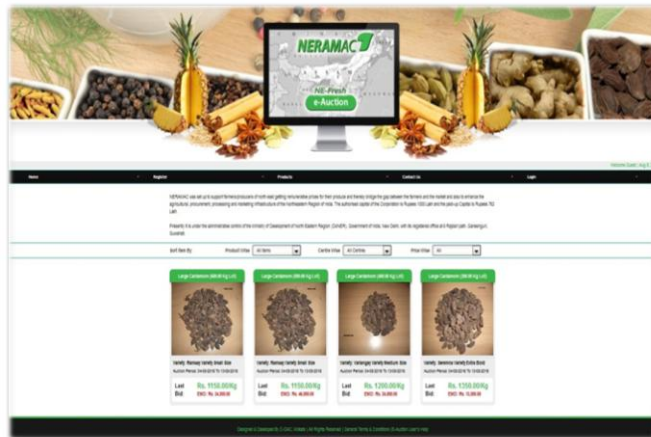
USCAS: Ubiquitous Speech Collection & Analysis System

The Ubiquitous Speech Collection & Analysis System (USCAS) consists of distributed Sensor Nodes that capture acoustic signals and transmit them over a RF Network to the Control Station.

The Sensor Nodes are equipped with a sensitive microphone that captures acoustic signals in its vicinity; a powerful processor that analyses, compresses, and packetizes these acoustic signals; and a RF Transceiver that transmit these packets to a central coordinator.
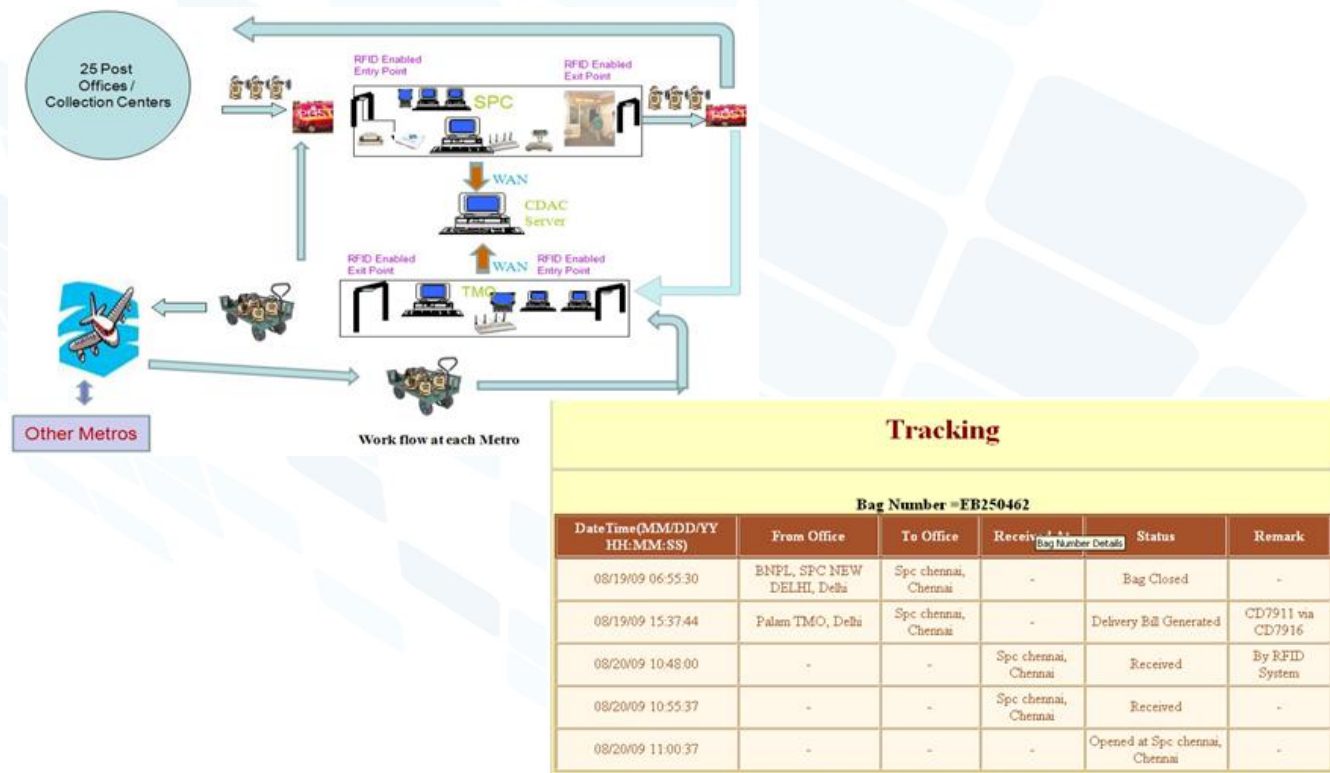
The central coordinator connects to a Control Station that can be used to monitor the acoustic activity in the area, and can also upload these packets to a Central Server for further use. The captured audio can also be downloaded and played on smart mobile.

PTS: Postal tracking System

The PTS is an integrated solution for the Indian postal services/department of post, primarily for:

• Tracking the speed post articles /bags once they are booked & moves in the process flow.
• Increase the visibility of the speed post articles & bags and to give appropriate information of their status.
• To decrease the paper work & reduce the human error.
• To use RFID enabled tags which are reusable & faster in information access
• To reduce pilferage & increase automation

Work flow at each Metro

Tracking

Bag Number =EB250462

DateTime(MM/DD/YY HH:MM:SS)	From Office	To Office	Receiv... Bag Number Details	Status	Remark
08/19/09 06:55:30	BNPL, SPC NEW DELHI, Delhi	Spc chennai, Chennai	-	Bag Closed	-
08/19/09 15:37:44	Palam TMO, Delhi	Spc chennai, Chennai	-	Delivery Bill Generated	CD7911 via CD7916
08/20/09 10:48:00	-	-	Spc chennai, Chennai	Received	By RFID System
08/20/09 10:55:37	-	-	Spc chennai, Chennai	Received	-
08/20/09 11:00:37	-	-	-	Opened at Spc chennai, Chennai	

OCR for printed documents in Indian script

The OCR converts the scanned printed documents into electronically accessible format. It can process documents in Indian languages namely Bangla, Devanagari, Malayalam, Telugu, Tamil, Kannada, Gurmukhi, Urdu, Assamese and Manipuri.

This system has been developed to facilitate the digitization of the bilingual document including symbols and numerals images having complex layout and varying font styles.

SMART HEALTH

Advances in information and communication technologies are making healthcare services smarter and improving lives every day. Smart cities will take medical care to the next level enabling connectivity across devices and remote monitoring of patients. Health monitoring devices have made it possible for physicians to remotely collect patient data to foster diagnostics, preventive care, and measurement of treatment results.

- Hospital Information System
- Food & Drug Management
- Disease Surveillance
- Blood Bank Management
- mHealth
- Telemedicine
- AYUSH
- Home Healthcare
- Health Call Centre
- Green Corridor service
- Analytics based Care management
- Spurious Drugs Identification

SMART HEALTH

- Disease Surveillance (MoSQuiT)
- Treatment Adherence (mDOTS+)
- Decision Support System (AyuSoft)
- Mercury Nimbus
- iCare@Home
- Telemedicine Network
- PHRMS
- Blood Bank Management System
- e-RaktKosh: Centralized Blood Bank Management System
- eSanjeevani
- eAushadhi
- e-Dhanwanthari
- Generic Medical Equipment Interface (GMEI)
- MOTHER (Mobile based maternal Health Awareness)
- Healthcare Knowledge System for Preventive Health Care
- Electronic Health Records (EHR)
- Hospital Management Information Systems (HMIS)
- HealthCare Standards (DICOM, Hl7)
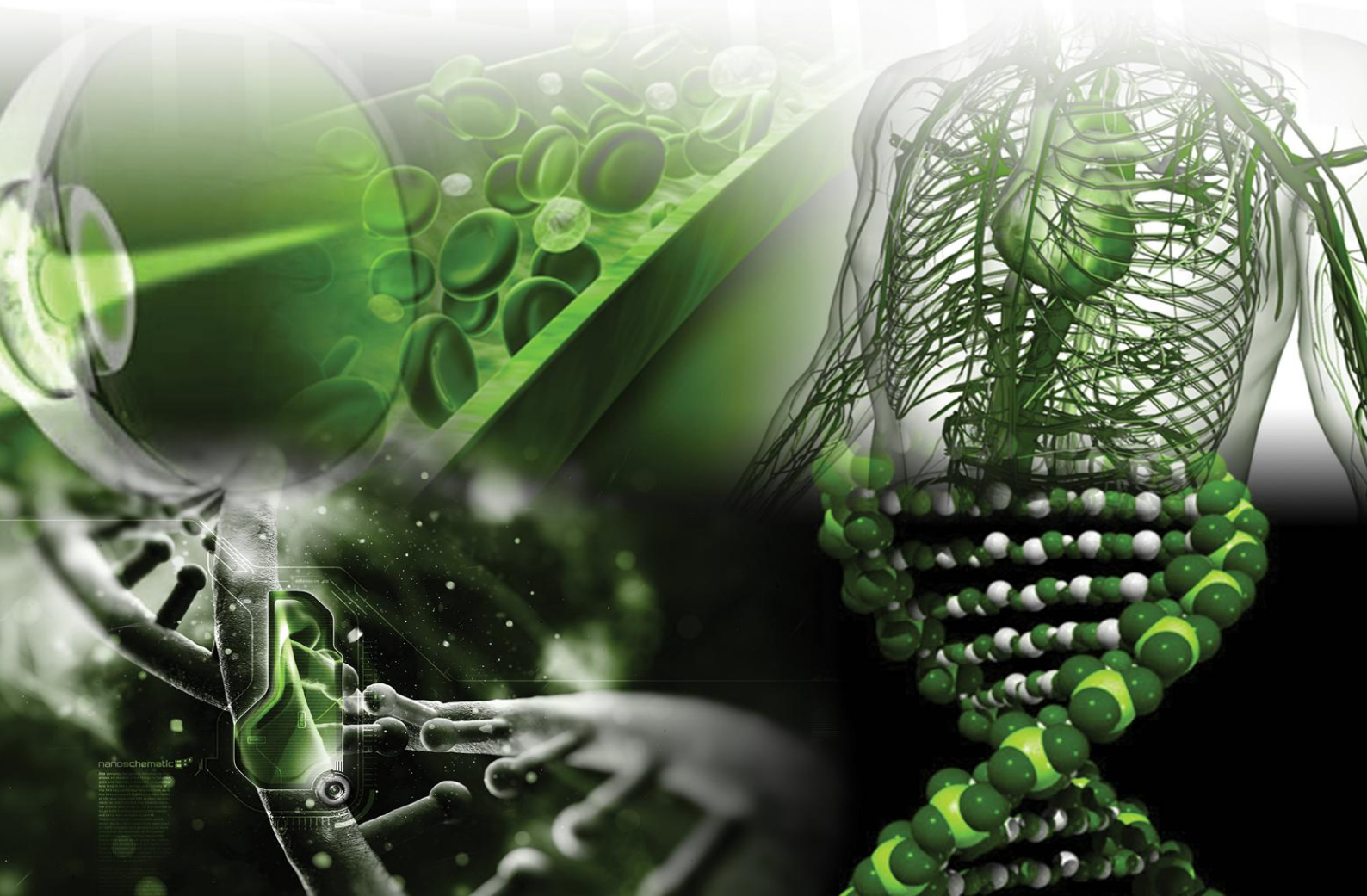
Disease Surveillance (MoSQuiT)

MoSQuIT (Mobile based Surveillance Quest using IT) is a Disease Surveillance system for Malaria using mobile platform. It enables effective data-collection/updation/collation for a centralized repository, thereby reducing the time required for information proliferation and initiation of appropriate action by State Health department.

MoSQuIT connotes the systematic and continuous watch/vigil over the status of malaria in the community.
It helps monitor, plan for control measures, and will help detect both spatial and temporal changes in the long run. It triggers an early warning system in identifying potential outbreaks which frequently occur in this region. In particular, the system helps prevent and control malaria in the community.

Key Features:

- Integrated Malaria Surveillance
- Malaria Outbreak Prediction
- Drug Inventory
- Vector Surveillance
- Spatial Epidemiology
- Geo tagging of Patients Location
- Analytics
- Stenciling
- Community Awareness
- Medical education

Website: https://cdac.in/index.aspx?id=hi_mhs_mobile_healthcare_solutions

Treatment Adherence (mDOTS+)

Empowering RNTCP stakeholders with effective TB monitoring & Control using Mobile

Key Features:

- Automated Treatment Monitoring/ Self Reporting using an "IVR System & a missed call from the patient"
- Mobile-based Treatment Card: Accessible to TU stakeholders
- Automated daily updates of the Treatment Card
- Treatment adherence with IVRS - Reminder calls to the patients at scheduled time
- Interface between Mobile-based Treatment card & the centralized repository(Nikshay / RNTCP)
- Various reports & statistical analysis
- Daily treatment status report on Mobile
- SMS to Private Practitioners for referring their +ve cases to the related TU

Decision Support System (AyuSoft)

AyuSoft is a vision of converting classical Ayurvedic texts into comprehensive, authentic, intelligent and interactive knowledge repositories with complex analytical tools.

Key Features:

- Integrated system offering multiple interconnected applications under the same umbrella
- Systematic examination tool as per classical Ayurvedic guidelines
- Investigations, Case Analysis etc. according to practical clinical needs and research challenges
- A High End Query Database with Multidimensional search utility
- System addressing heterogeneous needs of various user categories like Hospitals, Practitioners, Researchers
- Offers human expert analysis with human-independent analysis
- Applications as well as data can be plugged into AyuSoft to help you customize the tool to your specific needs aided by automated data loading and customized textual and graphical report generation capabilities

Website: https://cdac.in/index.aspx?id=hi_dss_ayusoft

Mercury Nimbus

MERCURYTM Nimbus suite is a cloud-enabled comprehensive EMR / EHR and Telemedicine solution. MercuryTM Nimbus Suite includes three tools; ; MercuryTM on Cloud, Cloud Repository and MercuryTM for Android, specially tailored to cloud / clustered infrastructure.

The MercuryTM Web Telemedicine Central (MWT-C) is centrally implemented Telemedicine solution that allows full web-browser based telemedicine interaction. The solution packs ability to support both multiple specialists and patient nodes.

The server stores the data centrally and is accessible to any authorized RTC users and the specialists of the implementing hospital.The MercuryTM Central Repository Server (CRS) allows creation and deployment of maintenance-free data center.

Website: https://cdac.in/index.aspx?id=hi_ts_medinfo_mercury_nimbus_overview

iCare@Home

iCare@home is a suite of Integrative healthcare informatics based solutions with applications like Risk predictors, Symptoms analyzer and Computer games. It is targeted to create health awareness among individuals and communities through Analysis, Prediction and Edutainment.

It offers Holistic healthcare solutions for health, disease prevention and primary care of diseases and symptoms. iCare@Home introduces health games, which are a perfect blend of health education and entertainment for varied age groups.

Website: https://cdac.in/index.aspx?id=dl_icare

Telemedicine Network

Owing to the shortage of doctors and hospitals in rural areas of the country, telemedicine solutions have become an attractive option to reach quality healthcare everywhere. The Telemedicine network is being effectively used for benefit of patients, health professionals, paramedical workers, Nurses and medical students.

It also aggregates clinical records (EHR) from diverse healthcare systems available in healthcare facilities spread over a hospital, group of locations and hospitals, region or nation. It is based on a highly redundant, fail-safe, and secure system framework. It provides a base for developing various applications on top.


