



97th Indian Science Congress

January 3-7, 2010 Thiruvananthapuram

PROCEEDINGS

SECTION OF
**Information and
Communication Science &
Technology**
(Including Computer Science)

President

Dr. Mrs. Shraddha V. Ingale

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I

Presidential Address

President

Dr. Mrs. Shraddha V. Ingale

Role of ICT in Socio-Economic Development

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The term, Information and Communication Technologies (ICT), refers to forms of technology that are used to transmit, store, create, display, share or exchange information by electronic means. This broad definition of ICT includes such technologies as radio, television, video, DVD, telephone (both fixed line and mobile phones), satellite systems, computer and network hardware and software; as well as the equipment and services associated with these technologies, such as videoconferencing, email and blogs. In short, **Information and Communication Technologies (ICT)** is an umbrella term that covers all advanced technologies in manipulating and communicating information.

While technically, ICT would encompass pre-digital technologies, including paper-based writing, it is most often used to describe digital technologies.

These digital technologies include

- a. Technology to broadcast information
 - Telecom
 - Television
 - Radio
 - Internet
- b. Technology to store information
 - Magnetic disks or tapes
 - Optical disks like CD, DVD or the latest Bluray Disks
 - Flash Memory
- c. **Technology to Process Information**

- Computers
- Servers

Application of ICT for socio-economic or international development, i.e. social and economic development of a society/country aimed to develop greater quality of life for humans, is termed as ICT4D.

ICT4D concerns itself with directly applying information technology approaches to poverty reduction. ICTs can be applied either in the direct sense, wherein their use directly benefits the disadvantaged population, or in an indirect sense, wherein the ICTs assist /aid organizations or non-governmental organizations or governments or businesses in order to improve general socio-economic conditions

HISTORY OF ICT

The term “information technology” evolved in the 1970s. Its basic concept, however, can be traced to the World War II alliance of the military and industry in the development of electronics, computers, and information theory. After the 1940s, the military remained the major source of research and development funding for the expansion of automation to replace manpower with machine power.

The five key milestones that have led to the ICT revolution are as following:

Development in Computers

The first revolution started during World War II, with the first large, automatic, general electro-mechanical calculator, Harvard Mark 1. ENIAC (Electronic Numerical Integrator and Computer) was the first general purpose electronic computer and was built in 1946. ENIAC contained 17,468 vacuum tubes, 7,200 crystal diodes, 1,500 relays, 70,000 resistors, 10,000 capacitors and around 5 million hand-soldered joints. It weighed 30 short tons (27 t), was roughly 8.5 by 3 by 80 feet (2.6 m × 0.9 m × 26 m), took up 680 square feet (63 m²), and consumed 150 kW of power. Input was possible from an IBM card reader, and an IBM card punch was used for output. These cards could be used to produce printed output offline using an IBM accounting machine.

It was designed to calculate artillery firing tables for the U.S. Army’s Ballistic Research Laboratory, but its first use was in calculations for the hydrogen bomb.

Later, with the development of first transistor, faster and more powerful computers were constructed.

“Computers” became a new catchword, and input-output technology

graduated from punch cards to magnetic tape, faster printers, and more languages for programming. Applications also were expanded, from use in academic research to weather forecasting, from airline ticketing to accounting.

This development of computer continues.

Birth of the PC

The capabilities of the personal computer have changed greatly since the introduction of electronic computers. By the early 1970s, people in academic or research institutions had the opportunity for single-person use of a computer system in interactive mode for extended durations, although these systems would still have been too expensive to be owned by a single person. The introduction of the microprocessor, a single chip with all the circuitry that formerly occupied large cabinets, led to the proliferation of personal computers after about 1975.

The first complete personal computer was the Commodore PET introduced in January 1977. It was soon followed by the popular Apple II. Mass-market pre-assembled computers allowed a wider range of people to use computers, focusing more on software applications and less on development of the processor hardware.

Throughout the late 1970s and into the 1980s, computers were developed for household use, offering personal productivity, programming and games. Somewhat larger and more expensive systems (although still low-cost compared with minicomputers and mainframes) were aimed for office and small business use. Workstations are characterized by high-performance processors and graphics displays, with large local disk storage, networking capability, and running under a multitasking operating system.

The Microprocessor Technology

Microprocessors have become embedded in an ever-widening range of products: the steering systems of airplanes, the control panels of hydroelectric power stations, domestic air conditioning systems, the traffic lights in our streets. Even when we do not recognize it, they have become part of our everyday lives: in video players, credit cards, remote controllers, cameras, hotel room door locks, and smart buildings. There is a microprocessor embedded in our digital scale in the kitchen.

Microprocessors translate bar codes into prices at the cash register, monitor electronic injection of fuel in our cars, and determine where the elevator stops in our building. An ordinary household now contains some 100

microprocessors, in everything from dishwashers to alarm systems. Microprocessors constantly expand their capacity, applications, and users.

The Internet

In late 1960s, the U.S. Department of Defence drew up guidelines for a communication network among computers (ARPANET). After a while, universities in and outside the United States were hooked up to it, and some started to use it to send messages. France developed its variant—its Minitel system—at the beginning of the 1980s, at the same time the U.S. National Science Foundation set up its own network among academic institutions that later became part of Internet. A dozen universities on the U.S. East Coast with IBM mainframes contributed with BITNET. In Europe, EARN became a network among academic institutions, while CERN in Geneva was crucial in the development of the World Wide Web, which got its name in 1990. The opening of the network to commercial interests began in 1988. The US Federal Networking Council approved the interconnection of the NSFNET to the commercial MCI Mail system in that year and the link was made in the summer of 1989. In that same year, three commercial Internet service providers (ISPs) were created: UUNET, PSINet and CERFNET. Various other commercial and educational networks, such as Telenet, Tymnet, Compuserve and JANET were interconnected with the growing Internet. A couple of years later, surfing on the net started, and more and more people hooked up. A PC needed a modem to use its potential fully. This continues like the others as more and more computers are interlinked with an ever-growing number of “servers” and an expanding range of applications.

Yet, the most important part of the fourth ICT revolution was this: on the computer networks engineers had constructed, users built social networks to make them useful and effective—in this case, the social superstructure built on the material basis became really super.

Wireless Links

With Wireless linking (without lines)—the new possibilities opened up with the rise of mobile phones. At first, they were big and bulky. Reduction in size and weight was accompanied by expansion of reach and functions, and miniaturization was accompanied by multifunctionality. Mobile phones could be used not just for talking, but also to exchange messages, receive news or stock exchange quotes, review restaurants, or order movie tickets. Phones are no longer only for transmitting phonemes; now they can transmit written messages, pictures, and music. Linking without lines now takes place not just inter-continentially via satellites, but also via high frequency short-range radio

transmitters covering a specific area or cell (hence the name, “cellular phones”) and inside buildings by “Bluetooth” and infrared light.

As can be seen, the speed at which the developments have happened in ICT has been tremendous. Every new generation has seen a new milestone which has significantly changed the in ICT.

This rapid progress in ICT has empowered individuals with unprecedented access to information and knowledge, with important consequences in terms of providing education and access to markets, of doing business, and of social interactions, among others. Moreover, by increasing productivity and therefore economic growth in developing countries, ICT can play a formidable role in reducing poverty and improving living conditions and opportunities for the poor. In these challenging times of global economic crisis, the extraordinary capacity of ICT to drive growth and innovation should not be overlooked, since it can play a critical role not only in facilitating countries’ recovery but also in sustaining national competitiveness in the medium to long term.

Information and Communication Technology (ICT) is increasingly moving to the core of national competitiveness strategies around the world, thanks to its revolutionary power as a critical enabler of growth, development, and modernization. Recent economic history has shown that, as developed countries approach the technological frontier, ICT is crucial for them to continue innovating in their processes and products and to maintain their competitive advantage. Equally importantly, ICT has proven instrumental for enabling developing and middle-income economies to leapfrog to higher stages of development and fostering economic and social transformation.

APPLICATIONS

Let us take a look at some of the key areas, specific to the Indian context, and see how ICT has made or can make a difference.

Agricultural Applications

A large country like India is highly dependent on agriculture to be able to sustain its huge population. ICT would not only provide tools and valuable cropping and management information, but also provide very crucial linkages with experts support as and when farmers require them. The need to be informed of the opportunities available for getting timely information regarding weather, disease management and control measures, epidemics and threats, etc. remain central to the agricultural information and extension activities.

Currently, the interest is to create delivery means that are suitable and in a way that is accessible to the farmers, for example, by the effective use of mobiles for end-delivery of information modules. Other dynamic portals have been created to use intelligent computing to interface between the farmer's needs and queries and the responses of the experts, thus building an effective databank. Such innovative initiatives will come to a naught, unless there are clear strategies for outreach and use by the small and marginal farmers, and delivered in local languages. Current research trends indicate efforts in this direction.

The most important aspect of the role of ICTs is to help the farmers with timely market and financial linkages and opportunities. Efforts have been made not only by governments, but also by agricultural institutions and by leading NGOs and international development agencies.

Some of the applications and programs which can be of immense help in fostering ICT in agriculture are presented below:

The aAQUA system

Developed by the Developmental Informatics Lab at IIT Bombay, India - the aAQUA system was launched in 2003. It is a collaborative effort by IIT-B, Krishi Vigyan Kendra (KVK) at Baramati and Vigyan Ashram, Pabal in Maharashtra. The aAQUA system is an attempt to build a bridge between advanced technology and the farmer at the grassroots of Indian society who don't always have access to expert advice.

Farmers can pose questions with the help of computer operators about their crops or livestock and experts respond to the queries. The portal maintains a repository of the questions and answers which can be assessed by anyone in future too.

Some features of aAQUA are as follows:

- The portal offers an online digital library which displays images related to crop diseases, farmers can choose the appropriate photo and then look for control measures. The portal also employs a multilingual meaning based search engine that allows users to search for content in their own language and view documents in their language irrespective of the language of the original document. Users can search for content by clicking on keywords rather than typing text in a search box.
- A price information service provides updated prices of every agricultural commodity in different markets of Maharashtra to the farmer.

To make information more accessible to farmers, content delivery through other media is also being experimented on such as, telephony extensions, FM radio and mobile SMS (Short Messaging Service). There are plans of creating state-wise portals of aAQUA, quality standards for exports and translation of content into various Indian languages.

InDG - India Development Gateway's Agriculture vertical

InDG is a national initiative supported by the Department of Information Technology, Government of India and implemented by Centre for Development of Advanced Computing (C-DAC), Hyderabad. The initiative targets specific information needs of the country in the domain of rural and social development. The 'Gateway' has been developed as a single-window access to information and services, with the specific objective of reaching the 'unreached' rural communities of India, especially women and the poor. All content in this portal is available in six languages: English, Hindi, Telugu, Tamil, Bengali and Marathi.

The content hosted on the website is segregated in the following categories:

- Primary Education
- e-Governance
- Health
- Rural Energy
- Agriculture

With participation from the National Agriculture Research System (NARS) and Line departments, the Agriculture vertical carries essential information under various Subheads, namely:

Crop Production Techniques

Educates farmers about the production techniques for different crops, a special section on technologies for the North Eastern parts of India which has different agroclimatic conditions, new crop varieties being developed, irrigation systems, agri-engineering technologies, tissue culture and also food safety standards and Codex.

Animal Husbandry

Focuses on the breeds, availability, feeding, breeding and disease management of dairy animals, poultry, goats, sheep, pigs and rabbits.

Fisheries

Information about commercial production of freshwater fishes (carps, prawns), freshwater pearl culture, ornamental fish farming, market intelligence of marine fishes as also URLs of the national level institutes on Fisheries.

