

Health Informatics

Healthcare Knowledge System

HCKS is a web enabled health related Semantic Networks using Concept Maps. Thousands of health information pages have been transformed into 300+ concept maps. This eHealth solution is deployable through Website / Kiosks / Tablet / Mobile Phone etc. to promote Public Healthcare Awareness and Health Education in the North-East regions of India, Goa Medical College, Navodaya Medical College (Karnataka), National Institute of H&FW (New Delhi). Common people, students and medical practitioners find this eHealth solution a very effective one for faster and "At-a-Glance" meaningful understanding of important interrelated health care concepts. This is a new experience to human cognition for quick understanding of Diseases, Symptoms, Prevention, Diets, Diagnosis, Symptoms Checking and Treatments.

EMR/EHR Systems

Distributed 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.

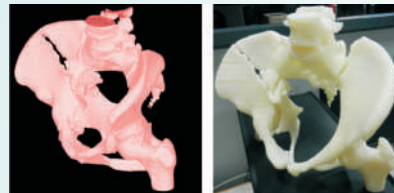
EMR System for Cancer Care

The EMR System for Cancer Care supports Oncology based Electronic Medical Record (EMR) which can provide significant improvements in the proper management and maintenance of patient specific treatment and clinical information.

Future Roadmap

Software Reconstruction and Implant Synthesis from Tomographic Images –SRISTI

The SRISTI software takes CT/MRI images as input and helps medical professionals to visualize 3D model of the anatomical part prior to surgery or other invasive procedures, which is not feasible from sequence of 2D scan images. It also exports the virtual model in standard STL format for use by standard CAD software for creating accurate physical models and prosthetic implants.



Signal Processing System for Neurological Disorder Detection

The project attempts to automate the analysis and interpretation of long term Electroencephalogram (EEG) data to extract neuro-physiologically meaningful information for assisting expert doctors to detect neurological disorders such as epileptic seizure. Various signal processing and machine learning techniques have been implemented in the system. System supports identification of the seizure regions in EEG signals during epilepsy in a patient independent manner.

Medical Document Semantic Analyser

This is a Medical Language Processing system that extracts data from patient / clinical related documents such as discharge summaries in electronic form and encodes them to structured data representations compatible with HL7 Clinical Document Architecture (CDA) Specification. It is a web based application and uses GATE 5.0 for Natural Language Processing.

iHeal – Integrated Healthcare Applications Platform

iHEAL is a mobile point-of-care device, specifically designed to enhance the workflow of clinicians, by providing them real-time access to patient information at the point-of-care. iHEAL incorporates modern wireless communication technologies to provide the doctors and clinicians instant access to EMR, telemedicine and other healthcare software. It also provides integrated features like camera, barcode scanner and smart card reader.

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Hospital Information Systems

Drug Management System

Telemedicine Solutions

Healthcare Standards

Decision Support Systems

Mobile Healthcare Solutions

EHR/EMR Systems

Health Informatics technologies help to improve quality of healthcare, reduce medical errors, reduce healthcare costs, increase administrative efficiency, and expand access to affordable healthcare. C-DAC has developed several technologies and software/hardware solutions in this area; many of which are deployed and are being used in practice.

Hospital Information Systems

Hospital Management Information Systems (HMIS)

C-DAC has designed and developed Hospital Management Information System (HMIS) in various models like conventional stand-alone hospital version and SaaS (Software as a Service) over the cloud infrastructure. The real time HMIS streamlines the treatment flow of patients and simultaneously empowers the hospital's workforce to perform their duties effectively and efficiently. It is modeled on the unique combination of a 'patient centric and medical staff centric' paradigm, thus providing benefits to both the recipients and the providers of healthcare. C-DAC has also developed a unique concept of state-wide implementation of HMIS across various government hospitals ranging from super specialty hospitals, medical college hospitals, district hospitals to area hospitals. C-DAC's HMIS has been deployed in more than 40 hospitals across India. Various solutions developed by C-DAC in this area include

- *e-Sushrut* - a web based HMIS developed using open source technology and with compliance to various national and international standards. It can be easily integrated with other systems using HL7 messaging
- *Megh Sushrut* - an ERP solution for health delivery in SaaS model
- *Tejhas* - an HMIS solution with special features for cancer care

Blood Bank Management System (BBMS)

BBMS automates the processes involved in an individual stand alone 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.