Key Features:
- Monitoring of Telemedicine Network and all other Telemedicine activities in the state by housing the Central Telemedicine Node.
- Training in Telemedicine Technology, Medical Animation & Medical Multimedia (Capacity Building in Health IT).
- Archiving Electronic Teaching material and clinical study material
- Offering Distance Medical Education by coordinating medical institutes inside and outside the state for skill promotion & knowledge gain of users.
- Extending telemedicine facility to people residing in urban and rural areas who may not have access to Govt. run Telemedicine Network
- To help in disease diagnosis & Follow-up of rural patients by making available medical diagnostics through adequately trained personnel

Website: https://cdac.in/index.aspx?id=prs_rl206

PHRMS

Personal Health Record Management System (PHRMS) facilitates the creation and aggregation of clinical and health information of an individual for better disease management, thereby leading to a healthier lifestyle. The PHRMS has been designed in compliance to the Electronic Health Record (EHR) Guidelines released by the Ministry of Health and Family Welfare, Government of India.

The PHRMS system also makes use of global healthcare standards such as SNOMED CT for various Personal Health Record (PHR) components including procedures, laboratory tests and allergies. PHRMS also includes Practice Management for doctors.
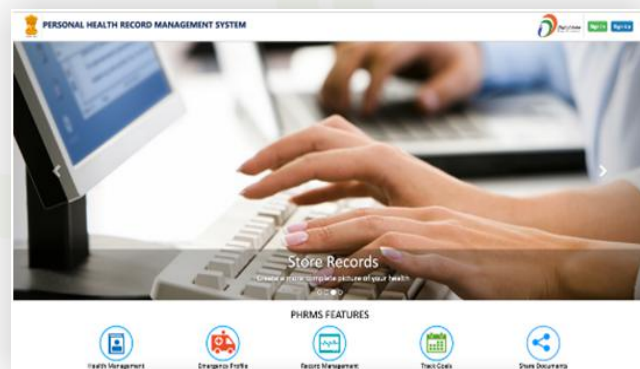
Blood Bank Management System

Blood Bank Management System (BBMS) is a browser based solution designed to store, process, retrieve and analyze information concerned with the administrative, inventory management and clinical aspects of providing services within a blood bank.It empowers blood bank administrators, blood bank staff, and the donors.

BBMS automates the processes involved in an individual standalone Blood Bank. BBMS stores, processes, retrieves and analyzes information with respect to the work-flow and other inventory and clinical oriented processes for providing services within a blood bank.

e-RaktKosh: Centralized Blood Bank Management System

e-RaktKosh, a cloud based centralized blood bank management system is an initiative to make the blood banks smarter by strictly enforcing standards and guidelines ensuring real time and authenticated availability of information to the citizens.
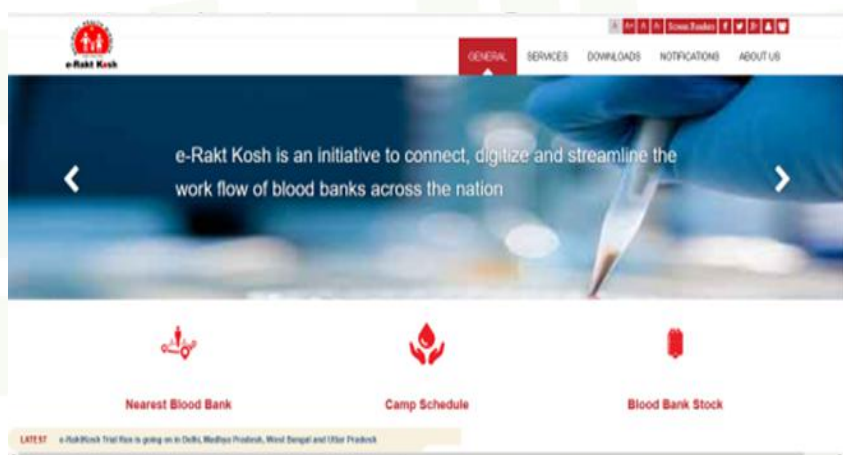
eSanjeevani

'eSanjeevani', is a web-based comprehensive telemedicine solution.

URL: https://www.esanjeevani.in/aboutus.aspx

'eSanjeevani' extends the reach of specialised healthcare services to masses in both rural areas and isolated communities. Besides enhancing quality of medical services, addressing issues pertaining to uneven distribution and shortage of infrastructural as well as human resources.

eSanjeevani also aims to make healthcare services equitable by bridging the digital divide that exists between the urban vs. rural, rich vs. poor etc. eSanjeevani can also be used to provide medical education to interns, people across various Common Service Centres (CSCs), etc.

eAushadhi

'e-Aushadhi' is a Complete Supply Chain Management System that deals with the management of stock of various drugs, sutures and surgical items required by different district drug warehouses.

The main aim of 'e-Aushadhi' is to ascertain the 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. This includes classification/categorization of items, codification of items, quality check of these items, etc. and finally issuing drugs to the patients, who is the final consumer in

Features:

- Top down Approach helps Head Quarter in Better Monitoring and Control down the line.
- Help in better Planning and Execution at all administrative level.
- Efficient control on supply and Inventory.
- Complete Package for Centralized Supply Chain Management System supporting with best functionality.
- Best Performance with high number of users.
- Able to extend the functionality as per Department's choice and available Infrastructure.
- Quality Control on Drugs and monitoring and control on Quality of Drugs.
- Online Drug Distribution to Patient on DDC.

- Intra Depot Excess or Short drug transfer integrated with HQ.
- Supplier Payment linked with Supplier Performance.
- Help and Solution Desk for Users.
- Provide bar coding Interface for areas such as Drug Receiving and Issuance, QC Sample Issuance etc.
- Audit logging of transactions.
- Comprehensive User Management and Security.
- Dynamic and Standard reports.
- SMS and Email functionality for sending SMS/Email communication to identified recipients.
- DASHBOARD

e-Dhanwanthari

A web based telemedicine software solution in Open Source Framework provides expert-based health care to understaffed remote sites and advanced emergency care through modern telecommunication and information technologies. It offers super specialty medical services at the patient's door step.

Key Features:

- Creation of Electronic Medical Record (EMR) with unique patient ID, centralized / local storage, retrieval and updating of EMR

- Patient data accessible through unique patient ID and Social Security Number

- EMR includes demographic details, expert opinion, and clinical information consisting of medical images with reports, Audio / Video clips and investigation reports

- Access from anywhere on the Telemedicine Network through VSAT, ISDN, State Wide Area Network (KSWAN for Kerala) and also through Internet (Broad Band, Leased Line and Dial-up)

- Tele-Pathology, Tele-Radiology, Tele-Cardiology and Tele Education services

- Tele-Pathology, Tele-Radiology, Tele-Cardiology and Tele Education services

- Interface with clinical devices like Digital microscope, X-ray Film scanner, Digital ECG unit, digital camera, etc.

- Supports International Code of Disease

- DICOM (Digital Imaging and Communication in Medicine) Image viewer

- Fixing of appointment for tele-consultation

- Scheduling of Doctor's availability for telemedicine

- Generation of various types of Reports

- W3C Compliance

- Patient data made secure through user authentication and SSL

Generic Medical Equipment Interface (GMEI)

Generic Medical Equipment Interface (GMEI) is middle layer between Medical Equipments and Hospital Information System.

With the help of GMEI the outcome of medical equipments can be directly transfer into HMIS database. Through this the patient test results are provided at doctors' desk and hence it improves manageability of information. This GMEI software solution can be further extended to make more common application for interfacing different medical equipments.

MOTHER (Mobile based maternal Health Awareness)

MOTHER is a mobile based application that provides automated voice calls in regional languages to the pregnant and lactating women in rural communities to raise awareness about pregnancy-related health issues, or to give personalized advice based on their critical health parameters.

Frontline workers collects women data manually in the prescribed registration forms and in the evening, records are being updated online from the Mandal (block) Headquarters.

(Image Source: Net)

Once the data is registered, voice alerts are being pushed from the system to stakeholders (Pregnant and Lactating Women, husbands) mobile phones. MOTHER is unilateral Communication (Push Method).

Registered women receives customized, pre-recorded health related advices such as what type of care to be taken in case of high risks during pregnancy, immunization remainders, child care, nutrition, etc. in local language – Telugu, in their mobiles.

Healthcare Knowledge System for Preventive Health Care

The Health education software is based on knowledge graphs/ concept maps. The web-enabled Health Care Knowledge System consists of networks of health concepts.

Such initiative is the first of its kind in India to have organized knowledge through hundreds of knowledge graphs on important health topics along with images for quick understanding of symptoms, prevention, treatment, knowledge related to Key points to Stay-Healthy, Causes-Symptoms-Healing, Human Body's Organ Systems, Vitamins, Minerals, Diseases related to Aging, Heart, Rheumatoid, Allergy, Asthma, Pneumonia, Emphysema, Back Pain, Broken Bones, Burns, Cancer, Children, Eye Problem, Family Planning, Fever, Malnutrition, Stomach, Liver, Thyroid, Worm, Mental, Poisoning, Problem by Birth, Serious Sicknesses, Skin, Sexual Contact, Teeth-Gums, Women, Mother, Baby etc.

The software will be deployed on kiosks, web and operational training will be provided to health workers at various primary health centres that lack adequate health awareness resources.
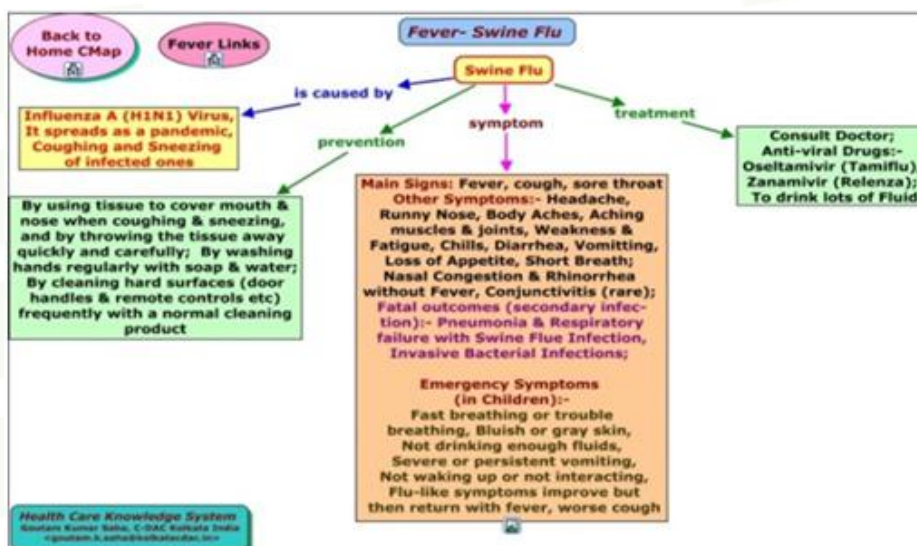
Electronic Health Records (EHR)

Distributed EHR Store is a distributed, scalable, reliable, secure healthcare information store that replaces or compliments existing healthcare repositories. It aggregates clinical records from diverse healthcare systems available in healthcare facilities spread over a hospital, group of locations and hospitals, region or nation. It is based on a highly redundant, fail-safe, and secure system framework. It provides a base for developing various applications on top.

(Image Source: Net)

Hospital Management Information Systems (HMIS)

C-DAC's Hospital Management Information System is a complete ERP solution for Hospitals or a chain of Hospitals. It incorporates an integrated clinical information system to improve hospital administration and patient health care. It also provides an accurate, Electronic Medical Record (EMR) of the patient. A data warehouse of such records can be utilized for statistical and research requirements.

It can be customized for a variety of hospitals such as medium sized clinics, large sized hospitals which could be Government hospitals, Super specialty hospital or Purely Private hospitals. It can be provided as a centralized Hospital Management Information System for a group of Hospitals with the Patient Medical record being available at any hospital

HealthCare Standards (DICOM, HL7)

DICOM - C-DAC's Medical Informatics Standards Software Development Kit for DICOM is a toolkit that provides APIs for applications/ medical devices to comply with NEMA's DICOM Standard. It is a rapid application development tool which provides high return on investment through cost effective implementation of the standard.

HL7–C-DAC's Medical Informatics Standards Software Development Kit for HL7 is a toolkit that provides APIs for applications/ medical devices to comply with Health Level 7's HL7 Standard.

CSNOtk – It is specially designed toolkit for easy access and integration of SNOMED CT in health care applications. SNOMED CT is comprehensive clinical healthcare terminology provided by International Health Terminology Standards Development Organisation (IHTSDO).

SMART TRANSPORT

The application of advanced and emerging technologies (computers, sensors, control, communications, and electronic devices) in transportation moving towards a fully integrated transportation management system, improving efficiency, safety, productivity and general mobility, while reducing threats to travel safety and security as well as the negative effects to the environment such as pollution.

- Smart Ticketing
- Public Information System
- Vehicle Health Management
- Smart Parking
- Intelligent Traffic Management System
- Green Corridor

SMART TRANSPORT

- Red Light Violation Identification System
- Area Traffic Control System (CoSiCoSt)
- Vehicle Tracking System
- Wireless Traffic Controller (WiTrac)
- Intelligent Parking Lot Management (ePark)
- Traffic Signal Monitoring & Management Software (TraMM)
- Smart Parking (SPARK)
- National Common Mobility Card (NCMC)
- Smart and Dynamic Urban Transit System (SDTS)
- Green Corridor

Red Light Violation Identification System

iRIDS (Intelligent Red Light Violation Identification System) is a state-of-the-art device that captures images and videos of red light violations with the help of vehicle sensors, cameras, and controller hardware installed at busy road intersections.

Unlike the other red light violation devices, iRIDS will provide vehicle and traffic signal in a single image. Not only the stills, the iRIDS also given video footage of violations. A three-second video and three progressive snapshots recorded by iRIDS will be enough to catch red light jumpers. It also helps enforcement agencies in giving proof that could not be challenged in court.

In iRIDS, the sensor, camera and controller work in a loop configuration. The sensor will detect vehicle presence from loops and trigger camera, which capture image of violated vehicles. It also capture image of the number plate.

Using RTO database connectivity, the iRIDS could issue ticket with vehicle owners name and address.
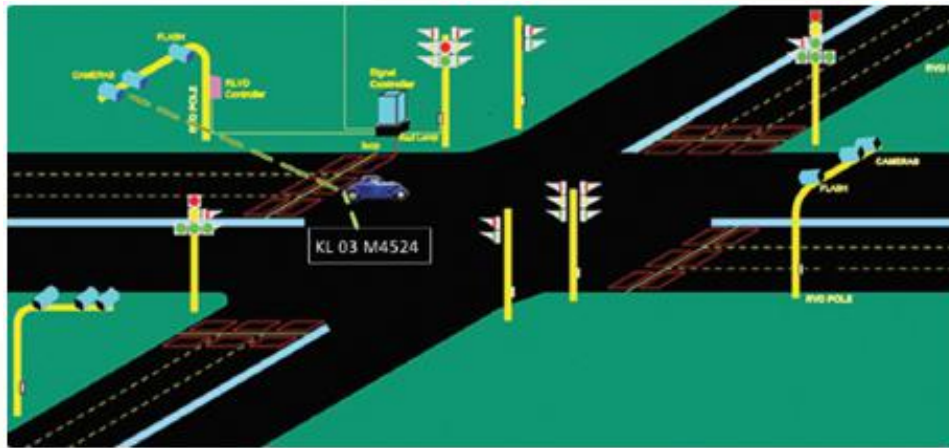
Area Traffic Control System (CoSiCoSt)

Area Traffic Control Systems (ATCS) are traffic responsive systems that use data from vehicle detectors and optimize traffic signal settings to reduce vehicle delays and stops. The system operates in a closed loop, evaluating the real time demand and properly updating network signal timings.

C-DAC developed a Composite Signal Control Strategy (CoSiCoSt) for distributed network model that address all typical Indian road conditions. Strategies are built into the system to guard against network failure, power failure etc.

Major building blocks of ATCS:
- Traffic Signal Controller
- Vehicle Detectors
- Communication Network
- Application Software
- Central Control Station

Vehicle Tracking System

The Vehicle Tracking System provides information on the location of vehicles and its movement on real time. The Plotting Software allows the user to monitor the entire fleet of vehicles and plots the position of the vehicles on the map.