Farm-based Enterprises

Information on value added enterprises like Sericulture, Mushroom production, vermicomposting, agri-business and rural technologies.

Best Practices

This section informs our agriculturists about the System of Rice Intensification (SRI), Precision Farming and a section dedicated to innovations made by farmers.

Policies and Schemes

Information about the Government's policies and schemes for the farming community.

Credit and Insurance

This section informs farmers about the Banks in the Agricultural sector and their credit and crop insurance schemes and also the Kisan Credit Cards.

Discussion Forums

The discussion forum is a space where farmers can hold discussions and share information on issues related to agriculture.

Related Websites

This section is a compendium of links to the Ministry of Agriculture, State Agriculture Departments, other related Ministries and Departments, State Agriculture Universities, ICAR Institutes, Commodity Boards and other related National and International Organisations and agri-related portals from India. The comprehensive information provided by the portal in different Indian languages is a boon for the e-enabled farmers in India who will have access to information from all over the country at their fingertips especially after the nationwide roll out of wireless broadband.

eSagu

eSagu is a web-based personalized agro-advisory system which uses ICT to provide expert/scientific advice to Indian farmers to improve agricultural productivity. 'Sagu' means cultivation in Telugu language. The initiative is a joint research project of Media Lab Asia and IIIT Hyderabad (Indian Institute

of Information Technology). eSagu aims to increase farm productivity by delivering high quality personalized advice in a timely manner to each farm at the farmers' door-steps without the farmers asking any question. The advice is provided at a regular basis starting from sowing to harvesting which reduces the cost of cultivation, increases the farm productivity as well as it's quality. Extracting full benefits of the available ICT tools (Internet, database and digital photography), in eSagu, instead of visiting the fields in person, the agricultural scientists deliver their advice on the basis of the information received about the crops through digital photographs and other information. The project is currently serving 6 districts of Andhra Pradesh, India. The major crops covered under the project are cotton chillies, rice, groundnut, castor, red gram and fish.

Agricultural Wikipedia

Indian scientists have launched an 'Agricultural Wikipedia' that will act as an online repository of agricultural information in the country. Indian Government initiative called 'Agropedia' was launched on 12 January 2009. The project called Agropedia aims to disseminate crop and region-specific information to farmers and agriculture extension workers. Agropedia will also provide information for students and researchers. Currently, the website contains information on nine crops, including rice, wheat, chickpea, pigeon pea, vegetable pea, lychee, sugarcane, groundnut, and sorghum. Agriculture researchers will continuously add and validate the content by using open source tools as used in Wikipedia. The website will also contain blogs and forums on agriculture to exchange knowledge. The portal will help to communicate agricultural information and research findings to farmers, students and researchers. The INR 85 million project will be implemented over the next 30 months and is backed by the National Agricultural Innovation Project, a six-year government programme intended to modernize agriculture. The funding for the project is provided by the World Bank and the Indian Government with other six Indian agricultural and technology institutions partnered in the project to provide information and technological expertise. In the initial stage, the project will develop a mechanism to manage the vast repository of knowledge and later on it will develop ways to disseminate the knowledge. It is hoped that even where farmers do not have access to the Internet, the Agropedia information can be used as a basis for radio plays also.

Education

ICTs are a potentially powerful tool for extending educational opportunities, both formal and non-formal, to previously underserved constituencies—

scattered and rural populations, groups traditionally excluded from education due to cultural or social reasons such as ethnic minorities, girls and women, persons with disabilities, and the elderly, as well as all others who for reasons of cost or because of time constraints are unable to enroll on campus.

Anytime, anywhere.

One defining feature of ICTs is their ability to transcend time and space. ICTs make possible asynchronous learning, or learning characterized by a time lag between the delivery of instruction and its reception by learners. Online course materials, for example, may be accessed 24 hours a day, 7 days a week. ICT-based educational delivery (e.g., educational programming broadcast over radio or television) also dispenses with the need for all learners and the instructor to be in one physical location. Additionally, certain types of ICTs, such as teleconferencing technologies, enable instruction to be received simultaneously by multiple, geographically dispersed learners (i.e., synchronous learning).

Access to Remote Learning Resources.

Teachers and learners no longer have to rely solely on printed books and other materials in physical media housed in libraries (and available in limited quantities) for their educational needs. With the Internet and the World Wide Web, a wealth of learning materials in almost every subject and in a variety of media can now be accessed from anywhere at anytime of the day and by an unlimited number of people. This is particularly significant for many schools in developing countries, and even some in developed countries, that have limited and outdated library resources. ICTs also facilitate access to resource persons—mentors, experts, researchers, professionals, business leaders, and peers—all over the world.

One of the most commonly cited reasons for using ICTs in the classroom has been to better prepare the current generation of students for a workplace where ICTs, particularly computers, the Internet and related technologies, are becoming omnipresent. Technological literacy, or the ability to use ICTs effectively and efficiently, is thus seen as representing a competitive edge in an increasingly globalizing job market.

Improving the quality of education and training is a critical issue, particularly at a time of educational expansion. ICTs can enhance the quality of education in several ways: by increasing learner motivation and engagement, by facilitating the acquisition of basic skills, and by enhancing teacher training. ICTs are also transformational tools which, when used appropriately, can promote the shift to a learner-centered environment.

Motivating to Learn

ICTs such as videos, television and multimedia computer software that combine text, sound, and colorful, moving images can be used to provide challenging and authentic content that will engage the student in the learning process. Interactive radio likewise makes use of sound effects, songs, dramatizations, comic skits, and other performance conventions to compel the students to listen and become involved in the lessons being delivered. More so than any other type of ICT, networked computers with Internet connectivity can increase learner motivation as it combines the media richness and interactivity of other ICTs with the opportunity to connect with real people and to participate in real world events.

Facilitating the Acquisition of Basic Skills

The transmission of basic skills and concepts that are the foundation of higher order thinking skills and creativity can be facilitated by ICTs through drill and practice. Educational television programs such as Sesame Street use repetition and reinforcement to teach the alphabet, numbers, colors, shapes and other basic concepts. Most of the early uses of computers were for computer-based learning (also called computer-assisted instruction) that focused on mastery of skills and content through repetition and reinforcement. (See section below on Computer-Based Learning.)

Enhancing Teacher Training

ICTs have also been used to improve access to and the quality of teacher training. For example, institutions like the Cyber Teacher Training Center (CTTC) in South Korea are taking advantage of the Internet to provide better teacher professional development opportunities to in-service teachers. The government-funded CTTC, established in 1997, offers self-directed, self-paced Web-based courses for primary and secondary school teachers. Courses include “Computers in the Information Society,” “Education Reform,” and “Future Society and Education.” Online tutorials are also offered, with some courses requiring occasional face-to-face meetings.^[15] In China, large-scale radio-and television-based teacher education has for many years been conducted by the China Central Radio and TV University,^[16] the Shanghai Radio and TV University and many other RTVUs in the country. At Indira Gandhi National Open University, satellite-based one-way video- and two-way audio-conferencing was held in 1996, supplemented by print-materials and recorded video, to train 910 primary school teachers and facilitators from 20 district training institutes in Karnataka State. The teachers interacted with remote lecturers by telephone and fax.

Research has shown that the appropriate use of ICTs can catalyze the paradigmatic shift in both content and pedagogy that is at the heart of education reform in the 21st century. If designed and implemented properly, ICT-supported education can promote the acquisition of the knowledge and skills that will empower students for lifelong learning.

Elections

Sam Pitroda, the visionary technologist who spearheaded telecommunication revolution in India, quotes, “IT can raze cultural barriers, overwhelm economic inequalities, and even compensate for intellectual disparities. In short, high technology can put unequal human beings on equal footings, and that makes it the most democratizing tool ever devised.”

Barack Obama became the first non-white President of the oldest democracy of the world, USA. Barack Obama effectively used online tools such as YouTube, blogs, social networking sites, online petitions, Google and Yahoo groups and more conventional email lists to rally supporters, campaign, defend attacks and communicate with constituents, even raise funds. ICTs played a major role in the making of this historic moment. If we look at the Indian scenario, our Indian leaders are not left behind; they are also trying to woo their voters through the use of ICT tools which in more than one way are going to change the political culture in India in the coming years. This election is not only bringing ICTs to the fore as an important tool for campaigning, it is also witness to the most remarkable change in the attitudes of the political parties as they have promised to integrate ICTs in their scheme of good governance. They are not only using means of ICT, but also they are also promising to provide ICT services to masses. India’s main political parties, Bhartiya Janata Party (BJP) and Indian National Congress (INC) have been extensively campaigning online, and in their manifesto, have laid emphasis on providing smart phones, laptops, IT enabled jobs in rural areas, and so on. The online campaign of BJP can be seen spread across various websites in the form of Google ads. Blogging has also assumed tremendous popularity among political parties right from national parties BJP, INC, BSP to regional parties TDP, Shiv Sena, etc.

The latest tool that has been used by politicians to reach out to the masses is the social networking site, Twitter. Our Honorable Minister of State for External Affairs, Shri Shashi Tharoor, has been actively “tweeting” and keeping in touch with the common man through this medium.

Parallely, the Election Commission of India is moving on the road to integrate ICTs in the Indian Electoral process.

In 1977, after analyzing the pros and cons of the Electronic Voting (e-Voting) machine vis-a-vis Ballot paper by High Power Committees, the Chief Election Commissioner of India decided to use Electronic Voting Machine (EVM) in elections. The Election Commission of India (ECI) devised and designed the EVMs in collaboration with Bharat Electronics Limited, Bangalore and Electronic Corporation of India Ltd., Hyderabad. In 1980, both the companies (BEL and ECIL) brought out models with a common user interface. EVMs were first used in 1982 in India in the bye-election of Kerala for a limited number of polling stations. During General Elections 2004, EVMs were used throughout the country for the first time.

EVM works on batteries, so the voting process is not dependent on the availability of electricity. A single machine can record upto 3,840 votes, vs. only 600 per ballot box. The Commission made elaborate arrangements to receive results directly from the Returning Officers (RO) using GENESYS software. General Election System (GENESYS) is the software used for capturing data from the CEO (Chief Electoral Officer) offices and district centres all over India during Elections. The software feeds all data at the CEO level and for all the remaining states of the election process. The software also scans candidates' affidavits at the RO's offices and stores the data at the appropriate locations on hard disks. These scanned affidavits are sent to the CEO's Office. It also counts the results at RO/ CEO level which has been collated through the Internet.

The use of EVMs in elections was the first movement by the ECI to make elections more transparent and build people's faith in the process.

Panchayati Raj

Panchayats have rightly been called the backbone of the Indian villages. The Union Ministry of Panchayati Raj has already started using ICT tools for implementing and monitoring of various programmes and projects that have been designed for the benefit of our rural population. Softwares like PriaSoft, RuralSoft, NREGAssoft, etc., are helping the Union and the State governments in keeping an eye on the developments on the ground. These softwares also help maintain transparency in its functions and be accountable to the public. The journey from Panchayats to e-Panchayats has already started but this is just the beginning, a long way has still to be tread.

In recent years, several Centrally Sponsored Schemes require the states/ Districts to use the packaged applications developed, for reporting the progress of implementation of these schemes. Notable among these are: Pradhan Mantri Gram Sadak Yojana (PMGSY), Swaranjayanti Gram Swarajgar Yojana

(SGSY), Indira Awaas Yojna (IAY), National Rural Employment Guarantee Scheme (NREGS), etc.

For optimal utilization of ICT potential in building capacities of Panchayats and for improving service delivery, the Ministry of Panchayati Raj (MoPR) has formulated a Mission Mode Project- 'e-PRI' for e-governance in Panchayats under the National e-Governance Action Plan (NeGP).