Drug Management System

e-Aushadhi

e-Aushadhi is a web based Supply Chain Management system which deals with the purchase, inventory management and distribution of various drugs, sutures and surgical items to various District Drug Warehouses (DDWs), medical colleges, district hospitals, Community Health Centres (CHCs), Primary Health Centres (PHCs) and Drug Distribution Centres (DDCs) in the entire state. The system ensures that the drug reaches the ultimate beneficiary with uncompromised quality and well before its expiry date. e-Aushadhi also facilitates the top management with greater transparency, better monitoring and complete control over the drug distribution within the state.

Telemedicine Solutions

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. C-DAC has comprehensive solutions in this area, enabling patients in remote places to engage in live consultation with doctors situated elsewhere, sharing medical records and test reports online. C-DAC telemedicine solutions have been deployed in many states in India including Odisha, Tamil Nadu, Kerala, Punjab, North-East states (Sikkim and Mizoram), Himachal Pradesh and Rajasthan. They have also been deployed abroad. Three variations of this solution (Mercury, Sanjeevani and Dhanwanthari) are currently operational in many centres across Kerala, Tamilnadu, Odisha, Punjab, Himachal Pradesh and other countries like Tanzania and Myanmar. C-DAC has also developed Mobile Tele-Oncology System and Mobile Tele-Ophthalmology System.

Healthcare Standards

Software Development Kit (SDK) for DICOM

SDK for DICOM provides APIs for applications/medical devices to comply with the NEMA's DICOM Standard. The SDK is designed to be easily programmable, allowing DICOM developers to build sophisticated and complex applications targeting multiple platforms. The layered approach gives the ability to build applications exploiting different levels of capabilities defined by DICOM standard.

Software Development Kit (SDK) for HL7

SDK for HL7 assists in rapid development of HL7 compliant applications and is available for different platforms. It is a toolkit that provides APIs for applications/medical devices to comply with HL7 Messaging Standard and allows users to develop sophisticated and complex applications on top of it.

Decision Support System for Healthcare

Ayusoft – a Decision Support System for Ayurveda

AyuSoft is software developed with a vision to convert classical Ayurvedic texts into comprehensive, authentic, intelligent and interactive knowledge repositories with complex analytical tools. It supports Constitution (Physiological and Psychological) and Tissue Quality Assessment, Disease Diagnostics and Treatment, Diet and Lifestyle Advice, Personal Information Management System, Multimedia based Encyclopaedia and Textual and Graphical Analytical Reports.



iCare@Home

In line with the Millennium Development Goals set by the United Nations and the mandate of National Rural Health Mission (NRHM, India), C-DAC has developed iCare@home solution to empower households and even the rural populace having weak public health indices and infrastructure, with comprehensive knowledge of primary healthcare. iCare@home is a suite of Integrative healthcare informatics solutions with applications like risk predictors, symptoms analyzer and computer games. It is targeted to create health awareness among individuals and communities by Analysis, Prediction and Edutainment through holistic solutions for promotive 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.

Mobile Healthcare Solutions

mSwasthya

The solution is designed to extend the existing telemedicine and HIMS systems to mobile technologies. This system uses the mobile communications services to develop generic Body Area Network and a generic healthcare service platform for monitoring the following parameters: ECG, EMG, Pulse rate, Respiration Rate, Skin Temperature, Blood Flow, and Saturated Percentage of Oxygen. mSwasthya also covers various mobile health applications for home care and are available freely for download at mGov store.

HIMT - Health Informatics via Mobile Technologies

HIMT is a suite of health applications developed using Mobile technology. Applications range from relatively easy health awareness applications to location based medical services. It is targeted towards mobile users to create health awareness and assist them to easily locate nearest health services. These applications encompass health assessment through calculators, health indices as well as applications designed specifically for health awareness. It also offers services e.g. generate alerts through SMS to get immediate help in emergency condition. Some applications would create awareness within the society about disease out breaks as well as comprehend people about preventive majors that need to be adopted for a particular epidemic. HIMT applications are broadly categorized into three main areas; Health awareness, Preventive care and treatment, and Emergency services.

MosQuIT: Mobile based Surveillance Quest using IT

MoSQuIT 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.

CerviSCAN – Semi Automated System for Cervical Cancer Screening

Cancer of the uterine cervix is the second most common cancer in women worldwide. CerviSCAN is a computer assisted screening solution developed by C-DAC along with the RCC, Trivandrum, where the digitized images of the PAP-Smear are analysed and classified through image processing and machine learning algorithms. This software increases cytologist efficiency by pre-marking samples for potentially cancerous/non-cancerous cases.

mCare-Public Health Information Management System using mHealth

mCare uses mobile devices to provide a health management system that could enhance the quality of health care provided by the health workers. The product has two major components: Handheld device based data collection module and Web-based health management information infrastructure module. The system maintains a centralized demographic and public health data, which can be used for analytics.