This tracking system can inform you the location and route travelled by vehicle, and that information can be observed from any other remote location.

It also includes the web application that provides you exact location of target. This system enables us to track target in any weather conditions. This system uses GPS and GSM technologies.

Wireless Traffic Controller (WiTrac)

WiTraC is a vehicle actuated road traffic signal controller that controls the signal lamps over wireless medium.WiTraC is Area Traffic Control System (ATCS) compatible having features to perform at isolated intersections or as part of a synchronized chain of controllers.

Optimized Solar power operation, PWM based intensity control of signal lamps, GPS / Server based distributed time synchronization, pole mountable miniature architecture are other features of WiTraC.

Intelligent Parking Lot Management (ePark)

Easy Park (ePARK) is an Intelligent Parking Lot Management System that helps travellersfind parking

ePARK include elements ranging from traditional traveller information systems to quick and automated gate control systems, individual bay monitoring electronics, advanced parking management applications, pre-trip web-based information systems, VMS display boards, driver guidance and navigation systems that provide directions all the way to an individual parking space.

Traffic Signal Monitoring & Management Software (TraMM)

TraMM is a software tool to monitor & manage the traffic signal controller WiTraC remotely from the Command and Control Centre. TraMM has dedicated Human Machine Interface graphic software to configure, visualize real traffic patterns and control the traffic signals remotely.

Smart Parking **(SPARK)**

The parking solution is a sensor-based system, in which sensors are deployed in each parking lot to detect the presence of the vehicle.

This information can be availed in real time. There are entrance displays and guiding display nodes, which assist the drivers in finding a vacant lot in the parking areas, thereby easing a commuters search within parking complex.

National Common Mobility Card **(NCMC)**

Smart National Common Mobility Card (NCMC) model to enable seamless travel by different metros and other transport systems across the country besides retail shopping and purchases, is inter-operable across different transport systems in the country and which can also be used as a credit/debit card.

Smart and Dynamic Urban Transit System **(SDTS)**

The "Smart/ Dynamic Urban Transit System" will improve the reliability and convenient use of Bus Transit System (City Bus Service).It is based on dynamic scheduling of bus frequency considering the demand (passengers waiting at the bus stop) along the bus route.

It aims to dynamically schedule buses according to the requirement of each bus stop/ route. The system will also be able to give precise Estimated Time of Arrival of buses (ETA). We also propose to obtain the real time passenger commute data by using ticketing information.

Green Corridor

C-DAC is developing a platform, to track the position of the emergency vehicles, to establish communication amongst officials from various departments, for percolation of messages to all officials responsible for attending to an emergency like Green Corridor for Ambulance etc.

Hence to get information about the geographical location of the emergency vehicles, GPS is fitted on to them. The location information thus obtained can be continuously monitored, either using the mobile application developed, or on a web browser. Individual vehicles or a group of vehicles in a zone can be easily monitored.

SOCIAL WELFARE AND COMMUNITY DEVELOPMENT

A distinguishing feature of the Smart City concept is the centrality of people and the welfare of city residents. Smart cities are specifically concerned with the transformation of life and work of city inhabitants. Smart community development strategy aims to unify all the city systems, services, operations, activities, departments and agencies as a sustainable smart urban ecosystem.

- Skill Development
- Smart Education
- Social Welfare & Slum Rehabilitation
- Women & Childcare
- Affordable Housing

SOCIAL WELFARE AND COMMUNITY DEVELOPMENT

Skill Development

- Training Needs Assessment (TNA)
- Citizen Contact Center (Sampark)

Assistive Living for Specially abled

- BOSS ORCA for Disabled
- Shruti Drishti
- IoT based Indoor Navigation
- PUNARJJANI
- PRAYATNA

Smart Education

- EDUBOSS
- eBasta
- eBasta App
- Online Labs (OLABS)
- eMentor
- ePariksha
- e-Sikshak
- Cachar Smart School Mobile App
- CCAT: Online Examination System
- Online Screen Marking (OSM) System
- e-Saadhya (e-Learning framework for the specially abled children)
- Online Handwritten Character Recognization (Go-Write)

Smart Environment

- Real Time Weather Forecasting System
- ANUMAN
- UrbAirIndia
- Met@India
- ARANYA
- Air Quality Monitoring Toolkit
- Harmful Gas Detection System
- Obnoxious Odour Measurement System

Smart Agriculture

- ANNADARPAN Series
- ANNADARPAN
- Electronic Tongue for Tea Tasting
- Handheld Electronic Nose
- Resham Darshan
- Speech-based Access for Agricultural Commodity Prices
- Web Enabled Access of Agricultural Information (WEAAI)
- LCMS Tool (Ekalavya)
- SMARTFARM for precision farming

Skill Development

Training Needs Assessment (TNA)

TNA is an assessment tool that looks at employee and organizational knowledge, skills, and abilities, to identify any gaps or areas of need. Once the training needs are identified, then you need to determine/develop objectives to be accomplished by the training. These objectives will form criteria for measures of success and utility.

This analysis can be performed by managers who are able to observe their staff and make recommendations for training based on performance issues or gaps between performance and objectives. This analysis can also be performed on an organization-wide level by Training and Development managers who survey the organization to identify needs.

Features of the system:
- Time-bound assessment system (Objective or Subjective type questions)
- Assessment can be based on Multi-lingual Questions
- Easy and user-friendly navigation
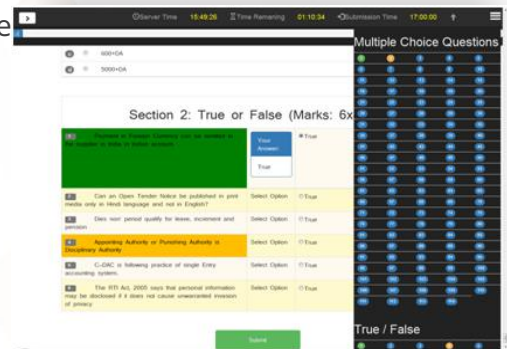
Administrator can:

- Schedule or reschedule the assessment
- Allocate or re-allocate batches for all candidates
- Generate login credentials, assign centre
- Generate individual results, consolidated results, merit list, department wise results & merit list
- Print answer sheet with the correct answer and the answer submitted by the candidate

Citizen Contact Center (Sampark)

The aim of "Sampark" is to deliver non-emergency Government to Citizen Services over the phone with the help of a single unique number across the nation.

It has four main components:
- **CRM:** Customer relationship management (CRM) for call centre environment, query management.

- I**VRS:** allows a computer to interact with humans. It takes input using DTMF tones (input via telephone keypad) and/or voice (Automatic Speech Recognition) and provide speech output using TTS/pre-recorded speech file.

- **TTS:** Text-to-Speech (TTS) component converts text into speech. TTS for around 13 languages (Hindi, Marathi, Tamil, Telugu, Malayalam, Bengali, Odia, Kannada, Gujarati, Assamese, Manipuri, Bodo, Rajasthani) are ready to use.

- **ASR:** As a part of CCC project we are developing limited domain ASR system for Hindi, English and Tamil. It is being trained for eGOV service names, state names, language names and some of the named entities. It can be customized for any other domains.
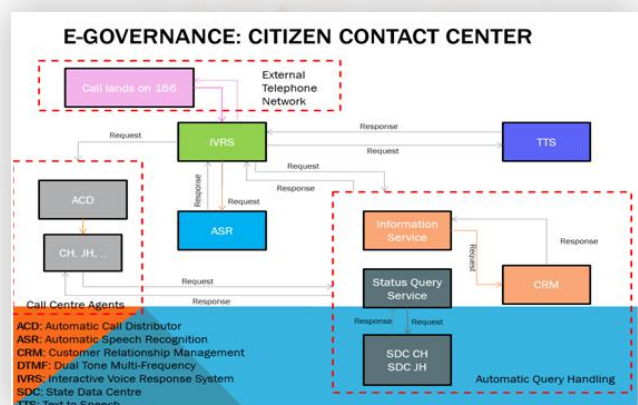
Assistive Living for Specially abled

BOSS ORCA for Disabled

Orca is a free, open source, flexible, extensible, and powerful assistive technology for people with visual impairments which default bundled in BOSS OS. Using various combinations of speech synthesis, Braille, and magnification, Orca helps provide access to applications and toolkits that support the AT-SPI (e.g. the GNOME desktop)
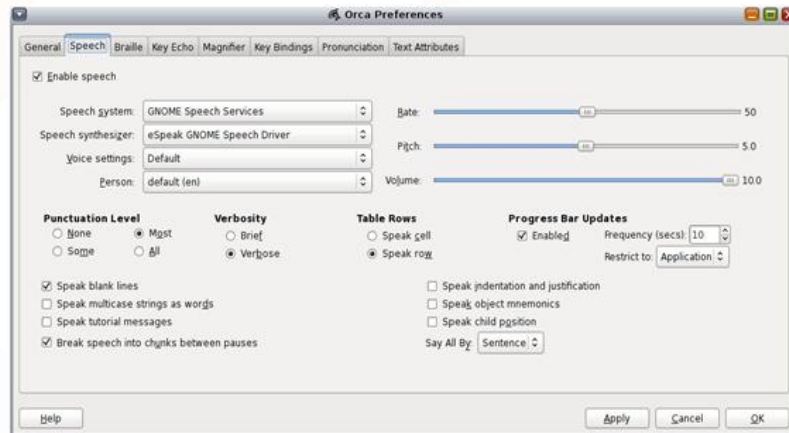
Features;

- Screen reader enables non-visual access to standard applications in the GNOME Desktop by using speech and braille output
- Magnifier provides automated focus tracking and full-screen magnification to aid low-vision user
- Voice type: Default, Uppercase, Hyperlink, System
- Speech synthesizer: Default, espeak, dummy
- Control rate, pitch, volume, and person
- Verbosity (brief, verbose)
- Braille support
- Keyboard modes - desktop and laptop keyboard layouts
- Key echo, Key bindings, Pronunciation dictionary, Text attributes

Shruti Drishti

"ShrutiDrishti" is an Integrated Text-to-Speech [TTS] & Text-to-Braille [TTB] System for the Visually Impaired using the Information Extraction and Retrieval techniques.The system enables visually impaired to browse internet using minimum key combinations.

ShrutiDrishti has an option of presenting the displayed information in a speech mode using a speech synthesizer or in the Braille format.

The speech mode of information representation provides descriptive information available on web page, including links, text etc. It is keyboard event driven and provides 'keyboard only' accessibility using a minimal set of keys. It also provides a large text window for partially sighted users and a standard web page browser to enable users to work together with sighted workers.

IoT based Indoor Navigation

The PoC provides the Internet of Things solution that will allow individuals to travel through familiar and unfamiliar environment without assistance of guides.

The system will consist of:
a) Infrastructure based on internet of things platform. That will include only Wi-Fi access points for POC phase.
b) Mobile application involving user interface that allow the user to request for particular destination and also to get current position information. It also contain module that will give first navigation instruction using position sensors on mobile.
c) Intelligent server that will be used as demand storage and computing tool.

This internet of things solution can be effectively made useful in historical places, museums, hospitals, universities and zoos. This provides complete solution for individuals including visually impaired persons to travel intelligently in familiar and unfamiliar environment.
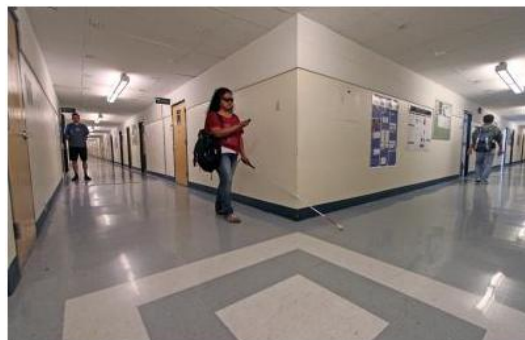
(Image Source: Net)

PUNARJJANI

ICT enabled integrated assessment tool for Mentally Retarded Children.

The package is capable of assessing each MR child based on the inputs given by special educators. The system can also suggest a suitable long term goal for each child. The system is also capable of generating various reports, charts and graphs on the development pattern of each child.

Salient Features:

- Basic algorithms have been drawn from the currently followed manual process. Using these algorithms, strength and needs of each individual child is identified. A grouping algorithm incorporated in the tool helps to create homogenous groups for group teaching of mentally challenged children.
- All three approved methods viz. FACP, MDPS, and BASIC-MR can be included.
  Based on this analysis, a long term goal and its short term objectives for each child are suggested by the system. Also suitable lesson plans are suggested from a built-in knowledge repository of lesson plans.
- The development pattern of each individual child can be analysed term wise, year wise, level wise and domain wise, which will be a very useful tool in planning the programming of children.
- Custom reports like evaluation report, case diary etc. can be viewed/ printed. Graphs for domain wise evaluation, growth charts etc. are also automatically generated. The improvement of each child is quantified and graphed every term/Year. Case History, Assessment and Evaluation details of every individual in digital form available for future reference on a mouse click.
  All assessments done by the teacher/Multidisciplinary
- team is stored in the system and can be accessed or retrieved easily. System is capable to hold details of each MR Child from his/her 3 years to 18 years.

PUNARJJANI

- Capability for separating items that achieved complete independence, required occasional cueing and problem areas. Area of achieved independence, area required for strengthening and problem area are identified for each children.
- Built-in check points to minimize the effect of subjectivity.
- Capability for suggesting age appropriate placement of a child.
- Facility for Problem Behaviour analysis.

PRAYATNA

'Praytana' is a web based tool, is an innovative attempt to introduce the power of ICT in vocational training and assessment of persons with mental retardation.

The tool is capable of providing multi-lingual support of various Indian languages so that any non-English speaking persons can use the same.

Salient Features:

- Evaluate a person for assessing his/her essential skills using standardized techniques and collect quantitative data.
- Create a vocational profile of a person by assessing his/her essential skills and help to match a job available in his community.
- Identify suitable job based on individual's work readiness and dexterity.
- Match a job or a task of a job to an individual based on his/her strength and needs.
- Finalize a comprehensive training plan by creating an Individualized Vocational Plan (IVP).
- Evaluate his/her progress by providing a framework for baseline, termly and final evaluation.
- Generate various reports and graphs. The special educators and trainers can send the progress reports of an individual through digital media to the parents concerned.
- Helping Special educators and rehabilitation professionals to do the community assessment for finding out the actual jobs available in the community.
- Capturing all components of the job to be trained to an individual.
- Finding a sequential process to perform the selected job.
- Performing job analysis by breaking it into various major tasks and sub tasks.
- Providing access of the scalable job repository by any school from anywhere.
- Providing an environment for training a job/task to an individual.

Smart Education

LILA- Rajbhasha

LILA (Learn Indian Languages through Artificial intelligence) is multi-media based intelligent self-tutoring application for learning Hindi. LILA, in Sanskrit means 'Play'. Using LILA, learning a language on your PC can indeed be as enjoyable as playing. Hindi Prabodh, Praveen and Pragyapackages offer a user-friendly and effective tool on the World Wide Web to learn Hindi through the medium ofEnglish, Assamese, Bangla, Bodo, Gujarati, Kannada, Kashmiri, Malayalam, Manipuri, Marathi, Nepalese, Oriya, Punjabi, Tamil and Telugu.

LILA Hindi Prabodh aims to impart a basic knowledge of Hindi and is the first-level course towards equipping one to carry out his/her day-to-day work in the Official Language. The package consists of Alphabet, Vocabulary, Lessons (51 units) and Dictionary Modules.

LILA Hindi Praveen is the full-length second-level Hindi course, specially designed for government and corporate employees. It is also useful for learning advanced Hindi after completing the LILA Hindi Prabodh course.

LILA Hindi Pragya course is specially designed to help the learner develop competence in drafting, in Hindi, various forms of official correspondence and texts, like notes, orders, memoranda, applications, circulars, notifications, reports, minutes, proceedings, requisitions, reminders, press releases, communiqué, etc., relevant to the Union Government.