The Objectives of e-PRI MMP are

- Enabling Panchayats to better deliver its mandated services to the Citizens through IT.
- Enabling PRIs to use IT as a tool for transparency, disclosure of services to Citizens and social audit
- Improving internal management processes and decision making in Panchayats
- Enabling PRIs to use IT for electronic tagging and tracking of funds transferred to Panchayats, including rapid bank transfer of funds, tracking fund transfers to, expenditures of the Panchayats.

Appreciating that the proposed e-PRI scheme has a critical role in improving the overall functioning of Panchayats as well as the success of Central and State schemes, the Apex Committee has approved the approach of the MoPR in principle. This project will, inter-alia:

- Equip all Gram Panchayats with computers, or provide access to computers with broadband connectivity.
- Equip all Panchayats with necessary software and skills to handle e-Governance for better delivery of services to citizens.

The other major component of e-PRI would be that of capacity building of PRI functionaries. The infrastructure that is proposed to be created through e-PRI would be utilised for training of elected representatives about their responsibilities and for giving them functional knowledge of the schemes that are implemented through the Panchayats or their statutory committees. Training will also be given for maintaining accounts etc, an area which is weak in PRI structure.

Effective management of funds provided to PRIs, by various agencies, is one of the most challenging tasks. To this end, the Panchayat Raj Institutions Accounts Monitoring Software (PriaSoft) has been designed, developed and hosted by National Informatics Centre. This web based software application (<http://priasoft1.tn.nic.in>) can be effectively used to monitor the funds

distributed to PRIs. It also helps in monitoring the expenditure and Panchayats own revenues through various means in the form of taxes, auctions, etc.

Climate Change

We are living in one of the most challenging periods in human history, faced with the prospect of irreversible global climate change.

The digital revolution and proliferation of Information and Communication Technologies (ICT) have changed people's lives dramatically and boosted economic growth. At the same time, ICTs have also had a negative impact on the environment, be it CO₂ emissions related to network operations, CFCs from refrigeration or e-waste from phones and personal computers.

According to various studies, it is estimated that the ICT sector contributes around 2.5* per cent of GHG emissions.

However, ICTs have the potential to assist the remaining 97.5 per cent of the global economy in reducing emissions, for example, by tele-working and teleconferencing. Businesses around the world could unlock global energy efficiency savings of over 500 billion Euros by systematically using ICTs.

Probably the most obvious area for carbon abatement opportunities offered by ICTs is in reducing, or substituting for, travel requirements. The ICT industry offers a number of different tools and services which can replace physical travel, especially business travel, ranging from the commonplace (e-mail, phone calls, text messaging) to the sophisticated (high-performance videoconferencing). E-commerce, e-governance and distance learning, all have contributed to reducing travel requirements and hence reduce CO₂ emissions.

A second area where ICTs have been extensively used for reducing CO₂ emissions caused by transport is in the use of intelligent transport systems (ITS). These systems are used in applications such as 'eco-driving', congestion charging, as well as for traffic management and parking optimization.

An effective public transport system will eventually reduce the number of vehicles on road and hence reduce CO₂ emissions.

A third way is through 'dematerialisation', or the replacement of 'atoms' with 'bits'. Examples of this are the current shift under way in the market for pre-recorded movies and music away from physical distribution (such as DVDs and CDs) to online delivery, from paper mails to emails, physical books to e-books.

More and more publications, books and magazines are now available online. Paper bills and other documentations have been replaced with corresponding online options. These too result in significant energy savings.

ICT can also help spreading awareness regarding climate change and can reach out to people across the globe through the various mediums like the internet, television, radios, etc.

Rural BPOs

Booming India Inc has led to skyrocketing real estate and infrastructure costs in Tier-1 cities. BPO industry has thrived all these years because of its ability to deliver services at a low cost. Increasing infrastructure costs, real estate costs, and salaries have raised BPO costs significantly and as a result Indian BPOs in Tier-1 cities are looking at Tier-2 and Tier-3 cities for operation.

Few entrepreneurs who had a vision of bringing the rural India into the mainstream of knowledge economy have found an opportunity here - setting Rural BPOs. The transformation of rural India started with the emergence of these Rural BPOs. These are not simple ICT projects in the rural areas, which often remain only projects on pilot or testing stage, but are real business and entrepreneurial ventures that have steered local leadership, engagement of the youth in training and capacity building, and more importantly lead to value addition, and continued employment to the educated youth.

Rural BPOs have a potential of translating into a great movement. The rural BPO business is likely to create over 2 million jobs in the next five years, which includes a range of services, from technical management of the centres, training centres to prepare the rural youth, diction and language training programmes, to direct employment and management opportunities within the BPOs. In addition to the core services, it can pave the way for auxiliary services like food and transport services, courier services and other technical, maintenance and support services. It provides a steady source of alternate income for the population of the rural areas, who are otherwise largely dependent on the vagaries of monsoon and the climate for their survival.

In urban areas, as there are too many BPO jobs chasing too few experienced BPO workers leading to almost 35-40% attrition rates. On the other hand rural BPOs have almost zero attrition rates as the rural youth are highly self-motivated to excel, stemming from their desire to raise the standard of living of their families from an erratic rain-fed agricultural income to a steady monthly salary income.

While rural BPOs stand to provide very good benefits, there are some other concerns as well like low skill level, infrastructure issues. If managed properly, the pros can quite easily outweigh the cons.

There have been many leading organisations which have setup rural BPOs. HDFC bank has incubated a rural BPO which provides back-end support for

major banking services; the Byrraju Foundation has embarked on a well-designed integration of rural BPO services for leading service providing agencies; Desicrew is a rural BPO operation which was born out of the TeNeT programme of Indian Institute of Technology; Drishtree is operating BPOs in 12 states, wherein they have brought a franchisee model of telecentres to become financially productive enterprises and evolved them to become operating BPOs to provide employment.

In short, Rural BPO is one of the few avenues of employment for rural India and an attempt to combine entrepreneurship and social empowerment bridging the ever increasing rural-urban divide.

CONCLUSION

In spite of the advances made so far in ICT4D for socioeconomic development, we still have a long way to go.

ICT4D faces some very important questions.

Sustainability

All the initiatives should be able to sustain themselves over a long period of time to make the change that is intended.

Scalability

There is a need to have a scalable model so that as the initiatives can grow on without getting disorganized and hence create a larger impact in the development process.

Evaluation of Results

While some initiatives have done well, there are quite some that have not underperformed. It is, hence, important to objectively evaluate the results of the failures and success and take the learnings in the implementation of the future programmes.

Appropriate answers need to be found to these questions for ICT4D to really make “the” difference.

This will require new technologies, new approaches to innovation and implementation, new intellectual perspectives and, above all, a new view of the world’s poor.

New Hardware Priorities

A need for innovation around low-cost, broad-reach terminals, telecommunications, and power. A need to bring the hardware success story of the last decade – mobiles – even more centre stage. The paper also discusses

implications of broadband, cloud computing, and individualization of hardware devices.

New Application Priorities

The growth of participatory content creation and the use of ICTs to create new income and employment for the world's poor. The paper also discusses implications of FOSS, and the growth of applications to address urban poverty, security, economic growth, and climate change.

New Innovation Models

The growing need for - and potential of - innovation that moves beyond top-down, laboratory-type models. This includes collaborative (para-poor) models that work alongside poor communities. It also means greater attention to the grassroots (per-poor) innovation that is arising from within those communities. The paper also discusses the new innovation intermediaries that are emerging in private and NGO sectors.

New Implementation Models

Based on the limitations of earlier ICT4D projects, there will be greater emphasis on sustainability, scalability and ICT4D project evaluation. This will necessitate more process than blueprint approaches to implementation, and better techniques for closing design—reality gaps. The paper also discusses new funding mechanisms and new organization forms that are increasingly seen.

New Worldviews

Effective ICT4D 2.0 policies, strategies and projects will require “tribrid” champions. They must understand enough about the three domains of computer science, information systems, and development studies to draw key lessons and to interact with and manage domain professionals. Training programmes and working group formation must reflect this need.

All these must be understood if we are to harness digital technologies in the service of some of our world's most pressing problems.

ICT4D has to now move to a new phase. From ICT4D1.0 to ICT4D2.0.



97th Indian Science Congress

January 3-7, 2010 Thiruvananthapuram

II

ABSTRACT OF
Platinum Jubilee Lecture

The P Verses NP Problem: When Computers Fail !

Dr. S.B. Nimse

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ABSTRACT

In the year 2000, Clay Mathematics Institute (CMI), organised the meeting of leading mathematicians of the world in Paris, and declared the list of seven most difficult open problems of mathematics, called as the Millennium problems, announcing the price of one million dollars for solution of each of these problems.

Of all the Millennium problems, the fourth problem “P verses NP” is the only Millennium problem that is about computers. As compared to remaining six mathematical problems buried deep within a mass of heavy-duty mathematics, this problem is relatively easy to understand and likely to be solved by even an amateur largely untrained in mathematics intelligent human being, by employing single new good idea. This problem basically deals with how efficiently computers can perform certain kinds of tasks.

During 1930’s Kurt Gödel shown how to translate questions about probability to equivalent questions about computability of certain functions from natural numbers to natural numbers. His famous incompleteness theorem states that in any axiomatised system, there will always be some functions that cannot be computed within the system. Building on Gödel’s work, Kleene and Turing established theoretical possibility of programmable computers, which ultimately become reality in 1940’s & 1950’s because of the work of Turing and John Van Neumann. Effects of mathematicians who studied the concept of computation with a view to improving the way real computers were used, led to the development of new branch of theoretical computer science called the “Computational Complexity”. P vs NP belong to this branch which can also be treated as subdiscipline of mathematics.

Cook’s paper on, “the complexity of theorem proving procedures” published in 1971, in which he introduced the concept of NP completeness,

led to the development of this conjecture. Cook was motivated by the Turing's solution to the Halting problem.

P versus NP problem is stemmed from the complexity of exponential-time processes such as travelling salesman problem, as compared to polynomial-time processes. All the four arithmetic operations-addition, subtraction, multiplication and division are polynomial time processes. Practically, all exponential-time processes that arise in industry and business, handling moderate size realistic data would take the world's fastest computer longer than the entire age of the universe! To illustrate, for $N=50$, the time complexity of polynomial N^3 is 0.125 sec where as for exponential type function 3^N time complexity is startling 20 crores of centuries (2^{10} years).

Computer scientists divide computational tasks into two main categories. Task of type P (e.g. polynomial -time) can be tackled effectively on a computer; task of type E (e.g. exponential- time) could take millions of years to complete. Unfortunately, most of the big computational tasks that arise in industry and commerce fall into a third category NP (non-deterministic polynomial-time), which seems to be intermediate between P and E. The question is, whether the NP is a disguised form of P? There are reasons to believe that NP and P are different. However, nobody is able to prove it since last 40 years. Proving $P=NP$, will have profound impact on commerce and industry including electronic telecommunications and World Wide Web, may be undermining the internet security.