Website: https://cdac.in/index.aspx?id=mc_et_lila_rajbhasha

EDUBOSS

EduBOSS - educational variant of BOSS Linux is a full-featured, user-friendly Linux operating system, has educational applications that are useful for schools (primary and higher levels).

Adapted from BOSS GNU/Linux, it features graphical installer, office application suite, onscreen keyboard, Smart Common Input Method, web browser, educational games, paint & graphic tools, typing tutor, screen reader, text to speech application and a host of tools and packages for learning, and also for teaching.

eBasta

eBasta project provides a framework to make the school books accessible in digital form as e-books, in line with the government's Digital India initiative,
A portal is provided to bring the various publishers – free as well as commercial – and the schools together on one platform.
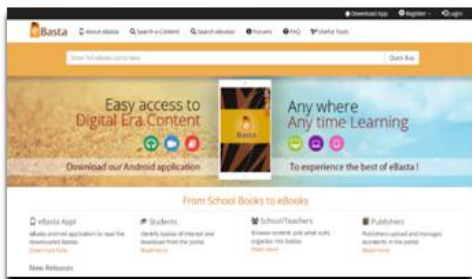
In addition, a structure to facilitate organization and easy management of digital resources has also been made; an app that can be installed on the tablet is also available for navigating such a structure.
The web-based eBasta portal [http://www.ebasta.in] brings together three classes of stakeholders: the publishers, the schools, and the students.

eBasta App

The eBasta App can access the basta created using the portal framework, and renders it for easy navigation by the student. The content rendered by the app is as defined by the teacher/school in the eBasta structure, irrespective of filenames and the location of the actual files. The eBasta App, freely downloadable from the portal, runs on an Android device (version 3.0 or higher).

Online Labs (OLABS)

The Online Labs is based on the idea that lab experiments can be taught using the Internet, more efficiently and less expensively. The labs can also be made available to students with no access to physical labs or where equipment is not available owing to being scarce or costly. This helps them compete with students in better equipped schools and bridges the digital divide and geographical distances. The experiments can be accessed anytime and anywhere, overcoming the constraints on time felt when having access to the physical lab for only a short period of time.
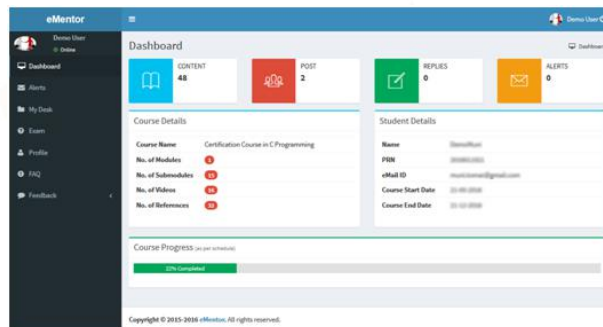

Features:

- Content aligned to NCERT/CBSE and State Board Syllabus.
- Physics, Chemistry, Biology Labs from Class 9 to Class 12. English and Maths lessons for Class 9 and 10.
- Interactive simulations, animations and lab videos.
- The concepts and understanding of the experiment.
- The ability to perform, record and learn experiments - anywhere, anytime, and individualised practice in all areas of experimentation.

eMentor

eMentor is a web based "Learning management System" that offers a flexible online course along with extensive features to guarantee learning and teaching independent of time and place. The system allows building courses, importing content, deploying online learning, managing users, and communicating with users, track training results,

ePariksha

ePariksha is a web based "Online Assessment System" for the automation of the examination process. Its user friendly interface is designed in such a way that it can cater to a broad student base

Key Features:
- User friendly interface
- Randomisation of questions
- Time based exam
- Resume Exam on power failure or internet connectivityloss
- Questions repository Management
- Easy&controlled management of exams
- Administrative featureslike course management, Examiner's management etc. Reports generation
- Real Time Monitoring
- HandheldDevices Support
- Responsive Design

e-Sikshak

e-Sikshak, a Unicode based multilingual e-Learning framework built on component based architecture. It provide Indian Language support in Telugu, Hindi, Tamil. It provides a Customizable Graphical User Interface.

Key Features:
- User Registration
- Course Organizer
- Online Assessment with QTI conformance
- Bulletin board
- Collaboration
- Whiteboard
- Chate-Mail
- Personal Space Wiki Sikshak
- Mobile Features
- Indian Language Interface support

Cachar Smart School Mobile App

The Smart Schools App has two modules viz., Attendance Monitoring System (AMS) and a Tour Management system (TMS).

- Using the AMS teachers can mark their entry and exit time. The app uses geo-fencing which permits a teacher to mark attendance only if they are within their respective school premises. Teachers can also apply for leave and access messages sent to them from higher ups.
- Using the TMS CRCCs(Cluster Resource Centre Coordinator) can plan and record the details of their school tour visits in a tour report.
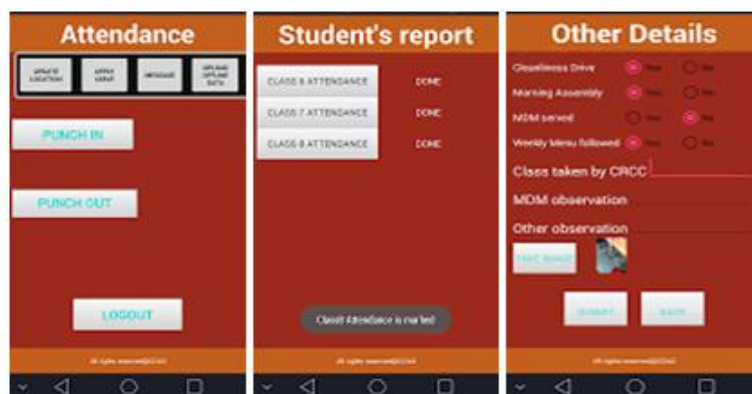
- The app has an Offline attendance marking and offline tour report submission facility, which would be useful for schools that do not have mobile connectivity.
- It will also provide a dashboard for accessing and viewing reports on the attendance and the tour.
- It is available in Google App store by the name Cachar Smart School APP.
- The App is currently used by 91 teachers for marking their attendance of 23 schools, 5 CRCCs for saving their school tour reports.

URL: https://m.downloadatoz.com/cachar-smart-school-app/ abcd.happy.CacharAttendance/

CCAT: Online Examination System

An Image based, LAN based, secure, fault tolerant and scalable system through which examinations can be delivered "on demand" basis in selected examination centres spread across the country.

Online Screen Marking (OSM) System

OSM is online Screen Marking System which facilitates digital evaluation of Answer sheets in a controlled environment. Evaluation is done in Controlled LAN environment.

e-Saadhya (e-Learning framework for the specially abled children)

e-Saadhya (Saral Anukulaney Adhyayan) an Adaptable & Accessible e-Learning framework for the children with mild mental retardation and Autism. The tool includes standard assessments, Individualized Education Programs (IEPs), lesson plans along with a multimedia based child learning environment. It supports all the stake holders like teachers, parents, therapists and children.

An awareness Web portal with local language support (in Telugu, Kannada, Hindi) is developed containing details on Intellectual Disability, Resources, References, FAQs etc.

The web portal is serving as a helpline for parents and also as a platform for interaction among parents and help for Adult Autism Children.

Online Handwritten Character Recognization (Go-Write)

With the advent of mobile computing various text-inputting mechanisms have been assayed but for Indian languages they still lack the simplicity and speed.

To simplify the human machine interaction C-DAC has come up with   Online Handwritten Character Recognition tools with state of the art image processing.

 Go-Write from C-DAC is an online Handwritten System which can run on Tablets as well as smart phones.

Smart Environment

Real Time Weather Forecasting System

An automated workflow for real time weather simulations: "Anuman" provides daily operational weather products in real time for scientific and general public.

The tool provides high-resolution (12x4 km grids) weather simulations and number of different weather forecast products over the Indian subcontinent, useful as a decision support for various user communities. Also, the daily and 6-hourly weather forecasts over nearly 50,000 locations of all the districts Indian states is available

Website: http://rtws.cesgroup.in/
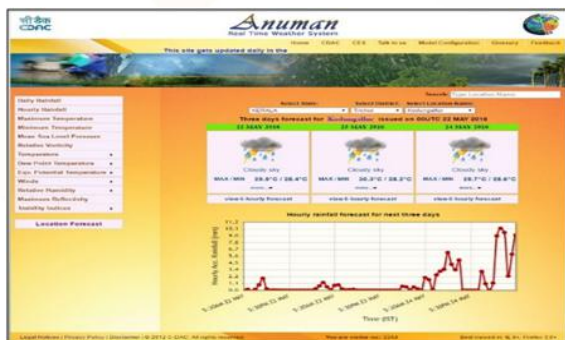
Key Features:

- End-to-end forecasting system
- Timely generation of important weather forecast products for many applications "On-Demand"
- Local-area, short-term, model based weather forecasting customized by location, application and dissemination
- Current forecasts available for several different states/village areas
- Capability of creating forecast products up to 4 km resolution
- The location specific real time weather forecasts
- An input for the hydrological modelling

ANUMAN

ANUMAN offers the latest weather forecast updates on mobile.

It provides hour to hour weather forecast over India using high resolution weather model output, generated using C-DAC's Supercomputer, PARAM Yuva-II. The mobile based forecasts can be customized to user locations and different parameters.

Downloadable from C-DAC's App Store:
https://apps.mgov.gov.in/descp.do?appid=762&value=Android&param=L

UrbAirIndia

UrbAirIndia is an integrated web based GIS enabled system for Indian urban air quality management, developed in collaboration with CPCB.

It provides science based decision for reduction of air pollution. It is an expert system that deals with various components of air quality management viz. air quality monitoring, emission inventory, dispersion and receptor modelling, and multiple scenario analysis.

The system combines air quality monitoring data of user defined campaigns/Projects, emission inventory, query mechanism for data analysis and future scenarios, dispersion and receptor modeling with plug-play facility using GIS platform.
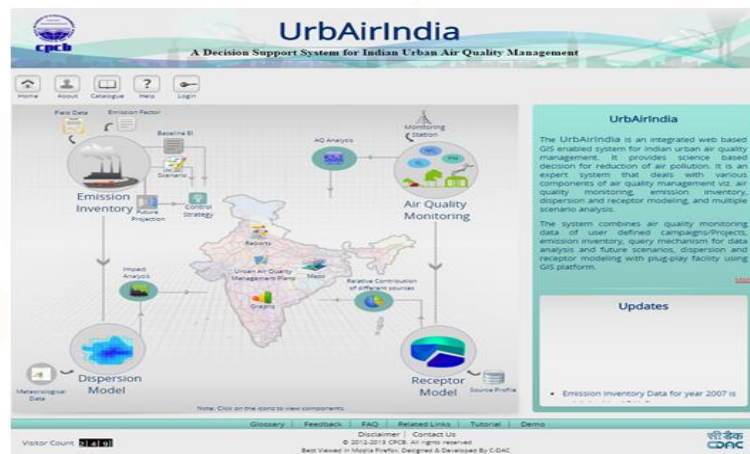
Website: https://urbairindia-cpcb.in/homeAction.action?breadCrumbGroup=HOME

Met@India

The Weather data & analytics portal is a query based database management system for the immediate access of historic weather data and a tool for verifying & analysing forecasted weather.

The system act as a service gateway for commercial industries involved in renewable energy sectors like wind, solar and hydro-power systems as well as agricultural applications. The version 2.0 has model based climatology and observations based climatology for the Indian locations as well as the rainfall climatology of the rain gauge locations of Maharashtra agricultural University.
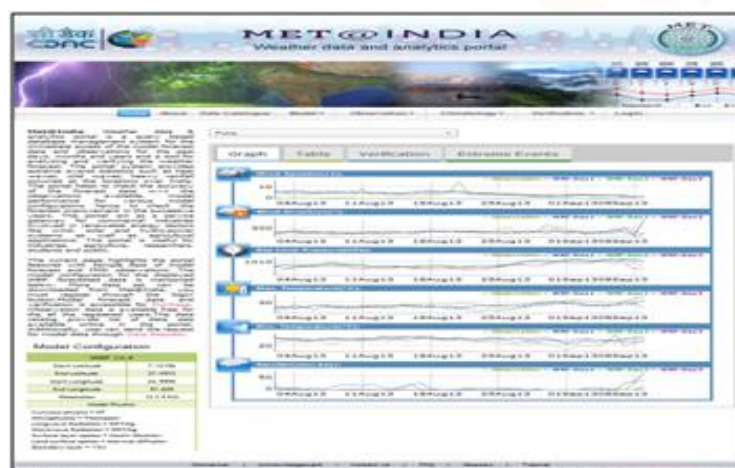
ARANYA

A Spatial Decision Support System for Forest Management , 'Aranya' facilitates the decision making in different domains of forestry, including protection, monitoring, management, research and planning, where each module broadly correspond to administrative working section of the forest departments in India, such as Territorial, Working Plan, Biodiversity, Wildlife, Research, Carbon calculator etc. It also has provision to carry out carbon pool inventory and land allocation planning for rehabilitation.

The software will assist the field managers to store global positioning system (GPS)-recorded data to help them take care of the queries related to habitat suitability analysis among others. The tool can help in taking well-informed decisions on territorial forestry, joint forest management and social forestry, wildlife and bio-diversity as well as village development plan.

Website: https://cdac.in/index.aspx?id=st_ssdm_ssdm_aranya

Air Quality Monitoring Toolkit

C-DAC has developed Indoor Air Quality Monitoring Toolkit- a wireless solution for indoor air quality monitoring for estimating and visualization of the pollution indices at various locations of a city.
The toolkit measures environmental parameters like temperature, humidity, gaseous pollutants, aerosol/Particulate Matter to determine the environmental health of an indoor space.

The tool estimates the Air Quality Index (AQI) which in turn can be used as input for controlling HVAC (Heating, Ventilation and Air Conditioning) system in a smart building. This toolkit allows users to view in real time, the air quality data of regions where the sensors are deployed in a building in the form of numbers and graphs.
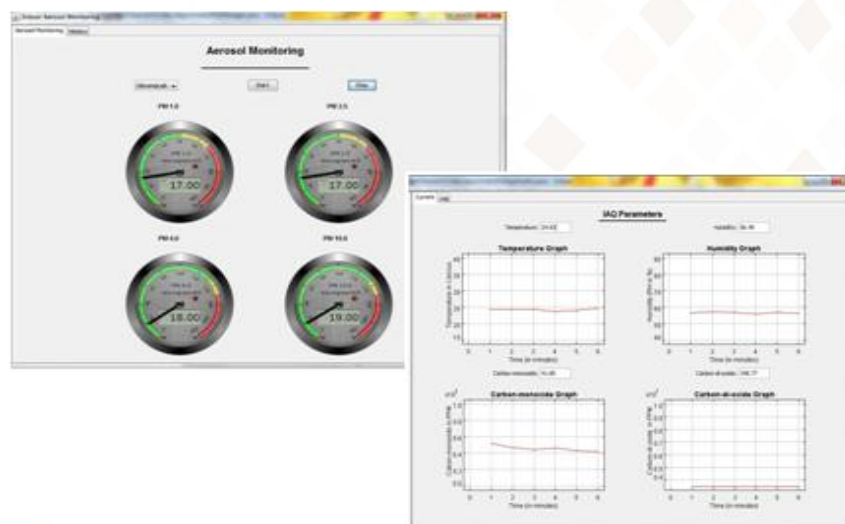
Harmful Gas Detection System

Real Time Monitoring System for Detection of harmful gases consists of distributed gas sensing nodes that monitors the safety levels of targeted gas leakage in the deployed environment and transmits the safety status over an RF network to Control Station.

Each of the individual nodes is equipped with a gas sensor to detect leakage of targeted gas. Each of the sensing nodes is calibrated to raise alarm much before leakage concentration of targeted gas reaches unsafe levels. The gas concentration levels are analysed and packetized and an RF transceiver transmits these packets to the Central Coordinator. The Central Coordinator is connected to a control station that monitors the safety status send by each node.