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III

ABSTRACTS OF
Invited Talks

1. Fuzzy logic Application in Environment Management: Revisited

***Dr.Ashok Deshpande Ph.D.(Engineering)**

*Chair: Berkeley Initiative in Soft Computing (BISC) - Special Interest Group (SIG) - Management Systems (EMS) Guest faculty: University of California Berkeley California USA, Adjunct Professor: Bioinformatics Center University of Pune, and also at the College of Engineering Pune (COEP); Former Deputy Director: National Environmental Engineering Research Institute (NEERI) India

ABSTRACT

The industrial policies of the developing countries mainly focus on the pursuit of economic growth. Ever increasing pollution levels due to rapid urbanization and industrialization with minimal focus on adequate pollution abatement strategies, resulted in impairing natural environment such river, air, land, and alike. One of the most important issues relates to communicating information on the status of environmental quality in general, and water quality in particular to the decision makers and the community in order to formulate sound public policies and effective implementation of environmental quality programs. The presentation discusses two vital issues of immediate significance with case studies. The first issue is regarding river water quality classification for specific usage while the other is about ranking of polluting industries based on their pollution potential.

In this sequel, a novel fuzzy logic based formalism, developed by the author, for straightway describing river water quality in linguistic terms with degree of certainty is discussed wherein the limitations of the method of computing Water Quality Index are also brought out. The study relates to classifying water quality at defined locations for bathing along the river Ganga after the implementation of Ganga Action Plan 1 (GAP 1).

A decision problem is generally complex and it gets further complicated if there exists multiple criteria decision making—both qualitative and quantitative in nature. The second case study, therefore, relates to the pollution status of three thermal power station units, and three dyeing and printing textile industries in the State of Gujarat. The research team has made an attempt to formulate a fuzzy model employing Fuzzy Multiple Criteria Decision Making (FMCDM)

technique, with a view to arrive at ranking of the industries based on their water and air pollution potential. Formulation of a hierarchical structure of Fuzzy Rule Based System (FRBS) for ranking the industries forms an integral part of the study.

2. Semantic Concept Similarity Methods

Dr.Virendra Bhavsar

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Keywords: **semantic matching, similarity, concept matching, concept similarity, taxonomy, shortest path length.**

ABSTRACT

Semantic concept similarity is important in many research areas including information retrieval, information integration, web services and natural language processing. We present a survey of semantic concept similarity methods that can be used for concept matching in taxonomies and outline a new approach that provides a finer concept granularity measure.

Syntactic matching algorithms match strings without considering any domain knowledge. However, the semantics of words/strings vary based on their contexts. Syntactic matching cannot distinguish such semantic differences and may lead to inaccurate or even wrong matches. Therefore, semantic matching techniques, such as schema matching and concept matching in a taxonomy/ontology are required.

This presentation focuses on concept matching in taxonomies. A taxonomy structures a body of knowledge into classes (concepts) and defines relationships among them, usually the subsumption (subclass-of) relationship. A taxonomy is often represented as a tree or a directed acyclic graph (DAG). Each node in a taxonomy tree (DAG) is a concept that might have superconcepts and subconcepts.

Although there are several possible link types in a taxonomy, such as *subclass-of/subsumes*, *part-of/has-part*, *type-of/has-type*, and *instance of/has instance*, the *subclass-of* relationship is the most important one among them. This is the reason why many researchers pay more attention to the taxonomy that only has the *subclass-of* type of links.

The semantic similarity of a pair of concepts in a taxonomy is computed considering the path lengths, edge weights, node information contents, and link types. The *edge-based* approaches are based on the shortest path length of two concepts. The *node-based* approaches explore the information content of nodes to compute the concept similarity. The edges in a taxonomy might have arbitrary weights due to various factors such as their local densities, link types, node depths, and link strengths.

3. ICT Based Healthcare: Research and Development Challenges

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ABSTRACT

In this paper we present the important issues related to the deployment of ICT based healthcare. We point out the characteristics of healthcare problems and we make a case that intelligent ICT systems are a good choice to tackle problems with such features. We also discuss different concerns that have to be covered before intelligent ICT systems can be effectively deployed in real healthcare settings. We conclude that intelligent ICT has all the time more important role to play in healthcare realm, because they considerably boost our ability to model, design and build distributed healthcare software systems.

4. Computational Learning: Statistical and Soft-Computing Approaches

Dr. Narendra S. Chaudhari

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ABSTRACT

Since 1967, when E.M. Gold reported the negative result that any “super-finite” language class (class containing at least one infinite language) cannot be learnt with only “positive” examples, the field of computational learning has attracted many researchers. In the last two decades, it has specially been very active area of research. In the first part, we review a few important results, especially concerning regular language learning. These results include the incremental learning of regular languages with the use of a lattice of finite state automata.

Context Free languages are more complex than regular languages, and their learning is more difficult. Researchers have tried various approaches including Genetic Algorithms as well as neuro-Fuzzy models for this problem. One of the interesting results is due to Zaanen, who in 2000, proved that (context free) grammar rules can be learnt based on alignment between texts of a given collection of sentences. In the second part of the talk, we define and study the alignment profile and formulate fuzzy similarity of alignment profiles for a given collection of sentences. Using the fuzzy similarity based profile alignment, we give a methodology to formulate stochastic context free grammar rules. We introduce profile alignment based dynamic sentence similarity threshold to formulate the rules of stochastic context free grammar. The proposed methodology is tested using CHILDES data set of sentences. The benefits of our approach are experimentally demonstrated. Since our approach does not make use of any domain knowledge, it is expected to be useful in wide variety of applications requiring the model construction. A few such applications in social sciences would be included in the presentation.

5. Role of Data Mining and its Benefit to the Society

Dr. D. Datta

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ABSTRACT

Advance of information science is always beneficial and also essential for the society. Extraction of new knowledge from the existing information is the basic requirement. As a process data mining keeps our society healthy rather profitable. As a software application, it empowers one to uncover previously undetected facts about users in the designed databases. According to IBM, “Data mining offers firms in many industries the ability to discover hidden patterns in their data pattern that can help them to understand system behavior and development trends”. For example, in nuclear industry, especially in nuclear reactor, data mining helps reactor operators to understand the behavior of reactor at every instant of operation and pertinent knowledge helps them to build their procedures so that reactor can operate safely to produce electricity without taking a frequent shutdown, because frequent shutdown of a reactor may give rise to a under design or unsafe signal. Further, in the field of radiation protection, data mining is essential to know how much clean the environment around the nuclear plant is. Illustration of this statement is as follows: Environmental survey laboratory is associated with every nuclear power reactor and its role is to monitor the environment around the reactor within an area of 30 km. for acquiring the relevant data on various environmental matrices (air, water, soil, and various food items) and to process these data for knowing the radiation exposure in the environment. Guidelines of Atomic Energy Regulatory Body with the same from International Commission of Radiation Protection (ICRP) provides a safe or no health risk limit in terms of radiation dose as 1 mSv/year for members of the public.

The advent of parallel processing and new software technology enable society to aware the benefits of data mining more effectively than had been possible previously. There are a number of ways that data mining improves the performance or efficiency of nuclear industry. It adds the benefits of automation to existing software and hardware.

Methodology of data mining will be focused using imprecision or insufficiency based information which are further based on various fuzzy measures (belief, plausibility, dissonance, non-specificity).

6. Geomatics Technology for Sustainable Development in Rural Areas

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ABSTRACT

In all areas governance, among others, includes all aspects of physical planning, management of social and physical infrastructure, and enhancement/restructuring of existing facilities, facility management and land use planning. In all these areas, there is a special emphasis on spatial dimensions. In true context, its G-Governance (Geomatics-Governance) coupled with emerging Geo-Spatial technology. Geomatics which is the synergy of multiple disciplines has evolved as a separate discipline dealing with spatial and non-spatial information, its method of acquisition, organization, classification, analysis, management, display and dissemination. It provides not only decision support system (DSS) for macro-level planning but also state-of-the-art models to the government in the context of decentralized planning for sustainable development in rural areas.

There is an increasing urbanization taking place in India as a result of rural masses migrating in large numbers from villages to towns, for want of better facilities and in search of better opportunities. This is expected to accelerate further in the future unless there is a concerted effort to arrest this migration through development of the villages. In this connection, application of modern ICT tools is being increasingly recognized to provide an efficient and effective means towards the preparation and implementation of appropriate development plans, viz., for creation of the required facilities/infrastructure in villages.

With the advancement in technology particularly in remote sensing, computer hardware, software, communication, it is possible to harness the potential of Geomatics Technology for rural development. There are number of products/ projects developed aiming towards watershed management, facility planning and management, rural electrification, rural roads, cadastral mapping, forest mapping, crop acreage/ production estimation, command area development, EIA and EMP and many more areas are being covered. Few products to name are *e-Gram Suvidha*, *GeoApproach*, *GeoAmpere*, *GoeForest* developed towards *G-Governance*.

7. SMS and VoIP Forging- A Gen Next Cyber Crime

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ABSTRACT

This is the era of technology. Every human being worth his/her self is networked with the planet, the primary medium is being internet however, it is this rampant increase in communication that has lead us towards Security Concerns. It is not impossible for hackers to extract your information like a zephyr today, in fraction of minute. Recent surveys have shown an increase of 200% in Cyber Crime within the last three years. Today, Cyber Crime is not just restricted to email hacking, but the claws have extended to SMS and Call Spoofing, Credit Card fraud, Child Pornography, Phishing and Remote Key Logging etc. SMS and Call Forging is Gen Next Cybercrime as far as ICT is concerned.

SMS Forging

SMS forging is a relatively new kind of high-tech felony, which uses the short message service (SMS), which is available on most mobile phones and personal digital assistants, to spoof or impersonate another user. The spoofing

is often used to send viruses that can be carried from phone to phone and which can cause destructive behaviour. SMS spoofing became possible after many mobile/cellular operators had integrated their network communications with/in the Internet. So anybody could send SMS from the Internet using forms at the websites of mobile operators or even through e-mail. Unfortunately, the Internet forms designed to send SMS may have vulnerabilities that could lead hackers to be able to break the tunneling protocol that links the phones with the Internet.

Caller ID Spoofing

Caller ID Forging the practice of causing the telephone network to display a number on the recipient's caller ID display which is not that of the actual originating station; the term is commonly used to describe situations in which the motivation is considered nefarious by the speaker. Just as e-mail spoofing can make it appear that a message came from any email address the sender chooses, caller ID forging can make a call appear to have come from any phone number the caller wishes. Because people are prone to assume a call is coming from the number (and hence, the associated person, or persons), this can call the service's value into question.⁷² 38 88 09 00 F1- Sender number (decimal semi-octets), with a trailing F, By changing this format at the sender side, we can spoof sender ID of the SMS. This paper discuss in depth details about SMS and Call forging and countermeasures for the same.

8. e-Governance : Issues and Implementation in India

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Keywords : ICT, G2C, G2B, G2G, Smart Governance.

ABSTRACT

Good and smart governance has been adopted as an important goal by many countries across the world. India has also taken up many effective initiatives for open and smart government. The Information Technology revolution, World Wide Web and multi-dimension applications of the Internet potential made the possibility of providing services at any time, anywhere. The same resulted the demands of touching the vital areas of Governmental functioning such as transparency in the functioning and speedier decision which will finally lead the governance to be more citizen centric than ever. E-Governance is that form of governance which seeks to realize processes and structures by harnessing the potentialities of Information and Communication Technology (ICT) at various levels of government and public sector for the purpose of enhancing good governance.

But practically governments are faced with the challenge of transformation and there is requirement to reinvent government systems in order to deliver efficient and cost effective services. The paper will cover the issues involved in implementation of the various e-governance projects within the domain of Government and Citizen (G2C), Government and Business (G2B) and in internal Government Operations (G2G) and discussions for overcoming the problems to simplify and improve democratic, government and business aspects of governance.

Since India has the core competence in Information and Communication Technology Applications, the possibility of success in bringing transparency in administration and management through e-enabled services, leading to e-governance will be definitely a successful mission.

9. Social Causes Need ICTs

DVR Vithal

Fellow CSI, Osmania University

ABSTRACT

There are many social causes that ICTs can help meet. For instance:

- **Trust and tolerance** enable diverse groups to live together and prosper. ICT must be usable to build trust and tolerance.
- **Diversity** has given us a rich cultural heritage. ICTs must be usable to sustain and nurture diversity.
- **Consumerism**, lack of self restraint is leading to reckless ruining of environment – nature, home, and workplace. ICTs must be usable to bring back the ethos of simple living and high thinking.
- **Scientific temper** Undermining scientific objectivity by traditionalists and rootlessness and historical innocence of modernists are two extremes. ICTs must facilitate skepticism and heterodoxy and scientific pursuits and creativity. ICTs must be usable to spread scientific temper – open mind, prepared mind.
Authority will press for benefits to property. Professionals must press for benefits in personality.
- **Research** The needs of the Third World are different from the First world and market forces meet them at best accidentally. The needs are great and unique and lead to a rich and diverse agenda. ICTs research community must take on this challenge.
- **Connectivity** Networks pervade nature, society and virtual worlds giving structure and function to a variety of resources and behaviours. Discovering the future interconnection environment is a major challenge.
- **Knowledge society** In a knowledge society, decisions and actions are driven by knowledge in an efficient and well understood manner and there is no guess work. ICTs must be researched to usher knowledge society. The obscurity divide, the planned opaqueness in government, industry and institutions must be minimized.
- **Survival** The professions must tackle social challenges, biggest is

society's survival. We must spot the rhino and not wait to see its rampage. ICTs can do system study, build models to predict, models to mitigate threats, and adapt and motivate to meet these challenges.

- **Public awareness** The political negative impacts of not using ICTs upon economies, economic decision-making, networking, advocacy, empowerment of civil society groups are serious. Countries that fail to use ICTs to their advantage will fall further behind. This must be articulated to create public awareness.
- **Credo** Modern life is complex and abounds with complex systems. We need to be professional not just between 9 to 5 but be professional 24/7. This must become the credo of all professionals.
- **Adoption** Organizations are to adopt an underserved institution/ organization and make it a model for ICT absorption.

10. The Role of ICT education in Human Resource Development

Pawan Lingras¹, Manish Joshi²

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ABSTRACT

Indian information and communications technology (ICT) industry is one of the largest in the world, which is supported by a large pool of skilled human resources. The range of programs offered and the types of educational institutions in India, which is probably without parallel, has shouldered the responsibility of transforming students into skilled human resources with the help of appropriate ICT education. The educational system has evolved over last four decades and seems to serve the needs of the industry. This talk will pose important questions with respect to: the efficiency of the system based on quantitative and qualitative analysis,

- infrastructure backbone support including the resources, contribution to research and development,

- mechanism to match students' skills and abilities with the future industrial opportunities,
- whether ICT education contributes in the multidimensional development of an individual.

We will explore the availability of ICT education to all sections of the society in the geographically diverse Indian landscapes. Impact of the accessibility of ICT on the societal development will also be addressed.

HUMAN RESOURCE DEVELOPMENT

Following is the list of skills most sought after by employers:

- ◆ Domain knowledge
- ◆ Analytical/Research Skills
- ◆ Managing Multiple Priorities
- ◆ Leadership /Management Skills
- ◆ Teamwork
- ◆ Problem-Solving/Reasoning/Creativity
- ◆ Communication Skills
- ◆ Computer/Technical Literacy
- ◆ Interpersonal Abilities
- ◆ Multicultural Sensitivity/Awareness
- ◆ Planning/Organizing

Most of these aspects can be inculcated by the educational institutions through proper practice and training. Hence it is important to know the status of the educational institution to understand how qualitatively it transforms students into skilled HRD.

11. The Mobile Phone: An Instrument for Economic Development

Satish Babu

Co-founder, President of InnApp, CSI, TRV Chapter

ABSTRACT

The mobile phone revolution that the world witnessed in the current decade has had several unforeseen impacts. Apart from being a communications device,

a mobile phone has several other roles: a personal entertainment device (audio, video and games), a device for business-on-the-move, a flexible contact book, a tool for instant asynchronous messaging (SMS), a navigational aid (GPS), an appointment book, and a web browser, to name a few. However, one additional role that is emerging is that of a business enabler, especially for the small farmer, artisan and craftsman. Mobile phones may not enlarge markets, but they do transform the marketplace. Thus, possession of a mobile phone enables an craftsman to advertise his availability through his mobile phone number, thus creating visibility and instant, 24x7 access.

An even more enabling use of mobile phones is in making micropayments, as has been seen in Africa. This allows transactional services through mobile phones, at all places, and at all times. The mobile phone thus offers significant potential in transforming the lives of people, especially women and the poor, who are often constrained by their immobility.

12. Energy Internet Alias Smart Grid

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ABSTRACT

Internet is here and poised to stay long as an enabler of most of the human activities. This path-breaking development of recent origin is giving ideas to many in other spheres to emulate Internet experience by applying the concept of ‘network of networks’ to reap benefits. Power sector is in this process now, to benefit by applying ICT right from power generation to its delivery to the end user. The grid, the artery through which electricity flows, has lot of scope to improve its role of a delivery channel, making use of the tools and techniques continuously being rolled out by ICT sector.

There is a parallel between the energy and IT sectors. IT activity involves production (computing), distribution (networking) and storage. Energy sector

also has similar activities-electricity production, wheeling and distribution. But unlike in IT arena, storage of electricity in bulk is a new requirement cropping up on account of worldwide interest in renewable energy sources, lacking elegant solutions.

Just as the Internet revolutionized communication and commerce, Energy Internet drawing inspiration from conventional Internet, is working towards making electricity grids smart, paving way for efficient use of electricity, including integration of renewable energy sources on a large scale. The paper will delve into major aspects concerning the development of Smart Grids, emerging as the backbone of all modern power system networks.

13. Free Software for Scientific Computation and Data Visualisation

V. Sasi Kumar

Free Software Foundation of India

ABSTRACT

Free Software is software that gives users the freedom to install on any number of computers, use for any purpose, share with others, study its source code, make modifications and redistribute the modified software. Free Software is ideal for everyone, but especially so for developing countries and scientific computations. For developing countries, Free Software gives the freedom to use and adapt for their own purposes, it saves them the cost of licensing and helps retain the money spent in the local community. For scientific computations, it is vital to know what exactly the software does, and this is possible only with Free Software because the source code is available for study. A wide range of software for scientific computation and data visualisation is available as Free Software. Some of them will be introduced.

14. Interpolation Search – Faster than Binary Search

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Keywords: **Binary Search, Interpolation Search, Uniform Distribution**

ABSTRACT

In general we search through a dictionary (where entries are ordered) for a particular word by guessing/interpolating pages. In each search step it roughly calculates where in the remaining search space the sought item might be based on the key values at the bounds of the search space and the value of the sought key, usually via a linear interpolation. The key value actually found at this estimated position is then compared to the key value being sought. If it is not equal, then depending on the comparison, the remaining search space is reduced to the part before or after the estimated position. Only if calculations on the size of differences between key values are sensible will this method work. **Interpolation search** is an algorithm for searching for a given key value in an indexed array that has been ordered by the values of the key. Binary search is regarded as one of the fastest searching technique for sorted list with complexity $O(\log n)$ but Interpolation search proves that it is faster than Binary search.

15. Utilities and the IP Based World

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ABSTRACT

The electric industry is now embarking upon a revolution which in many respects resembles the transformation that the communications industry has undergone in recent decades. The transition from the “dumb” telephone network of the past to the intelligent Internet of today transferred greater and greater control and functionality to the edge of the network — to customers. Similarly, the emphasis now placed on distributed resources and dynamic load control signifies an era in which customers will have greater control over their energy bills and over the nation’s generation mix.

In the late 1960’s, PLCs were designed to eliminate the higher cost of complicated, relay-based control systems. By the 1980’s, Distributed Control Systems achieved popularity within increasingly automated plant environments, with keyboards and workstations replacing large, individual control cabinets. Entire production lines and processes could be linked over industrial cable/buss networks (Modbus, Profibus, Fieldbus and others) to provide monitoring and control to a foreman’s desk. Dials, gauges and idiot lights were replaced by a pictorial representation of the process with fields displaying real-time information. The available systems were “proprietary,” capturing market share by staying incompatible with competitive systems. By 1998, however, customers were beginning to demand open systems, common protocols and vender interoperability. This closely mirrors the way that computer network standardization developed, but industrial networks have been far more resistant to open system competition. They remained largely incompatible.



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IV

ABSTRACTS OF
Young Scientists' Presentations

1. Development of Methodology for Detection and Fixing of Physical Devices for Security and Forensic Applications

Dr. Gaurav Gupta

Under the guidance of Dr. M. S. Rao, Director-cum-Chief Forensic Scientist, Directorate of Forensic Science, New Delhi, MHA, GOI

ABSTRACT

Dependency of mankind on digital technology is increasing by each passing day. The advent of cheap and sophisticated scanning and printing devices have led to their widespread use by individuals, corporations, and governments. These devices, such as computers, cell phones, digital cameras, scanners, and printers, all contain various sensors, which needs to be identified (detection and fixing) from the perspective of security and forensics. One technique that is used to authenticate a device involves embedding information, or a watermark, into the output generated by the device. This strategy has potential problems in that the watermark could be attacked and/ or privacy issues, allowing untrusted data to appear authentic. Identification through forensic characterization means identifying the type of device, make, model, piece, and other characteristics of the device based on observation of the data that the device produces. The characteristics that uniquely identify the device are called device signatures. There are many scenarios (in security and forensic) in which it is useful to characterize a device. One use is to verify the source/ authenticity and authorship of digital data (photographs/ video/ documents) in a court case. This paper presents a framework for forensic characterization for scanning/ printing devices. The merits of the solution lie in its efficiency and accuracy in detecting and fixing of physical devices from security and forensic application perspective.

2. **Connecting Mobile Ad Hoc Networks to the Internet for Secured Transactions During Disaster Management Operations: The Case of Public Key Infrastructure-Based Key Revocation in India, Existing Problems and a Practical Solution**

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Keywords: MANET, Key revocation, Public Key Infrastructure (PKI), Certifying Authority, Disaster Management.

ABSTRACT

Mobile Ad Hoc Networks (MANETs) have emerged as an emerging technology of popularity for use in disaster management operations, due to their attractive properties such as faster deployment, infrastructure-less setup and self-management. Being able to perform secured transactions via the Internet is very crucial during disasters. In this paper, we study the issue of key revocation in MANETs during disaster management situations, with particular attention to issues that concern the Indian scenario. We discuss the architecture as well as the performance of our scheme compared to the popular existing scheme by considering scenarios and metrics of importance in networks used for disaster management operations. The proposed scheme reduces the time to gain information about the revocation list and ensures availability and, thus, improvement of the system as a whole.

3. A Code Selection Criterion for QS-CDMA System with Channel Overloading

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ABSTRACT

Code selection plays a prominent role in the performance of CDMA based communication systems. In this work, a new criterion for code selection is proposed for overloaded DS-SS-CDMA systems under imperfect synchronization. The criterion is based on a new representation of periodic autocorrelation function for fractional delays limited to chip period. The paper also derives an accurate analytical model for overloaded DS-SS-CDMA system in presence of synchronization error. It is found that the proposed criterion improves the BER performance of the system by 0.9dB at synchronization error of $0.1T_c$, when codesets are obtained from WH matrix of order 64.