In case of leakage, control station raises an audio and visual alarm informing the operator about the leakage and the node location. Nodes can generate Audio and visual alerts.
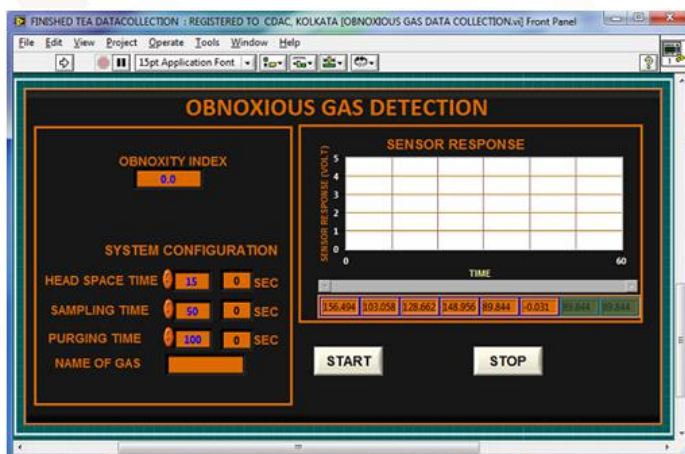
Obnoxious Odour Measurement System

Obnoxious Odour Measurement Device is an instrument that can measure concentration of odorants like Dimethyl Sulfide, Dimethyl Disulfide, Hydrogen Sulfide and Methyl Mercaptan and displays Obnoxious Odour Index, Odour Concentration and Odour Intensity. This instrument is suitable in Tannery, Distillery, Pulp and paper Industries, Gas manufacturing industries and Sewage water treatment.

OOMENS set up with Sample Collection, Sensing and Pump Units

OOMENS Sensor Array

Sample Screen shot of OOMENS User Software

Features & Benefits:

- Measurement of concentration of odorous odorant, such as, Dimethyl Sulfide, Dimethyl DiSulfide, Hydrogen Sulfide and Methyl Mercaptan.
- Measurement of Obnoxious Odour Index, Odour Concentration and Odour Intensity.
- An automatic instrument for monitoring obnoxious gases generated from Pulp and Paper Industry.
- User-friendly software for running the instrument.
- Monitoring of various sulphurous compounds generated from paper industry.
- Generating the revenue for the country through sell of the developed electronic nose of significant economic value in the international market.

Smart Agriculture

ANNADARPAN Series

A Machine Vision Solution for Quality Analysis of Food Grains & Pulses.

ANNADARPAN series of instruments are unique and novel systems that permit rapid, real time and non-invasive means of assessment of physical quality parameters of a number of food grains and pulses produced in India using image processing techniques. Based on the specific requirement of farmers and marketers in agricultural domain.

THREE variants of ANNADARPAN system are available as below:

- ☛ **ANNADARPAN**^{STANDARD}
   This is a desktop system with manual feed and lower sample handling capability.
   Suitable for low volume use in R&D environment.
- ☛ **ANNADARPAN**^{PLUS}
   This system is very robust with higher sample handling capability and suitable for small
   mandies.
- ☛ **ANNADARPAN**^{DYNAMIC}
   This is a conveyorized system with continuous operation capability thereby being
   suitable for bigger mandies with heavy load of assaying.

This is an Electronic Assaying System for bulk sample analysis including:
   a) E-Vision hardware (Camera, illumination) fixed on conveyor
   b) Appropriate feed arrangement
   c) Crop specific feeding mechanization for conveyor system
   d) Crop-specific Software

Key Features

- Conveyorized Feed and Inspection / Batch-mode Desktop based Operation.
- Electronic Vision and Digital Image Processing based Inspection.
- Configuration of Conveyorized / Desktop based instruments to remain constant for most of the commodities.
- Real time computer supported operation.
- Software to be different for different crops.
- Rapid and non-invasive measurement with Online data presentation
- Compatible for interfacing with existing E-Marketing System/s.
- User-friendly operation with Data archival and traceability.
- Integration with available gadgets, such as, moisture meter, weighing scale, etc. for complete assaying.
- Crops and Pulses include Caster Seed, Cumin, Coriander, Groundnut, Wheat, Paddy, Rice, Maize, Bajra, Mustard, Thymol (Ajmo seeds), Jowar, Tur, Gram, Udad, Mung, Kaboli Chana, Traditional Chana, Sesamum, Cotton Seed, Turmeric, Variali, Asario, Guwar, Soya bean, Green Chilly etc. may be assayed with the system. Based on need of users, more agri produces may be included.

ANNADARPAN

ANNADARPAN series of instruments are unique and novel systems that permit rapid, real time and non-invasive means of assessment of physical quality parameters of a number of food grains and pulses produced in India using image processing techniques.

ANNADARPAN an image processing based non-invasive, fast & reliable solution for online rice quality analysis based on its physical appearance.
Applications: Quality analysis of rice (Basmati & other varieties)

Software Screen for Rice Quality Analysis

Electronic Vision system for Rice Quality Analysis

Bar graph for Different Rice Grades

Features:

- PC based online Image capture and instant analysis of the rice sample.
- Analysis of individual rice grain.
- Graphical user Interface for easy operability.
- Bar plot for distribution of different rice grades.
- Instant report generation, print out facility.
- Compact in size for field mobility.

Electronic Tongue for Tea Tasting

Electronic Tongue is an instrument for evaluation of Tea taste. It can also predict the age of tea samples.

It can be used for:
- E-Tongue for taste characterization.
- E-Tongue for monitoring of aging of tea.

Key Features:

- Distinguishes tea samples having different astringency values with an accuracy of more than 85%.
- Complete tea testing operation in a single mouse click.
- Mimicking Tea Taster Scores by electronic means.
- Auto cleaning of electrodes by clean water.
- User-friendly software.

Sample Software Screen of E-Tongue
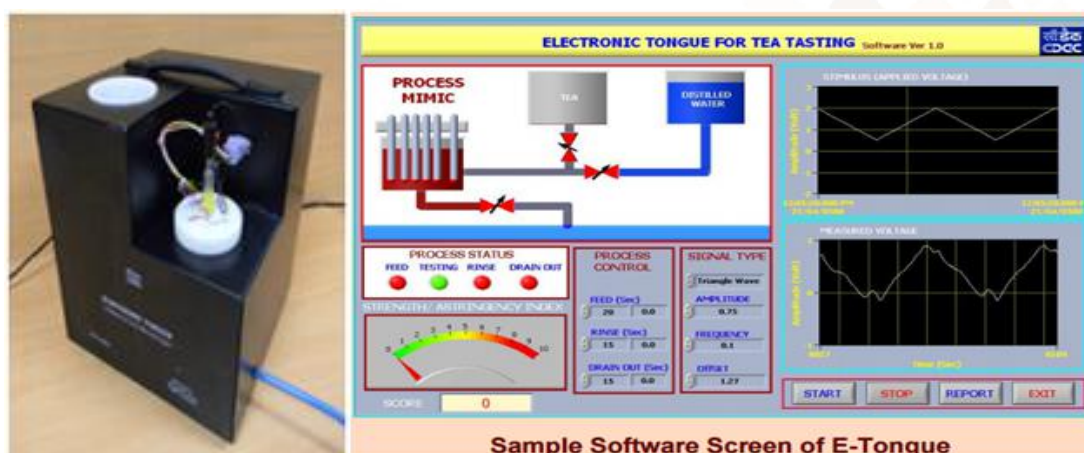
Handheld Electronic Nose

Handheld Electronic Nose (HEN) is a battery-operated portable instrument that can assess quality of tea samples based on aroma.

Objectives:

- Assessment of finished tea quality.
- Determination of optimum fermentation time for tea during manufacturing.
- Additional test beds such as cheese ripening or fruit ripening will also be targeted at trial stages.
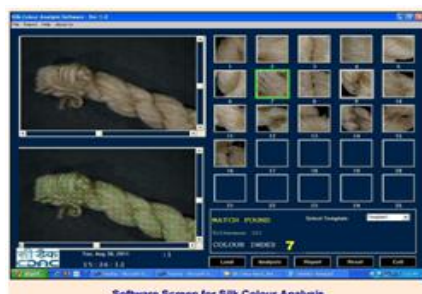

Features:

- User friendly and easy to operate.
- Instant Data Acquisition.
- Simple Statistical Correlation Algorithm for Embedded Platforms in absence of OS, the event-driven structure of the application is designed using a carefully devised State Machine.
- Interfacing of Graphics, Touch-screen, SD-Card, Memory, etc.
- Data entry - display being small and in absence of keyboard.
- Data management –in absence of any DBMS / RDBMS.
- Limited Program and Data Memory.

Applications:

- Reliable prediction of Tea-Taster like Score of Finished Tea
- Online Plot of Fermentation Profile for End-point detection.
- Quality Analysis of Floral Extracts, like Jasemine, Rose, etc.
- Quality estimation of Spices.
- Breathe Analysis for Diabetes detection..

Resham Darshan

A Machine Vision Solution for Colour Analysis of Silk Yarn, Resham Darshan is an image processing based solution for Colour Characterization of reeled as well as span yarn of silk.

Software Screen for Silk Colour Analysis

Yarn Colour sorting using Reshan Darshan System

Features:

- PC based online Image capture and instant colour analysis of the silk sample.
- Graphical user Interface for easy operability.
- Building colour templates automatically and Colour comparison.
- Online weight measurement and Data logging.
- Bar plot for distribution of different silk grades, Instant report generation and print out facility.
- Compact in size for field mobility.

Speech-based Access for Agricultural Commodity Prices

Speech-based Access for Agricultural Commodity Prices information system is an IVR based application for farmers in local vernacular (Bangla). This is an application of Automatic Speech Recognition (ASR). The main objective of the system is to provide updated commodity prices information through mobile/landline phone.

Figure: General Block Diagram of the System

Web Enabled Access of Agricultural Information (WEAAI)

Web enabled access of Agricultural Information (WEAAI) aims at dissemination of information pertaining through aportalto provide vernacular content in 7 local languages namely, namely 'Ho', 'Santhali', 'Nagpuri', 'Kuruk', 'Mundari', 'Hindi' and 'English' which are most commonly usedby locals of Jharkhand,in the domain of Agriculture, Animal Husbandry and Forestry to make it available over the Internet.

The system includes holistic information on the important cereal, pulse, oilseed, fruit and vegetable crops of Jharkhand. Besides technical information, it also includes information on market, bank, insurance, government schemes and weather.

LCMS Tool (Ekalavya)

Ekalavya is a multimedia based interactive learning tool designed keeping an eye on individuals.
The aim is to create a paperless, interactive learning environment for a farmer where he can gather knowledge about Diseases & Remedies in the Forestry, Animal Husbandry and Agricultural domain. In other words, the main aim is to disseminate the above mentioned information in such a way so that it can penetrate the common mass of rural India, most of whom are either illiterate or can read / write in vernacular language only.
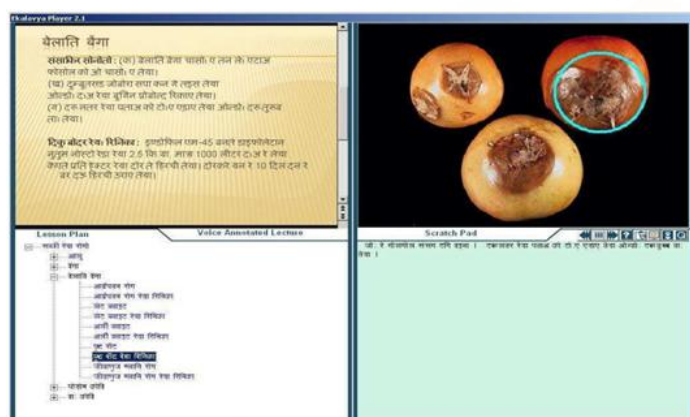
SMARTFARM for precision farming

Automation of farms and poly houses, allows farmers to apply the right amount of water and fertilizers at the right time, right place and in right amount. The SMARTFARM system can intelligently operate pumps / valves based on the data collected from the field and the crop specific programs available in the controller.

SMARTFARM system is a low power, user friendly device which helps the farmers to plan irrigation and fertigation based on environmental and soil conditions. This controller monitors different parameters like soil moisture, pH, atmospheric temperature, humidity, wind speed & Direction, rain etc., informs the farmer through graphical display corrective measures.
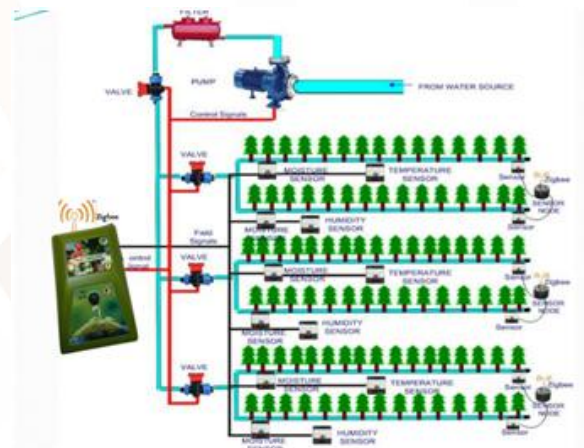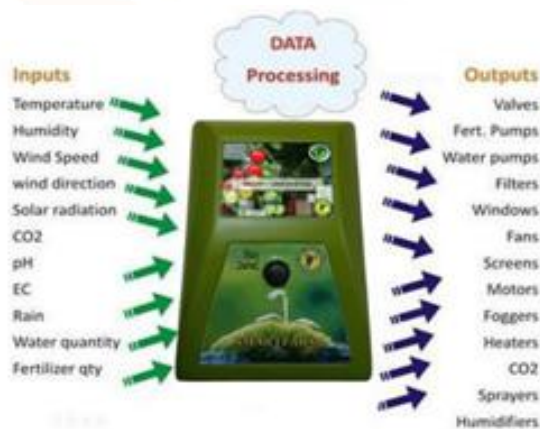
The farmers can configure the device for getting alerts of important field parameters or alarm conditions. These alerts can be in the form of pre-programmed SMS Messages in his mobile phone even when he is away from the farm.

The alarms can also be configured for giving alerts through LED flashing / hooters. Situation based commands for controlling the agricultural field equipment's from a remote location can be given through mobile phones.

Key Features:

- Monitoring and control of various agricultural parameters like Temperature, Humidity, CO2, Soil moisture, soil nutrients, Poly house shades etc. using suitable sensors.
- Hourly, daily, weekly monthly and yearly planner for irrigation and fertilization
- Wireless data acquisition through wireless motes
- External memory interface for Data logging and program feeding.
- TFT Touch screen display for better farmer assistance
- SMS messages to the farmers' cell phone for providing situational awareness regarding the agricultural field.
- Remote control of agricultural field equipment's through mobile phones.

DISASTER MANAGEMENT

Disasters cause great economic and human losses each year throughout the world. Emergency response system and resilience are among the most crucial dimensions of smart and future cities design due to the increase in various disruptions caused by frequent manmade and natural disasters.

- Natural / Man-made Disaster Management
- Preparation and Mitigation

DISASTER MANAGEMENT

- Glacier Lake Outburst Flood (GLOF)
- Flood Response System (FRS)
- Revival 2000 (Disaster Recovery Solution)
- Emergency Response System
- TETRA Communications System for Disaster Management

Glacier Lake Outburst Flood (GLOF)

The acronym GLOF is used for glacier floods caused by the drainage of naturally dammed lakes in the glacier, on or at the margin of glaciers.

A lake outburst can be triggered by several factors: ice or rock avalanches, the collapse of the moraine dams due to the melting of ice buried within, the washing out of fine material by springs flowing through the dam (piping), earthquakes or sudden inputs of water into the lake e.g. through heavy rains or drainage from lakes further up-glacier. The glacier lake may breach at the end-moraine or at the lateral moraine.