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V

ABSTRACTS OF
Oral/ Poster Presentations

1. **iSMART : Next Generation Intelligent Process Control Module with Wireless Connectivity**

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Key Words : Supervisory Control and Data Acquisition, Human Machine Interface, Multi loop Controller, Industrial System Monitoring Autonomous Remote Terminal, Real, Time Operating System

ABSTRACT

In recent years, state-of-the-art Supervisory Control and Data Acquisition (SCADA) Systems are being implemented in every plant, in order to facilitate data acquisition, monitoring, plant control and remote control operations. Industrial Automation Systems acquiring a new dimension due to the fact that support bars have been replaced by new generation intelligent SCADA systems and mini panel and recorders replaced by realistic Human Machine Interface (HMI), are applied with a success in all fields of the current industrial production. The SCADA based control systems offer benefits like higher profit, increased final product quality, minimization of wastage in production, minimization of energy usage and maximization of overall production rate. They can continuously process the operating parameters such as temperature, pressure, levels, flows, humidity, concentration, etc there by finding immense possibilities in the field of agriculture as well.

In this paper, we present the salient features of Multi Loop Controller, iSMART (Industrial System Monitoring Autonomous Remote Terminal), designed and developed by CDAC. The iSMART is equipped with modern data acquisition facilities, new cutting edge control algorithms, and next generation communication interfaces. The iSMART is designed in such a way that it competes with the products of pioneers in automation in terms of the

salient features and tops the above with respect to costeffectiveness. The developed module provides a progressive path of adaptive migration to tomorrow's advanced Automation Systems Technology.

2. Ubiquitous Computing-Programming Issues

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The most important issue that makes it difficult for ubiquitous (pervasive) computing is that the environment contexts of the executing program differ with the nonstop migrating of user, and even the context in a geographical fixed space changes all the time. It makes the operations which include software utilities, devices functionalities, etc. not always available. This requires the program performance to be able to familiarize quickly to new circumstance and deal well with the availability. In this paper we first focus the programming issues like shortcomings of object oriented design applied for ubiquitous (pervasive) computing then propose a new common model named Ubiquitous Computing Programming Paradigm (UCPP). The main feature of this paradigm should be to make it available through automatic fulfilling the developer's original purpose properly based on automatic service. The model should weave context into run-time program dynamically to relax design-time context complexity.

3. Context-Aware Applications

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ABSTRACT

Applications adapts environmental states is called “Contexts” in pervasive computing. Context Weaver is a platform that makes simpler developing of context-aware applications. All providers of context information registered with Context Weaver provide data to applications through a simple, standardized interface. Applications access data sources not by naming particular providers of the data, but by describing the kind of data they need. Context Weaver reacts with providers of context information that may include not only devices, services, and databases external to Context Weaver, but also programmed entities that process context information from other providers. If a provider fails, Context Weaver automatically tries to rebind the application to another provider of the same kind of data. Privacy policies, specified partly by administrators and partly by individuals who are the subject of context information, are enforced by Context Weaver to protect the privacy of those individuals.

4. Threats in LINUX

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KEYWORDS: Kernel hack, Root password hack, Printk, GRUB boot loader, LILO boot loader

Though linux is considered to be the most secured operating system which

has got different users having got different types of permissions respectively, but even in this type of operating system there are threats/loop holes where we can keep hands on for hacking the root password of the server which has both GRUB boot loader and LILO boot loader . The other is an indirect way to hack the kernel i.e., by using using an external software and installing it in our computer so that we can access the kernel .

There are also a few other ways in linux where we can do small hacks in the operating system like using printk which is considered to be the basic for linux hacking and it do prints the message where ever we want.

5. Design of 8 bit Data Path Whirlpool Hashing Core

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ABSTRACT

Weaknesses have recently been found in the widely used cryptographic hash functions SHA-1 and MD5. A potential alternative for these algorithms is the Whirlpool hash function, which has been standardized by ISO/IEC and evaluated in the European research project NESSIE. In this paper we present a Whirlpool hashing hardware core suited for devices in which low cost is desired. The core constitutes of a novel 8-bit architecture that allows compact realizations of the algorithm.

Cryptographic hash algorithms belong to the basic primitives that are employed in numerous cryptographic applications. They are widely used e.g. in message authentication, digital signature, and key derivation schemes. A hash algorithm takes in an arbitrary-length data input and compresses it into a fixed-size output value called *hash*. Compared to the hash algorithms of other fields, the required properties for cryptographic hash algorithms are that they are one-way functions and collision resistant. Cryptographic algorithms are

utilized for security services in various environments in which low cost and low power consumption are key requirements. Whirlpool is a one way 512 bit hash function operating on messages less than 2^{256} bits in length. It consists of iterated application of a compression function based on a dedicated 512 bit block cipher W that uses a 512 bit key that derived from the input data. In this work we choose to design a 8 bit data path in order to minimize the hardware area. Here we present the design and implementation of a whirlpool hardware core for low cost devices.

6. Electronic Instrumentation and Automation of Jute and Coir Processing Systems

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Sr. Scientist (Comp. Appln.)

Dr. Malay Naskar

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Keywords: **Instrumentation, Process Control, Spinning frame, Transducer, Sensor, MIS, Tenacity, Breaking Load, TIV, Microprocessor, Micro Controller**

ABSTRACT

The jute and coir processing machineries have been developed in the early stage of industrialization. The control and measuring systems used in those machineries are mostly mechanical and of pneumatic type having less sensitivity and accuracy. The time response capacities of those machineries

are also very poor. Moreover, no value added items can be produced using those old machineries due to the non-availability of their control features.

7. Underwater Robots for Environment

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ABSTRACT

This paper describes the low cost design, development, and application of a solar powered data acquisition robot having a sensor-actuated network that includes a robot vision system for the sensing and image-processing of the earth's oceans including the aquatic ecosystem. The robot is designed to transmit the exploration or observations back to the base. The solar powered robot system vehicle is used to determine various levels underneath to improve the water quality. This network consists of a set of environmental sensors for real-time, deep underneath to understand the physical and chemical properties. The goal of this design is to obtain a high-clarity observation and image over the time period after which the drilling equipment is used to go deeper to detect the presence of microbial organisms and detect the state of the oceans.

8. Evaluation and Analysis of Fixed, Programmable and Flexible Automation in Electronic Communication and Information Industry

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Keywords : Communication Techniques, Computer Control System, Computer Aided Design, Innovative Techniques, Automation Components & Interactive Graphics.

ABSTRACT

The need of sophisticated interactive graphics, computer controlled machine tools, intelligent robots, improved inspection techniques and host of innovations for the advancement and precision for better manufacturing leads to automation in electronic industry. Automation in electronic industries may start from the procurement of raw materials and continue up to the packaging of the finished products. The electronic communication techniques and use of microprocessors, sensors and the associated software have resulted into the brainstorm development in the manufacturing section. Automation, leads to the greater flexibility in the production systems, increased machine utilization, reduced labor and manufacturing lead time, low inventory and scheduling flexibility. In this paper, the various automation components like Electronic Machine tools, Electronic Material handling system, Computer control system and human labor in Manufacturing are discussed with the advantages of automation as compared to traditional techniques. The paper intends to identify some of the innovative techniques like, the use of DBMS (Database Management Systems) for CAD (Computer Aided Design) systems, used for the automation of the processes in automobile industry and Automation of

pattern designing and generation of subsequent mould in casting industry, with the help of computers and machines. The Automation leads to low cost impact on the manufacturing by saving time, increased production and lesser defects.

9. Location of User in Outdoor and Indoor Determination System for WIRELESS Local Area Networks-LOIDS

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KEY WORDS : WLAN, Access point, Indoor, Outdoor, IAPP

ABSTRACT

In recent years Wireless Local Area Network technology has been gaining popularity around the world with its sub standards IEEE 802.11a/b/g receiving major deployments in many indoor and outdoor environments. The aim of this research is to design and develop useful methods to find location of the mobile users in WLAN. This system uses the radio maps of the location of WLAN in indoor and outdoor environments. In this paper, it is discussed that the creation of two location map types, the first one is the Statistical radio mapping and the second is the Dynamic radio mapping along with implicit and explicit clustering, has also studied the location determination procedures in Indoor and Outdoor environments by these two radio mapping methods. In this paper six different architectures were designed to apply these mappings to find location of the user, where the user may reside. To see and find the location of a user, an application called Sniffer is used; which shows the position of the

user or to whom the user is currently connected in the WLAN. The performances of all the six architectures are compared in both (Ad-hoc and Infrastructure) the modes of operation in WLAN with statistical and dynamic radio maps in Indoor and Outdoor environments. Better results were found in Infrastructure mode operation of WLAN with statistical radio mapping. These results show that the usage of statistical radio mapping is better than dynamic radio mapping in outdoor environment.

10. Spectral Markers for Knotted Core of Proteins

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Key Words : Knot protein, Hydrophobicity, Fourier Transform, Spectral Analysis

ABSTRACT

Only a few percentage of known protein structures have shown knotted configurations in their native fold. Still the functions of these configurations are not understood. Protein knot localization has become possible in single molecule experiments. Here, we investigate peptide knot characteristics in detail with the amino acid indices hydrophobicity and isoelectric point which have crucial role in retaining the stability of proteins. Water capture and release is found to be controllable by the tightening force in knots. In this work we analysed protein sequences having knotted core with the help of Fourier analysis. The set of knot proteins from proteinKNOT web server(pKNOT) has been used for the experimentation.

11. Image Classification using Neural Network

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Keywords: Image classification, Shape features, Artificial Neural Network

ABSTRACT

The ‘semantic gap’ between the visual features and the richness of human semantics about image content is the big challenge for content-based image retrieval (CBIR). With the help of shape features it is possible to bridge this gap. Shape features are giving information that a human normally use to understand and classify the images. In this paper a neural network approach is applied with these shape features to classify the images. The empirical results shows that neural network can be used in image classification. The experiments are carried out on Caltech 101 image dataset. The classification accuracy achieved is 98.75% and 74.28% for training and testing respectively.

12. Some Remedies to Minimize the Pollution due to E – Waste

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ABSTRACT

As software gets more demanding, hardware needs to keep pace. The Government department, Local Authority, Private Sectors involved with large software providers and they find it most economical to replace their equipment

after every few years with new one. With the average of 3 years lifespan of computers, the environmental pollution and human health has become a serious issue. Now a day, it is the demand of time to either reuse or recycled the e-waste. Some toxic substances like lead, cadmium, mercury is dangerous to human health. In this paper, we made an attempt to suggest some remedies, which is helpful to reduce the pollution and also human health problems due to the hazardous substances available in electronic waste materials. Also for the metro cities of India, we have collected the e-waste data for last 4 years and estimated the e-waste in future years, which shows need of quick attention over it.

13. Development of Malayalam Language through Information and Communication Technology

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Keywords: Corpus, WEB 2.0, Frequency, KWIC, N-gram, HMM, PERL, PHP, Python, Ubandu

ABSTRACT

Information and Communication Technology is becoming an indispensable part for the analysis of a language and the development of Language tools which aims to enhance the society with knowledge. Malayalam Language also requires sophisticated computational techniques to understand the underlining linguistic features. Corpus developed for Malayalam from web sites are analysed using statistical techniques like frequency count, KWIC, n-gram etc. This paper discusses the use of web based corpus analysis with statistical methodologies which makes the language more acceptable to the society. Experiments are done with free open source software (Perl) in Linux environment.

14. Data Hiding Technique in Wavelet Domain

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ABSTRACT

Steganography is the art of hiding a message signal, such as audio, video, still images and text document without any distortion of the host signal or image. The advantage of steganography, over cryptography is that messages do not attract attention to themselves. Cryptography protects the contents of a message whereas, steganography can be said to protect both messages and communicating parties. The goal of steganography is to avoid drawing suspicion to the transmission of a hidden message in multi-medium.