CDAC's GLOFswill help the Government authorities in case of an impending GLOF event. The GLOF Early Warning System has the following capabilities:

- Water Level Sensors developed indigenously by C-DAC
- The near-real time sensors transmit data through INSAT satellite to control centre
- The flood simulation model runs the simulation for various GLOF scenarios. The model is capable of presenting Flood Simulation, Inundation information and Flood Arrival Time in the event of a glacier lake outburst flood
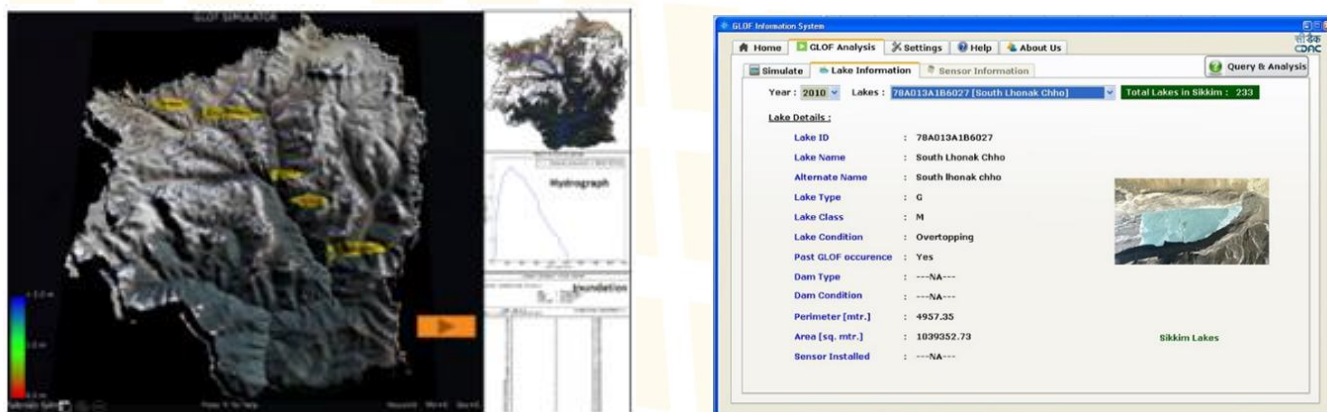
The GLOF Analysis Tool is the main interface of the GLOF Management System. The GLOF Analysis Tool has three sub-tools: Lake Information, Simulation & the Sensor Information.

The "Lake Information" tool gives basic information about the glacial lake selected by the user from the drop-down menu, such as, Lake Name, Lake Condition, etc. The satellite image of the glacial lake is shown on the right hand side.

The Simulate tool gives information regarding the GLOF simulation progress and the outputs of the simulation. The user will be able to see the time at which the GLOF at a particular glacial lake occurred and the period of GLOF simulation. The user can choose to see the simulation results such as Simulation video, Inundation map, Inundation report & Hydrographs.

The Sensor Information tool gives basic information about the sensors deployed at the glacial lakes for monitoring water-levels. Each sensor has a Sensor ID linked to the Lake ID. The user may add information of new sensors when sensors are deployed on new glacial lakes in future or delete existing ones, in case if they are decommissioned.

The Settings tool gives the user the flexibility to load the input data from any location on the computer. The data will be copied to an in-built database system for computations.

Website: https://cdac.in/index.aspx?id=st_ssdm_ssdm_glof

Flood Response System (FRS)

Flood Response System (FRS) is a Web GIS based for flood damage assessment with outputs in the form of spatial and statistical databases and theme-based maps.

The FRS aided by microwave remote sensing helps to plan and execute efficient emergency response and post disaster management measures. The system is enriched with information both in the form of GIS maps and database (village level information including both census and infrastructure).

FRS is a web based spatial decision support system, developed on open source technology and has following three modules:

- Microwave Data Analysis to demarcate area inundated
- Query Module for decision making
- Probabilistic Flood Information Module for embankment breach scenario

Model Output showing an Embankment Breach Scenario at *Matmara* village in Assam
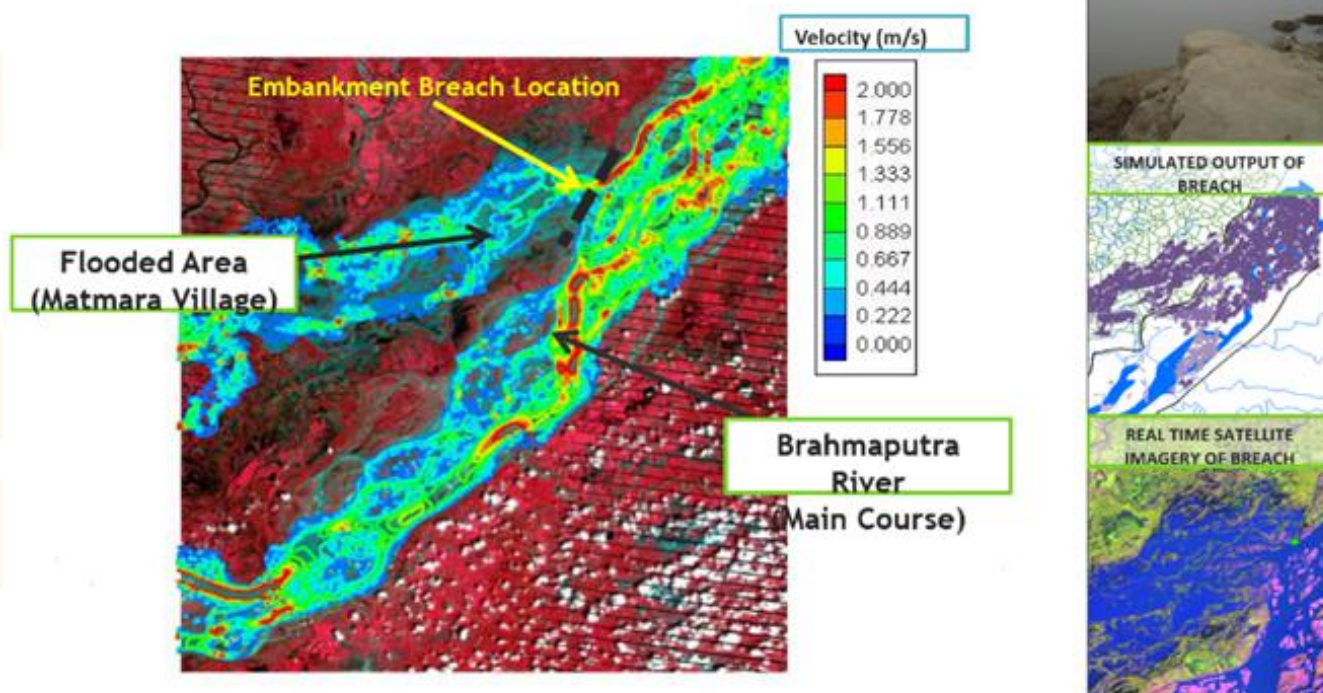
Website:https://cdac.in/index.aspx?id=st_ssdm_flood_response

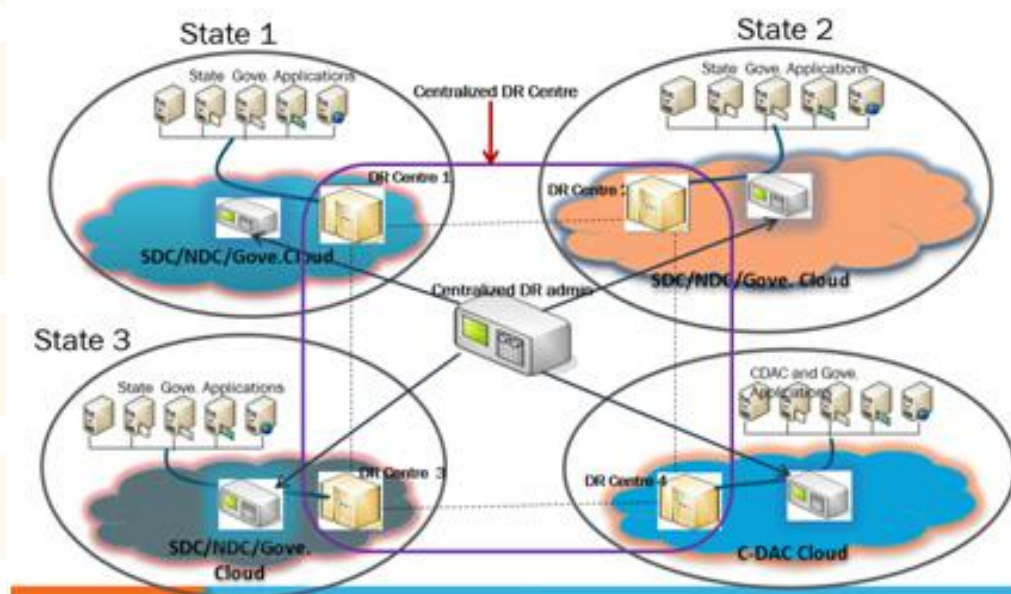# Revival 2000 (Disaster Recovery Solution)

Revival family is an ICT Disaster Recovery for business continuity/e-governance.

Automated data recovery approach of Revival provides fail-over and fail-back technique which completes the Disaster Recovery system in all aspects.

The product family has three solutions:
1)   Revival synchronous replication,
2)   Revival semi-synchronous replication and
3)   Revival optimal business continuity.

Key Features:

- Revival 2000 family is a complete disaster recovery solution which provides zero Recovery Point Objective and negligible Recovery Time Objective (also referred as optimal business continuity).

- New technology combining block replication and file based recovery to provide a complete Disaster Recovery solution.

- Revival 2000 is based on the principles of iSCSI.

- The product family has three solutions – Revival synchronous replication, Revival semi synchronous replication and Revival optimal business continuity.

- Revival 2000 uses mix of synchronous and semi-synchronous replication with WAN acceleration techniques to achieve optimal business continuity.

- Automated data recovery approach of Revival 2000 provides fail over and fail back technique which completes the Disaster Recovery system in all aspects

Emergency Response System

Emergency services include the Police, Ambulance, Fire & Rescue, and the disaster management and rescue agencies. In order to help the authorities concerned to communicate to each other better, and to help them take decisions faster, a platform for exchange of emergency alert information is necessary.

C-DAC is developing such a platform, to track the position of the emergency vehicles, to establish communication amongst officials from various departments, for percolation of messages to all officials responsible for attending to an emergency etc.

Hence to get information about the geographical location of the emergency vehicles, GPS is fitted on to them. The location information thus obtained can be continuously monitored, either using the mobile application developed, or on a web browser. Individual vehicles or a group of vehicles in a zone can be easily monitored.
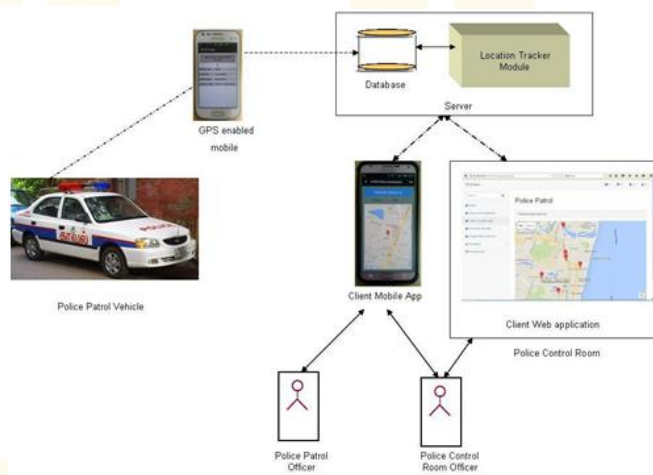

GPS based emergency vehicle location tracking

TETRA Communications System for Disaster Management

A mobile communication platform based on TETRA technology to provide a reliable emergency communication system for the relief and rescue teams operating on the disaster struck area.

The system consists of a vehicle equipped with Portable TETRA Base Station, Telescopic Antenna, Generator and TETRA handheld radio terminals. It also provides communication link between the relief and rescue teams operating on the disaster site and disaster managers at remote emergency control centers with its satellite connectivity.

TETRA is an open standard developed by the European Telecommunications Standards Institute (ETSI) for critical communication. It has rich set of features that are ideally suited for emergency operations like disaster management. Some of the key features are group and broadcast communication, dynamic group formation, priority and emergency calling, ambience listening, individual/group/broadcast messaging etc.
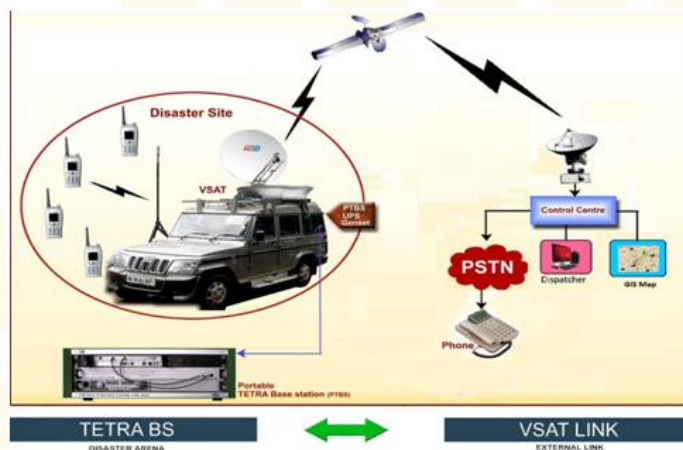
SAFETY & SECURITY

In a smart city, public safety is basically about making good use of the intelligence generated by all the connected entities for faster and better decision making. The application of information and communication technology creates actionable intelligence in the form of electronic records collated from national/international organizations, which include data such as criminals' fingerprints, photographs, and evidence. Surveillance cameras, remote monitoring devices, sensors, and access control systems help safeguard cities against crime and terrorism.

- City Surveillance System
- Vehicular Surveillance System
- Emergency Response System

SAFETY & SECURITY

- THMOS - Threat Monitoring System for Smart City
- Electronic Personal Safety System (ePSS)
- Distress Call Response Management System (DCRMS)
- TETRA System for Public Safety Communications
- BharatiyaAFIS (Bharatiya Automated Fingerprint Identification System)
- Biometric Security : Fingerprint SDK
- Biometric Security : Iris SDK
- Cyber Security for SCADA based Systems
- e-Praman
- TERP: Tamper Evident Recorder and Player
- Computerised Face Recognition System
- Third Eye
- Automatic Facial Expression Recognition System (AFERS)
- Video Summarizer

THMOS - Threat Monitoring System for Smart City

The proposed solution, THMOS (Threat Monitoring System for Smart City) is the key mechanism to monitor the threats spreading in the smart cities and provide the visualization support to display the attack Meta data to the user to mitigate the incidents. The attack infections would be visualized with its originating details to perform the necessary actions by the users.

The proposed platform will facilitate the end-user through threat incidence alert in the connected city network. An interactive mobile application will be implemented to visualize the alerts of the malicious propagation in the city network. Further, the threat reports would be shared with the local incident response team to mitigate the incidents.

The key objectives of THMOS are:

- Identify common threats and open security/privacy/reliability issues in existing IoE frameworks for Smart City applications.
- Develop an architectural framework for the interconnectivity of a large number of heterogeneous smart objects based on the concept of "security, privacy and reliability by design".
- End User Threat monitoring system for the mitigation of the attack incidence for the targeted attacks.
- Evaluate the performance of the framework in real-world Smart City environments.

Electronic Personal Safety System (ePSS)

Electronic Personal Safety System (EPSS) is an integrated personal security system aimed at assisting women, children, and senior citizens in fighting crime and calling for help during emergencies. EPSS automates this function by providing:

Android ePSD Application

ePSD GPS Tracker

The system brings about maximum automation in the Police Control Room Operations, real-time monitoring and management of Control Room Vehicles. This is expected to reduce the response time, offer better service to the people in distress and improve law and order situation.

a) a user friendly interface for the Call Takers in the Control Room who receives emergency messages
b) a user-friendly app for Mobile Data Terminals mounted in police rescue vehicles.
c) an external Personal Security Device from which emergency messages are generated and sent to Control Room
d) a free mobile App that can act as a personal security device which could be used by any citizen owning an android smart phone, for emergency purposes.

The system works on an integrated solution based on Electronic Personal Security Devices (EPSD), SMS Handling System (Call Takers), Automated Vehicle Locating System(AVLS) and Geographical Information System(GIS), over wireless communication media.

The main features of the system are automated message/SMS handling, faster response time, dynamic map generation, dynamic victim tracking, proximate vehicle identification, vehicle monitoring / tracking, total event logging, custom report generation and real-time alert messages.

## Distress Call Response Management System (DCRMS)

'Distress Call response Management System' provides an electronic interface to the 'Dial 100' plan of police forces. DCRMS automates the processes of Call Handling and providing instant assistance.

DCRMS is based on TETRA/GSM technology and controlled from Police Control Room. Multiple Vehicle Mount Units (VMU) are employed for getting GPS data and communication, GIS based navigation and guidance.

In the Police control room, a Call Taker attends the distress calls and collects the call details. Call details are routed to a Dispatcher for further event handling. Dispatchers have the capability to view the positions of the mobile rescue vehicles on a multi-layer Digital GIS map (includes Roads, Rail Lines, Water Bodies, Buildings, Junctions, Wards and Landmarks etc.) and to map the distress locations on the same vector map. The Dispatcher can route the call automatically/manually to the rescue vehicle nearer to the disaster site, so that the rescue team can respond to the calls immediately and give necessary assistance. A tailor made Dispatcher Work Station can do this very effectively through easy to use GUIs.

Key Features:

- Bilingual, user-friendly GUI
- GIS-based Call Taking
- Efficient dispatching and monitoring
- GIS Analytics, Geo-fencing and buffering
- Vehicle Tracking and mission management
- High Availability, Backup and Recovery
- Digital logging and historic search
- MIS Report Generation
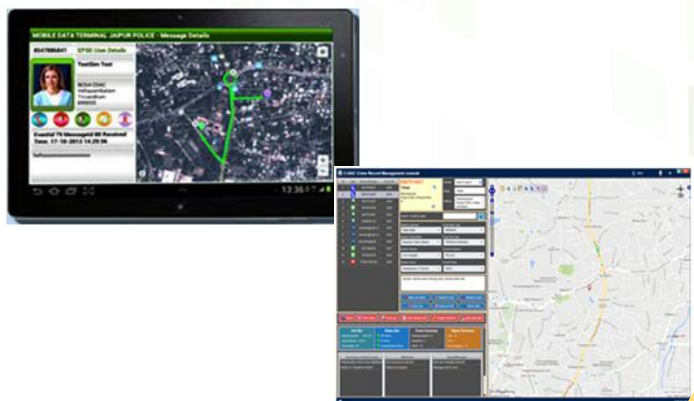
TETRA System for Public Safety Communications

C-DAC's TETRA for Public Safety isa totally indigenous communication network based on TETRA technology which provides a secure, reliable and efficient communication system for mission critical applications working in the most demanding environments. TETRA is an open standard developed by the European Telecommunications Standards Institute (ETSI) for critical communication.

Being IP enabled, the interconnection of TETRA Base Station and other infrastructure elements are very easy. Unlike other systems with a centralized switch, C-DAC's TETRA Network uses the latest, flexible soft-switching technology with distributed database which eliminates the need for expensive MSCs (Main Switching Centre) and makes the system much easier to install, configure and maintain. The various gateways like PSTN, Analog and VoIP provides connectivity of TETRA network to other networks and gives customers the facility to make the network heterogeneous. Using the Dispatcher and real-time GIS location tracker, command and control can be done from the control room more efficiently.
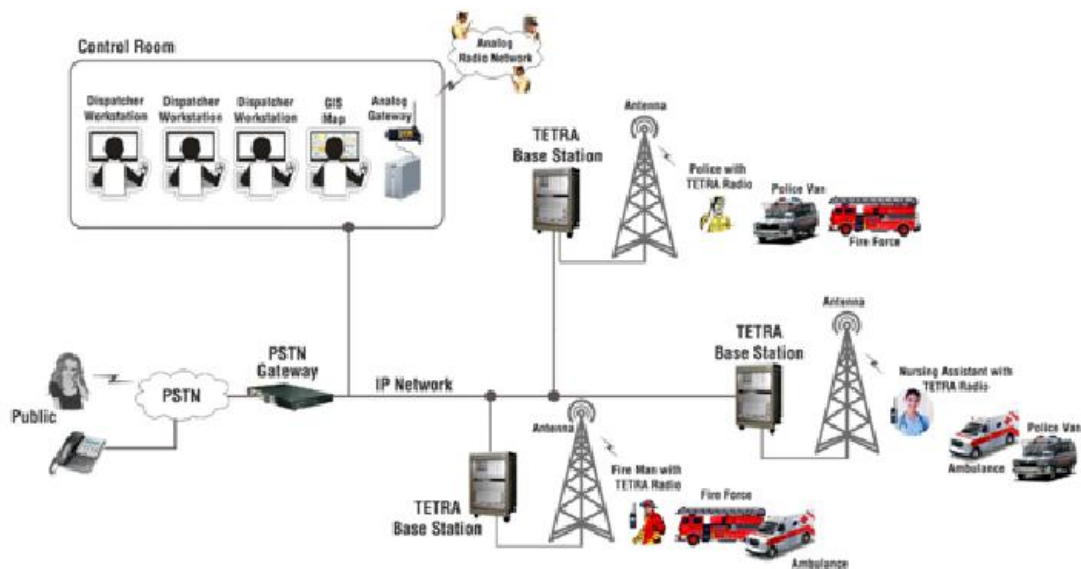
BharatiyaAFIS (Bharatiya Automated Fingerprint Identification System)

C-DAC BharatiyaAFIS refers to a family of Software Development Kits (SDKs) & Systems. BharatiyaAFIS SuiteTM to offer a much improved accuracy and high-performance fingerprint identification for Government agencies.

The products are in full compliance with international standards, viz. ISO/IEC 19794-2:2005, ISO/IEC 19794-4:2005, ANSI INCITS 378-2004, ANSI/NIST-ITL 1-2007, ILO-SID. The high precision is achieved with the help of fingerprint's Level III features (pores, ridge contours, edgeoscopic features: the intricate details of the friction ridges). immediate help.

The BharatiyaAFIS Suite comprises:
- BiometricSDK (General Purpose SDK)
- ILO-SID BiometricSDK (for Seafares Identity Documents)
- BharatiyaAFIS-II (AFIS based on Level I and II features)
- BharatiyaAFIS-III (AFIS based on Level I, II and III features)
- Fingerprint Attendance System
- Standardized Template Converter
- Fingerprint Image Quality Assessment Tool
- Fingerprint Slap Segmentation Tool
- Fingerprint (Latent) Image Processing Toolset
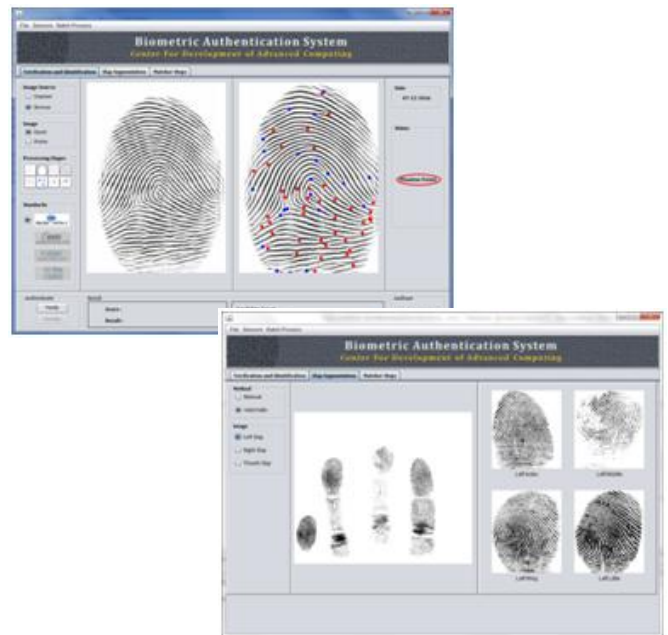- Automated Performance Evaluation Tool

Biometric Security : Fingerprint SDK

It is a fingerprint authentication technology designed for biometric system developers and integrators. The technology delivers fast and accurate system performance for fingerprint matching in 1-to-1 and 1-to-many modes.

Key Features:

- Supports FMR (Fingerprint Minutiae Record, ISO/IEC 19794-2:2005), fingerprint of Juvenile and older age group, Slap Segmentation (Tenprint), sensor interoperability.
- Average Matching time <0.1 sec using ISO fingerprint template. (Extensible to less than 300 ms depending on Hardware) and avg. extraction time < 1sec, 10 lac matches per hour.
- Proprietary Quality checks
- FRR <2% on FAR <0.01%.

Biometric Security : Iris SDK

It is an Iris authentication technology designed for biometric system developers and integrators. The technology delivers fast and accurate system performance for iris matching in 1-to-1 and 1-to-many modes.

Key Features:

- Identification (1:N) / Verification (1:1)
- Fully interoperable and compliant to International Standard: ISO/IEC 19794 – 6:2011
- A high performance Iris Recognition System, suitable for government and security agencies

- It is equipped with a multi-layered robust quality assessment scheme, which makes it highly suitable for non-ideal environments
- The system also enables identification of persons with Spectacles, Contact Lenses, persons from distance and with wide gaze
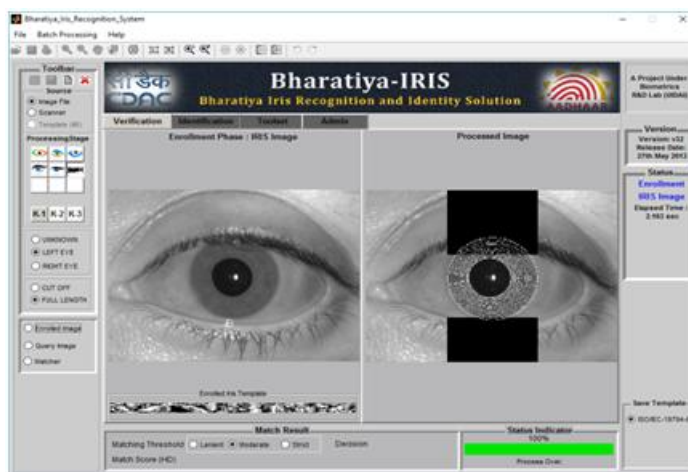
Cyber Security for SCADA based Systems

It provides communication channel security between the end devices used in SCADA based control systems.

SCADA Architecture With CDAC Security Solution
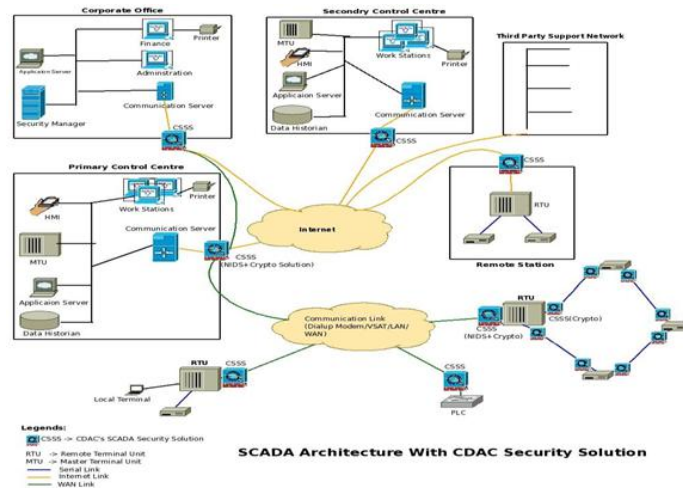
e-Praman

e-Pramaan is an initiative by the Government of India to standardize and ensure trusted, convenient and reliable online authentication identity management system.

It provides a standard based strong authentication to the integrated services. e-Pramaan supports single as well as multi-factor authentication which can be customized as per the e-Gov service's requisites. In addition to authentication, e-Pramaan also provides features such as Single Sign-On (SSO), two way authentication etc.

e-Pramaan offers four factors of authentication:

1. Username and Password,
2. One Time Password,
3. Digital Signature Certificate and
4. Biometrics.

Website: https://epramaan.gov.in/about_us-AUAASA%20Services.jsp

TERP: Tamper Evident Recorder and Player

Tamper evident Recorder is a revolutionary way of collecting digital information in tamper evident manner. The recorded information by this system may have importance in law enforcement primarily in evidence collection.

TERP records almost all types of information like audio, video, text, images, scanned documents, Biometric, GPS data with system related information and all the hardware Ids of peripheral. Just After recording, this system bundles the recorded information into a single information packet and then digitally signs the packet using a hardware crypto token.

This system has potential use in Evidence collection, law enforcement and all the areas where digital information need to be recorded in tamper evident manner.

Computerised Face Recognition System

It is an integrated software for identifying an individual's face from frontal view image. Be it the face of a missing person, an employee, a suspect or even the face of a terrorist the software can tolerate pose, intensity and expression variation within a limit. The software is tested with field condition image set.

Face Recognition System is an indigenously developed web based software solution aiming applications for identifying and authenticating users with webcams, ID card, digital image looking up matching faces in photo databases, automatically detecting facial features and detecting faces on still images.

Features:

- Textural features around 14 fiducial points.
- Shape features of eye and eyebrows.
- Searching Time - 5 seconds per query image against a database of
- size 5000.
  Limits of PIE variation:
    - Pose variation - 20%
    - Illumination variation - 20% of relative illumination variation
    - Expression Variation - Can tolerate deformation caused by natural expressions.
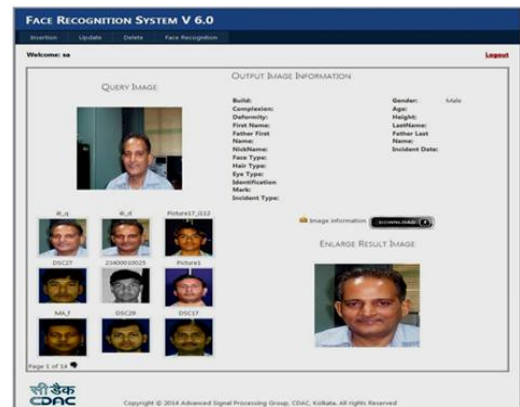
Third Eye

Third Eye is an apparatus for instant detection and capture of facial image of the intruder in unattended mode followed by offsite preservation for future reference.

This solution may be used for surveillance purpose of individual houses, Bank ATMs, hotels and in similar locations where potentialities exist for unwanted people to trespass and cause unwanted or unlawful activities.

This solution may be used for surveillance purpose of individual houses, apartments, housing complexes, Bank ATMs, hotels, guest houses and in similar locations where potentialities exist for unwanted people to trespass and cause unwanted and unlawful activities.

Novel features of the gadget are as follows:

- Detection and capturing of face image of the intruder in unattended mode.
- Preservation of facial image with time stamp ensuring lesser amount of storage space.
- Well-separated data capture and offsite data preservation units will reduce the risks of destruction of evidence.

Type A   Type B

Automatic Facial Expression Recognition System (AFERS)

Automatic Facial Expression Recognition System developed by CDAC, Kolkata can recognize six basic emotional facial expressions of human beings (irrespective of gender and age) such ashappiness, disgust, fear, surprise, anger and sadness from video sequences in online mode using camera followed by saving the video for offline analysis at a later time.

Features:

- AFERS captures live video stream for online analysis and stores the video sequence for offline analysis.
- A unique feature of AFERS is quantifying with a score for each of the expressions based on the intensity or degree of expression exhibited by the person. The scores so exhibited have been validated by Human Psycho-visual judgment.
- The intensity of expression is represented graphically for one or more expression (in case of mixed expressions) for each of the frames.
- For easy user interpretation graphical representation of one or more expression is displayed after completion of analysis both in the form of bar graph and pie-chart.

Video Summarizer

Video summarization and analysis comprise methods to create a summary of the video collection, identifying objects of interest, tracking of such objects of interests from frame to frame across multiple videos, and possibly identifying behavior or activities performed by the objects.

The "Video Summarizer" assists and alerts the system operator about potential security threats.