This project aims in hiding the presence of a secret image within a cover image. The secret image is compressed using wavelet transform and then encrypted using RSA algorithm and is hided within a compressed cover image and the stego-image is transmitted. At the receiver end, the secret image is obtained by decryption and decompression and the cover image is obtained by decompression using inverse wavelet transform. The wavelet transform has the advantage of lossless compression and the proposed RSA algorithm is very effective in encryption and decryption of message. This type of data transmission finds applications in fields where higher degree of secrecy is required.

15. Otoacoustic Emission Analyzer Using Smartphone

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ABSTRACT

Hearing loss is one of the pathologies with the highest prevalence in newborns. If it is not detected in time, it can affect the nervous system and cause problems in speech, language and cognitive development. The recommended methods for early detection are based on oto acoustic emissions (OAE) and/or auditory brainstem response (ABR). National Institute of Speech and Hearing (NISH) use Oto acoustic emission analyzer to test audibility of infants. Presently the instruments used are imported and are costly. If such instruments can be developed in house at a low cost, they can be positioned in all district hospitals. This will be beneficial for the common man in rural areas to correct the hearing problems in children as corrective action is possible below three years of age. A Cell Phone as a Platform for Healthcare will be inexpensive. Mobile phones provide immense possibility for development of socially relevant, cost effective, portable instruments. Cell phones known as smart phones have high computing power, memory, communication facilities, interfaces and an operating system. Standard PC based development platforms are available for application developers for implementing the required functionality in standard programming languages like C++. This paper addresses the requirements of hardware and software and the process involved in the realisation of a low cost acoustic emission analyser.

16. An Encryption Technique Through Bitwise Operation of Blocks (BOB)

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Key words: **Bitwise Operation of Blocks (BOB), Cipher text, Block cipher, Session Key.**

ABSTRACT

The technique considers a message as binary string on which a Bitwise Operation of Blocks (BOB) is applied. A block of n bits is taken as an input stream, where n varies from 4 to 256, from a continuous stream of bits and the technique operates on it to generate the intermediate encrypted stream. The same operation is performed repeatedly for different block sizes as per the specification of a session key of a session to generate the final encrypted stream.

It is a kind of block cipher and symmetric in nature hence, decoding is done following the same procedure. A comparison of the proposed technique with existing and industrially accepted RSA and TDES has also been done in terms of frequency distribution and non homogeneity of source and encrypted files.

17. Cloud Computing the Biggest Thing Since the Web

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ABSTRACT

Cloud computing, a computing platform for the next generation of the Internet. The paper defines cloud ,applications, outlines of cloud architecture ,conclusion and future work. A cloud computing platform dynamically provisions, configures, reconfigures, and de-provisions servers as needed.

Cloud applications are applications that are extended to be accessible through the Internet. These cloud applications use large data centers and powerful servers that host Web applications and Web services.

18. Spatial Health Information System in the Light of the National Health Bill 2009: A Bottom-up Approach

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Key words: **Spatial Health Information System, Public health management**

ABSTRACT

Indian health infrastructure and services are much below the acceptable standards of quantity, quality and accountability. Poor governance system and

poor knowledge management are the major concern for public health delivery in India. Public health management needs information on various aspects like spatial pattern of prevalence of diseases, and availability of health infrastructure in order to take decisions on either creating additional infrastructure, or for taking immediate action to control epidemics, or other diseases. The National Health Bill 2009 has provision for creating health information system. However, it does not provide much detail about how to create the health information system. The present paper details out Spatial Health Information System (SHIS) with a bottom-up approach. The proposed SHIS will have the following six sub-systems:

- Monitoring system;
- Data aggregation system—data movement from sub-centres, primary health centres, community health centres, and private hospitals/ dispensaries to the servers of District Health Departments;
- Data management system—with a provisions of interaction with the servers of District Health Departments, State Health Boards, National Public Health Board, and National Spatial Data Infrastructure;
- Model management system;
- Spatial dialog management system; and
- Web-enabled client interfaces for various stakeholders.

19. Clustering Iris Data Using Supervised and Unsupervised Learning

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Keywords : Data Clustering, Supervised Learning, Unsupervised Learning, Fuzzy C- Means Clustering Algorithm, Feedforward Neural Networks, Cluster Shape.

ABSTRACT

In this paper, data clustering using supervised and unsupervised learning is implemented. Clustering is the unsupervised classification of patterns into groups. i.e. to partition a dataset into homogeneous groups which gather similar objects. Object similarities or object dissimilarity is expressed in terms of some distance function. To do this, the nature of Iris data base is studied and it is observed that the Iris Setosa is much smaller than others, and Iris Virginica is smaller than Iris Versicolor. So it is easy to distinguish Iris Setosa with others. However, the separation between Iris Virginica and Iris Versicolor is not obvious. To measure degree of dissimilarity between pair of patterns four dissimilarity methods are used. To extract the dissimilarity relation directly from the Iris flowering data, feedforward neural network is used with some pairs of points with known dissimilarity. Then, the dissimilarity measure generated by the network is used to guide unsupervised relational clustering algorithm for clustering. Fuzzy C-mean clustering algorithm is used based on attributes sepal length verses sepal width and petal length versus petal width for each dissimilarity methods. It is observed that the points are correctly classified into three clusters i.e. Iris Setosa, Iris Virginica and Iris Versicolor when the feature is petal size.

20. Ionic Transportation and Sensational Information's in the Bioactive Polymers.

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ABSTRACT

Matter reflects in smaller units as atoms and molecules with the states of fluids and solids. The life complex molecules exhibit the special property of growth and sensational moments every matter has unique in nature and secrete of the life lies secret only. The life is complex structure made up of smaller unites called monomers. The natural polymers with special metabolic activities of mobility, diffusion due to polar molecules and dielectric properties. The electro positivity and negativity always influences the transportation of the ions from end to end. The particular ions with its atomic mass exchanges the information's. This is very interesting in case of cell structures.

The molecules of the fluid in acidic and basic state plays key role in every process. The PH of aqueous solutions main role in metabolic activities. Which is a temperature dependant directly affects the bimolecular process. The P^H of the blood in Venous limits 7.36 to 7.4 and of arterial 7.38 to 7.42. The buffering systems are H₂CO₃, HCO₃⁻, HPO₄⁻, H₂PO₄⁻, HBO₂, HHBO₂ HB⁻, HHb, potentates and protein present in blood and lymph and spinal fluids and exudates Water is nothing but H⁺ and OH⁻ ions acts as universal solvent. Biological fluids contains Ca⁺², Na⁺, K⁺, Cl⁻ HPO₂₄, HCO₃ with several other trace elements and compounds. These ions activities determines rate of reaction and chemical equilibrium The difference of concentration gradient and equilibrium position attains by diffusion, osmosis through the cellular membrane. Proteins are polymers of amino acids and non polar side chains, neutral side chains. The synthetic polymers like PMMA and PVA which are using bone cement and wound healing hydro gels in bio cells shows some strange properties. Every ionic transportation exchanges the new information.

21. Mineral Information Management System (MIMS) of Mineral Resources of Jharkhand: A Pilot Study for Bauxites

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KEYWORDS: Mineral Information Management System (MIMS), Web Technology e-Knowledge of Bauxite, Natural Resource, Jharkhand

ABSTRACT

Mineral database as available in the country needs revision and proper dissemination of these information are realized by the industries. An attempt of preparing a Mineral Information Management System is in progress. A bit of study for the for the Bauxite resource data of Jharkhand is presented here.

22. Question Box: Bridging the Information Gap with Voice

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Key words: Knowledge management, South Asia, Development Studies, Information Systems, ICT, Convergence.

ABSTRACT

Question Box Project is a solution that brings much of the information on the Internet to those who will likely not have access any time soon, or perhaps

in their lifetime. Question Boxes are phone-based hotlines manned by a live Operator that allow users to ask almost any question searchable on the Internet. This simple and innovative system relies on verbal communication rather than written, is very easy to use, and by its presentation offers a very low barrier to exploration and access. This paper describes the pilot use of Question Box in greater New Delhi, India, where two Question Boxes were trialed in rural villages.

23. E-readiness: Its Impact on Agricultural Sector of Orissa

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Keywords: E-readiness, Agriculture, Internet, ICT, WWW

ABSTRACT

The Information and Communication Technology (ICT) sector as a whole (telecommunication, broadcasting, computer hardware/software and related technologies) has emerged as a strategically important sector driving social and economic changes in India. Now a days, ICT is considered as a catalyst for social transformation and national progress. The disparities in levels of ICT readiness and usage could translate into different levels of productivity and hence, could influence a country's rate of economic growth. Understanding and leveraging ICT is critical for nations striving for continued economic progress.

During the last decade, one can observe that the progress in ICT is affecting all spheres of our life. Such IT based developments provide new opportunities to improve the utilization and performance of livelihood through the agriculture, education, health, medical services and artesian technologies. In this direction, our research interest like e-readiness focuses on analysis of the impact of ICT on agriculture sector.

24. The New Paradigm Shift in High Performance Computing: Clouds

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Keywords: **Cloud, Community, Server, Utility Computing.**

ABSTRACT

Early time-sharing systems allowed users in a community to do their computing all in one place. “Cloud Computing” creates the same kind of functionality by supporting homogeneous access to applications and data in the internet “cloud,” creating a national, even international, community. Cloud computing has become a major force for change in how web design, configure, provision, and manage IT infrastructure. This style of computing combines current notions of service orientation. It focuses on potential cost savings, has obscured the true benefits it can offer. With the explosive growth of Internet-connected devices. Cloud computing focuses on the user, and offers highly efficient acquisition and delivery of IT and information services, Starting from the review of Cloud Computing, this paper covers the changes and improvements that have been made in Cloud Computing and growing range of possibilities in Cloud Computing.

25. UML Based Approach to Find the Objects for Software Reengineering

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Key words: **Partial Reengineering, UML, RRC, RRCM.**

ABSTRACT

During software development, the maintenance and reengineering models are crucial. They are used to describe and validate software system. Unified Modeling Language (UML) is a modeling language, and provides a wide array of diagrams that can be used at analysis and design of software system. It is used to create visual model of software system. UML class diagrams are one of the most important tools for both requirements analysis and design of object oriented software systems. With the help of UML one can visualize and analysis the object for the purpose of software reengineering.

26. Development and Tryout of an Interactive Computer Aided Learning Tool for Correlation and Regression Concepts in Statistics for Undergraduate Students.

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Key Words : Training efficiency, Computer Aided Multimedia Tool, Worked–out examples effect, Concepts in Correlation and Regression Analysis

ABSTRACT

This study investigated the extent to which instructional format had an impact on training efficiency among undergraduate students in learning correlation and regression concepts. The investigations were carried out in order to test the effectiveness of teaching learning process method by means of worked-out examples.

It was hypothesized that studying correlation and regression topic with the help of worked examples that are presented using computer aided multimedia tool is a more efficient than studying conventional chalk –board method . The study was based on the sample consist of 66 undergraduate students of science faculty which was divided in two homogeneous groups.

Participants of experimental group were trained using multimedia tools and Participants of control group by conventional method. Subsequently, they had to solve a series of test problems. Dependent variables were perceived as performance on the test.

Results showed that performance of experimental group (computer aided multimedia tool used for teaching) was better than the control group. The study comes to the conclusion that multimedia-based instructions seem promising for the undergraduate students for learning correlation and regression concepts.