It provides the below features:

- **Synopsis Generation:** Short summarized surveillance video showing multiple activities occurred at different times, while preserving the essential activities of the original video.

- **Indexing of Surveillance Video:** pointing to the original video and the original time of activity

- **Intrusion/Object Detection:** Detection of moving objects in selected areas covered by the camera; Avoid false alarms due to wildlife or other moving objects (e.g., tree leaves). The object of interest could be tracked across several videos or it could simply be an object that has been left unattended in restricted areas covered by the cameras.

- **Monitoring of Vehicles:** Detection of illegal parking in no parking zones; detection of vehicles driving in wrong way or reversing.

- **Crowd behavior:** Detection of people flow and counting of people in selected areas.

SMART INFRASTRUCTURE

Smart Infrastructure aims at Smart Management of key resources for e.g. provisioning of drinking water, improved sewerage facilities, better municipal waste management, building roads and highways, lighting up homes.

- GIS Mapping of City
- City Development
- Water Management
- Energy Management
- Smart Environment
- Waste Management
- Digital Infrastructure

SMART INFRASTRUCTURE

- **Digital Infrastructure**
  - PARAM Series of Supercomputers
  - PARAM Shavak - Supercomputing Solution in a Box
  - PARAM Yuva II
  - Param Bio Blaze
  - Garuda Grid
  - Meghdoot Cloud
  - Mobile Seva
  - IoT Middleware Framework
  - Smart Card Operating System
  - NCMC: National Common Mobility Card
  - SDN Online Lab
  - Darpan S3 (Network Management Solution)

- **Energy Management**
  - ZLED (ZigBee enabled LED Luminaire)
  - Voice Enabled Smart Lighting

- **Water Management**
  - Smart Sprinkler

Digital Infrastructure

PARAM Series of Supercomputers

The technological advancements are bringing new dimensions to the understanding of molecular basis of living organisms. There is immense data generated due to computing, but storage and analysis of this data is becoming a challenge, therefore there is an urgent need of supercomputers.

Website: https://cdac.in/index.aspx?id=hpc_ss_supercomputing_systems

PARAM Shavak - Supercomputing Solution in a Box

PARAM Shavak - solution, aims to provide computational resource (Capacity building) with advanced technologies to perform high-end computations for scientific, engineering and academic programs to address and catalyze the research using modelling, simulation and data analysis.
PARAM Shavak provides the computing power necessary to keep academic institutions on the leading edge in today's competitive market at affordable cost.

Salient Features:

- Supercomputer in a Box system in a table top model
- Powered with 2 multicore CPUs each with minimum 12 cores
- 2 numbers of accelerator cards
- 3 Tera-Flops peak computing power with 8 TB of storage
- Easy to deploy solution with no additional datacenter infrastructure
- Pre-loaded with parallel programming development tools and libraries
- Preinstalled tools for scheduling and resource management
- Video Tutorials, learning materials and user manuals etc.
- Indigenous HPC portal- CHReME
- Indigenous applications interface - Onama

Website: https://cdac.in/index.aspx?id=hpc_ss_param_shavak

PARAM Yuva II

PARAM Yuva II is a High Performance Computing (HPC) Cluster that is latest and fastest in the prestigious PARAM series of Supercomputers built in India.

The first sub-cluster of PARAM Yuva II with a peak computing power of 529.4 Tera Flops (TFs).

Website: https://cdac.in/index.aspx?id=hpc_nsf_param_yuva_ii

Param Bio Blaze

Param Bio Blaze is a supercomputing facility, to address the challenges in bioinformatics.It has a capacity of 10 teraflop and will be able to analyse human cells and its functions.

The facility will help capture the movement of molecules and also interaction between two molecules and the effects.

Website: https://cdac.in/index.aspx?id=hpc_nsf_param_yuva_ii

Garuda Grid

GARUDA (Global Access to Resource Using Distributed Architecture) is India's Grid Computing initiative.

The GARUDA High-Speed network is a Layer 2/3 MPLS Virtual Private Network (VPN) connecting select 45 institutions across 17 cities at 10/100 Mbit/s with Stringent Service Level Agreements with the service provider. This Grid is a precursor to the Gigabit speed nationwide Wide Area Network (WAN) connecting high performance computing resources and scientific instruments for seamless collaborative research and experiments. The High Speed Network is being established at all the Garuda partner institutes in close collaboration with ERNET who is also responsible for the operation, maintenance and management of this network

GARUDA is a collaboration of science researchers and experimenters on a nationwide grid of computational nodes, mass storage and scientific instruments that aims to provide the technological advances required to enable data and compute intensive science for the 21st century.

Contact: grid-help@C-DAC.in
URL: https://gridsupport.garudaindia.in/

Meghdoot Cloud

C-DAC has developed a complete open source based software stack named 'MEGHDOOT' for setting up a private cloud to offer basic cloud services such as Infrastructure, Platform, and Software services.

Meghdoot is an open cloud initiative of C-DAC. It offers the basic cloud services such as Infrastructure, Platform and Software as a Service.

On demand dynamic provisioning, Metering and Monitoring, Graphical Installation of Middleware stack, Customized Elasticity, and Web service based management of cloud are among the value additions by C-DAC.

- Provides reliable data exchange among applications
- Enables authenticated and secured data sharing
- Data storage and management

URL: https://cdac.in/index.aspx?id=cloud_ci_cloud_computing

Mobile Seva

Mobile Seva is an innovative initiative aimed at mainstreaming mobile governance in the country. It provides an integrated whole-of-government platform for all Government departments and agencies in the country for delivery of public services to citizens and businesses over mobile devices using SMS, USSD, IVRS, CBS, LBS, and mobile applications installed on mobile phones.

Mobile Seva platform provides a government AppStore which hosts various mobile applications developed for various government departments. The Appstore supports hosting of applications for multiple Mobile Platforms (eg. Android, JavaME, etc.). Government Departments can develop and deploy mobile applications for providing their services through mobile devices.

URL: https://cdac.in/index.aspx?id=st_egov_mSeva
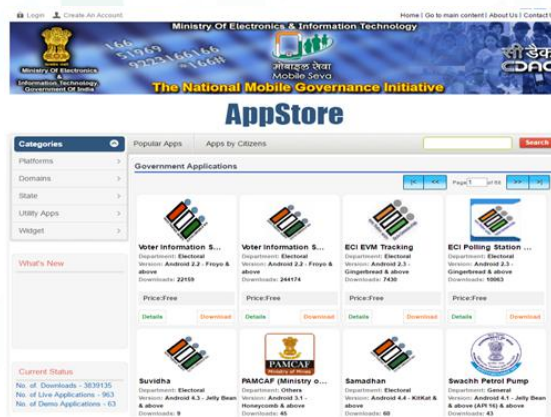
IoT Middleware Framework

The framework can provide automation of Standard Operating Procedures via a rule interface. The rule that describes automation of City Operations can be configured by City Administrators. The city officials can also use the framework to manage any dynamic situation.

The data collected will be stored and maintained in a distributed file system like Hadoop File System (HDFS) and NoSQL databases. Cloud Distributed Systems can handle all types of data from disparate systems: structured, unstructured, log files, pictures, audio files, communications records, emails etc. regardless of their native format.

Features:

- Provides Publish/Subscribe API for data sharing between applications
- Enables Peer – to peer real time data exchange between applications
- Applications can be language independent

Smart Card Operating System

Smartcard offers a secure and convenient platform for carrying digital information and credentials for identification and authentication of an individual. It also facilitates the storage of physical credentials like fingerprint, etc. on the same card.

The card can be used for multitude of applications like e-commerce, access control, attendance, digitally signing documents, encryption of confidential information, storage of user specific information e.g., medical records, canteen bills, library usage, financial transactions , etc.

Two products - SCOSTA CL and SCOSTA PKI (having enhanced security features and superset of SCOSTA-CL) are ready to cater Contact and Contactless based Smart Card market.

NCMC: National Common Mobility Card

CDAC is actively participating to make the common specification for National Common Mobility Card (NCMC) which involves a generic architecture to converge to a single card based open loop solution for almost all kind of conventional financial transaction.

Considering transit application as the primary objective, the subsequent development of indigenous validation terminal and metro gate has been initiated with a bigger road map towards PoS terminal following the NCMC specification.

The NCMC specification is expected to have a common front-end framework to accept all common kind of cards primarily following ISO7816 and ISO1443 contact less specification which will have a clear direction to accept Indian card OS standard like qSparc and SCOSTA.

SDN Online Lab

A web-based SDN application development platform. The product aims at delivering a web-based integrated development environment for developing SDN applications.

The system provides a platform for experimentation, development, debugging, simulation, emulation, deployment, testing, verification and execution of SDN applications.
The envisioned system comprises of a web-interface, IDE, Controller Engine, and network elements to support the actual deployment.

DE and Controller Engine will communicate through Representational State Transfer (REST) Application Program Interface (API). Controller engine and network elements will communicate through OpenFlow protocol. Hypervisors will be used to manage multiple controllers.

Darpan S3 (Network Management Solution)

DARPAN Series 3 is a policy based autonomic network and cloud management suite of solutions for heterogeneous multi-vendor IP networks. The system supports both centralized and distributed hierarchical management and is suitable for any size network ranging from small Local Area Network (LAN) to large geographically distributed multi-site enterprise networks.

The system can be further scaled in its capability through optional pluggable components for Traffic Flow Analysis, Log Management for Audit Support, SLA Management, Application Management, Database Management, Help Desk etc.
The system supports wide range of management protocols including SNMP vl/v2/v3, SSH, Telnet, NetFlow, JFlow, IPFIX etc.

Key Functions

* Automatic resource discovery
* Automatic topology discovery and mapping
* Inventory management
* Real time performance monitoring
* Events and notifications
* SLA management
* Configuration management
* Self-Configuration
* Self-Healing
* Self-Optimisation
* Self-Protection
* Cloud Management
* MPLS Management
* Log Management
* Traffic Flow Analyser
* Help Desk
* Application Monitoring
* Database Monitoring
* Real time statistics and History reports

Key Features

* Autonomic Management
* Hierarchical Distributed NMS
* Unified Management of LAN/WAN/WLAN
* Centralised single pane of view
* Real Time Infrastructure visibility
* Real Time monitoring
* Support for multi-vendor network elements
* Support for SNMP v1, v2 and v3

Energy Management

ZLED (ZigBee enabled LED Luminaire)

ZigBee is a wireless technology designed to address the unique needs of low-cost, low-power wireless sensor and control networks.

A Zigbee controlled dimmable LED luminaire (ZLED) has been designed and developed for providing energy efficient illumination in buildings.

ZLED is a wirelessly controlled dimmable LED luminaire with ZigBee End Device (ZED) to control its operation. A ZigBee Coordinator (ZC) connected to the server controls the operation of LED luminaire based on the decision taken by illumination control algorithm. ZLED uses inbuilt PIR sensors to detect human presence in the office environment.

Key Features:

- Different levels of dimming (5% to 100%)to provide optimum illumination in work plane
- Wireless control of light using ZigBee
- Thermally stable LED luminaire
- Web, Tablet and Mobile based GUI to monitor and control the lamps
- Occupancy prediction using Hidden Markov Model
- PIR based occupancy detection and lighting control
- Human Activity based lighting control
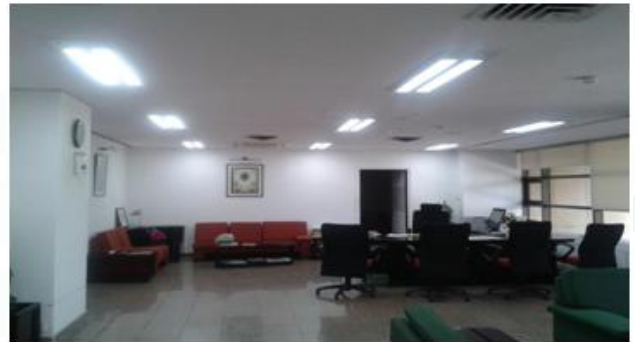
Voice Enabled Smart Lighting

Smart Buildings enabled with sensors and intelligent algorithms can significantly contribute towards user comfort and reducing energy consumption. C-DAC's Lighting Solution can reduce energy consumption in Smart Buildings
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Key Features:

- Light Control
  - Master On/Off for all lights
  - Dimming LED light
  - Floor Layout
  - Individuals LED light control
- Camera Control
  - Individuals camera view for Lights
  - Switch camera views
- Application compatible with
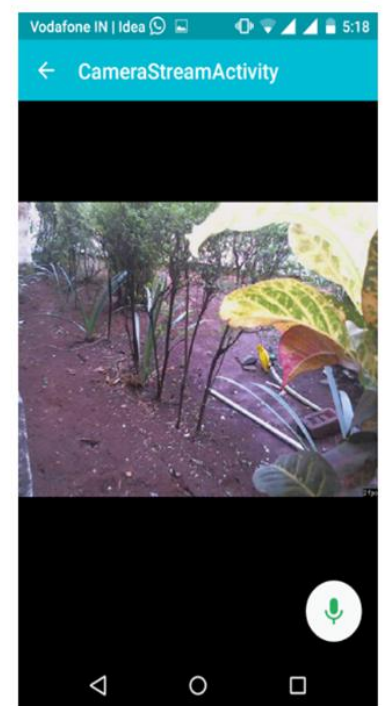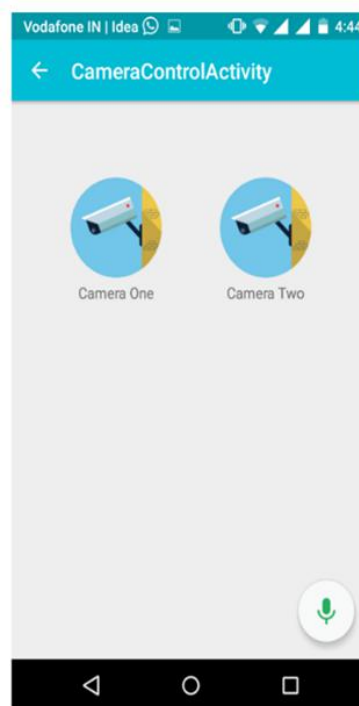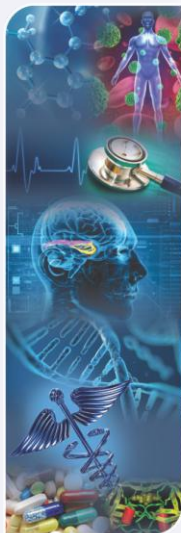 - Aakash 2 Tablet
  - Android 4.0 and above
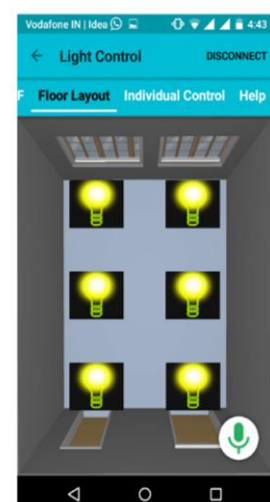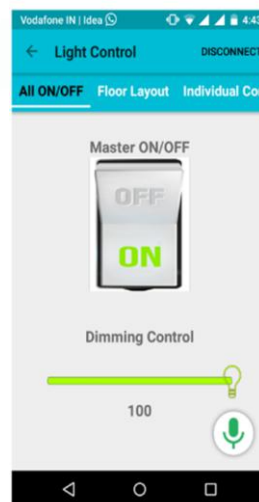
Smart Sprinkler

The voice enabled smart sprinklermanagement system aims to irrigate the targeted zones in green space, garden and parks and maintain optimal water usage. The targeted IoT based system gives flexibility to manage the desired zone selectively from anywhere and anytime. The end-user mobile app aims to provide easy to use interface including voice based control.

Key Features:

- Sprinkler Control
    - Master On/Off for all Sprinklers
    - Individuals Sprinkler control
- Camera Control
    - Individuals camera view for Sprinklers
    - Switch camera views
- Application compatible with
    - Aakash 2 Tablet
    - Android 4.0 and above