27. Content Based Image Retrieval System Using SOM and Feature Extraction

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ABSTRACT

The success of digital revolution and the growth of the internet have ensured that huge volumes of high-dimensional multimedia data are available to all users. It leads to the problem to mine useful information or patterns from the huge datasets. Data mining refers to this process of extracting knowledge that is of interest to the use. Traditional data mining techniques have been developed mainly for structured data types. The image data type does not belong to this structured category, suitable for interpretation by a machine and hence the mining of image data is a challenging problem.

Accordingly, in image mining, an image retrieval system is a computer system that can browse, search and retrieve images from a large database of digital images. This research work is aimed at compression and retrieval of images from large image archives. A Kohonen Self Organization Map approach using content categorization, including feature level clustering, is developed to provide a differential compression scheme. It ensures that the visual features are mapped to codebooks, which significantly speed up content-based retrieval. The interaction between compression and content indexing are proposed, which include techniques for feature extraction, indexing, and categorization.

K-means clustering algorithm is used to build the feature cluster. This will create various number of clusters based on the feature vectors, and it increases the compression efficiency by limiting the variance of images within each clusters. This approach leads to the similarity matching based on shape and texture, which supports functions like “query by example”. Experimental results demonstrate that the proposed method can improve the compression ratio compared to VQ. And it is efficient in terms of retrieval time as the average retrieval time is less than 2 sec.

28. Application of Red Tacton in Human Area Networking

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Keywords : Human Area Networks, Red Tacton, Naturalness, Inevitability, Sense of security

ABSTRACT

Communication between people and objects of various source has emerged of great importance. Thus for communication to be user-friendly to everyone, we require technology and its advancements day-by-day. Focusing on the naturalness, inevitability, and sense of security conveyed by touching in everyday life, this paper describes human area networking technology that enables communication by touching, which we call Red Tacton . Here, the human body acts as a transmission medium supporting IEEE 802.3 half-duplex communication at 10Mbit/s. The key component of the transceiver is an electric-field sensor implemented with an electro optic crystal and laser light. Human Area Networks (HAN) for connectivity to personal information, media and communication appliances within the much smaller sphere of ordinary daily activities— the last one-meter. In the past, Bluetooth, infrared communications (IrDA), radio frequency ID systems (RFID) were used. The physical resistance offered by the human body could be used to create a virtual keyboard on a patch of skin. The skin can be used as a power conduit and data bus. The body may be that wide variety of living animals and need not be limited to being a body of a human being. Typical applications of Red Tacton includes in health services, Defense applications at war fronts, advanced space research etc. Thus this paper presents the Human Area Networking technology that enables communication by touching.

29. SVM Based Classification of Unknown Genomes Using Chaos Game Representation

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Key Words: Chaos Game Representation, Genomic Signature, Mitochondrial Genomes, Support Vector Machines

ABSTRACT

Classification of species from fragments of its complete genome is an area in bioinformatics, having various theoretical and practical applications. Experimental and computational methods have been reported for such classification. This paper proposes a novel combined technique of Chaos Game Representation (CGR) and Support Vector Machines (SVM), the former for dimensionality reduction and feature selection and the latter for subsequent species classification. The genome fragment is initially mapped into its Chaos Game Representation format. A Frequency Chaos Game Representation (FCGR) is computed with order 3 resulting in a $2^3 \times 2^3 = 64$ element feature vector. The size of the feature vector is reduced to 16 taking into consideration the fractal nature of CGR. Classification using SVM is performed on both 64 element and 16 element feature sizes. 7 categories of phyla from NCBI are used for the study. Accuracy of above 99% was obtained for Deuterostomia, Acoelomata, Cnidaria and Porifera, 93% for Pseudocoelomata while, Plant and Fungi gave an accuracy of 80%.

30. Handling and LOG Exploitation to Seize Evidence

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Keywords: Log Files, Event Log, Intrusion Log, Network Log, System Log, Web Log, Log Manipulation.

ABSTRACT

Logs are one of the most fundamental resources to any security professional which is not being illegally accessed or manipulated. The attackers may try to remove the trespassing activity or try to manipulate with the maintained log because the attacker do not want to leave any evidence of his crime. We protected the log information by applying the DES encryption algorithm where the attackers query to see his information becomes unusual. When the user wishes to retrieve any trusted information is treated as illegal access and his details will be maintained in another log like his IP Address, Date and Time, Source Port and Destination Port etc. We develop a system to handle unauthorized manipulation of Log and protect the Log information from unauthorized access and also provide sufficient information to the law enforcement agencies against the attack. We maintained an intrusion log that keeps the information about the illegal access of the log by the number of illegal users. The information in the intrusion log becomes the potential legal evidence about the illegal access of the attacker in front of judiciary.

31. Detection of DNS Cache Poisoning Attack on Web

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Keywords: **DNS Cache Poisoning Attack, DNS reply, TTL, Request transaction ID, Reply transaction ID.**

ABSTRACT

Many security systems, whether they protect privacy, secure electronic-commerce transactions, or use cryptography for something else, do not directly prevent fraud. Rather, they detect attempts at fraud after the fact, provide evidence of that fraud in order to convict the guilty in a court of law, and assume that the legal systems will provide a “back channel” to detect further attempts. We believe that fielded systems should recognize this fundamental need for detection mechanisms, and provide audit capabilities that can survive both successful and unsuccessful attacks. We studied the behavior of the DNS Cache Poisoning attack and formulated the algorithm based on packet header to detect the threat. The information about the attack is maintained in a log for the evidentiary purpose in the court of law. Hence the work is embodied with the appropriate results.

32. Anonymous ID Based Signcryption Scheme for Multiple Receivers

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Keywords: **Signcryption, Ring Signcryption, Multi-receiver Signcryption, ID based Cryptography**

ABSTRACT

Anonymous signcryption is synonyms of ring signcryption which provides anonymity of the sender along with the advantages of signcryption. Multi receiver signcryption is suited for situation where a sender wants to send a message to multiple receivers in the confidential and authenticated way. This paper proposes an identity based anonymous signcryption scheme in multi-receiver setting. It also provides proofs of provable security of the proposed scheme under some computationally difficult problems.

33. An Efficient and Publicly Verifiable Id-Based Multi -Signcryption Scheme

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ABSTRACT

Multi-signcryption is used when different senders wants to authenticate a single message without revealing it. This paper proposes a multi signcryption scheme in which no pairing is computed on the signcryption stage and the signatures can be verified publicly.

34. **Dynamic Update of Link Costs with Change in Network Hiding data in a .bsq file: A Concept of Steganography**

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Keywords: Image Files, LSB Substitution Method, Graphics Functions, Integrated Development Environment

In this project an attempt has been made to work with image files which are used to hide some secret data in the image files and by retrieving the same stored information from that file, and simultaneously displaying on the screen. This concept is implemented using LSB substitution method. Insight understanding is acquired in handling of the files for various windows environment which deploys various file formats, as knowledge of windows file formats and file handling is required for this project. With the file-handling concept, graphics functions were also studied. The resources used include 'TC' as the Integrated Development Environment, and the platform, for which the software has been developed, is Windows 95 or later, or Windows NT 4.0 with NT Service Pack 3 or later.

35. Traffic (Load), in Distance Vector Routing (Using Network Simulator-2)

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Keywords: Tool command language, Network load, Link cost, NAM, TCP & UDP Agents (Traffic Generator), Network Simulation, NAM Trace File, NS Trace File

ABSTRACT

This project addresses the simulations of routing protocols with Network Simulator 2. In routing, a routing table specifies the optimum path for the packet and this table may be static or dynamic. Here, different unicast routing protocols using NS2 and influence of dynamic connectivity on the routing will be examined. We compare static routing with dynamic distance vector routing. We did simulations of distance vector routing where variation in distance (in terms of cost) reflects a change of path by which the packets move from source to destination. So a variation of link cost manually by simulation code is done and based on that routing paths will be altered (as network load changes, the optimal path will also change). But, if we can devise a procedure that will dynamically update link cost depending upon the changes in network load that will be much more effective. Our aim is to implement that will make the routing completely effective and dynamic, its resultant behavior being shown by NS2. The key advantage of using NS2 is that it helps us to simulate real world networks. The process of model modification is relatively cheap and fast. It helps to predict network behavior and allows testing new protocols in a reproducible environment.

36. I.T. Education and Industry Needs Industry Academia Interface

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ABSTRACT

Information Technology has emerged as a dominant sector of the Indian Economy. Various agencies in India and abroad have identified a wide gap between supply and demand of human resources for the growth of I.T. Sector. The issue of human resource development for I.T. is a complex problem and can not be addressed through a linear cause effect model. The traditional education system in India is based on maximum theoretical concepts and algorithms. From last 20 to 25 years, people working in the industry have been well versatile with I.T. application to some Extent. The industry demands more “Techno Managers” who have good knowledge of Technology and are well versatile with managerial skill. The Engineering mind-set generated by formal education helps the I.T. industry to transform Engineers from diverse disciplines into software Engineers. Industry wants formal education to concentrate on a body of knowledge that is permanent in nature. Training in educational institutes is best done with the help of industries for actual implementation of the work carried out by individuals. The industry academia interface is all about knowledge transfer and technology transfer. The academic creativity should be transferred to industry which has the role of converting ideas to Products for society’s use. Educational institutes and industry alliance is a productive interface in the present times of knowledge economy. This interface creates a synergy which is critical requirement for the continuing health of country’s business strengths. The academic process of creating I.T. Experts should be in tandem with industry’s requirements and this necessitates a continuous cross flow of knowledge and practice between industry and academia. This stress the academia and the industry onto a common Platform and affect an easy course of movement for the students from Campus to Corporate. With this regard, I would like to say “Introducing maximum laboratory courses will become the site for true Information and Communication

Technology learning and teaching”. The academia is the reservoir from which we can create trained, skilled and technical manpower and this is facilitated only with a successful academia – industry partnership.

37. Real Time Deployment with Warning System using WSN

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ABSTRACT

The objectives of this paper is to deploy a wireless sensory network using strain gauges and analyze the performance of it, at different conditions and make the communication from those sensors in an optimized way so that sensing can be done in an economical way. As the name suggests, the deployment of a WSN including strain gauge sensors can be done, and the performance analysis is also done to know the behavior of the bridge at various site conditions. This paper is concentrating on different modules, and it deals with a complete sensing mechanism that can send the monitored data to all over the world, so that anyone can access and analyze at any time. The efforts of this study have been chiefly focused upon two aspects; how efficiently the bridge behavior can be studied if the sensors are placed wirelessly and how the sensor performance varies with different conditions applied to it.

38. ICT: Trends and Issues

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Information and communication technology (ICT) is playing a vital role in advancing economic growth and improving governance. The potential impact that ICT can have on individuals, businesses, and governments depends largely on how policies are formulated and technology and markets evolve. Thus, it is important for countries to possess timely ICT data and benchmarks to facilitate policy making that extends the reach of ICT and increases its development impact.

ICT development is multifaceted, ranging from the rollout of telecommunications infrastructure- providing voice, data, and media services- and information applications tailored to specific sectors and functions (for example, banking and finance, land management, education, and health) to the implementation of electronic government (e-government) and the development of information technology (IT) and IT-enabled industries (including IT goods and services). There are many opportunities for developing countries to advance development through the innovative use of ICT. Banking services and job search text messaging services delivered through mobile phones and portable devices used by farmers and fishermen to track crop prices and market demand are a few examples that are changing the lives of people in developing countries.

The present article uses the data from the AAG tables to demonstrate the progress that many developing countries have made in recent years in improving ICT access, use, quality, affordability, trade, and applications, and to show how that progress relates to enabling policies and regulations.

This ICT trends analysis and the ICT at-a-glance tables use standard World Bank income and region classifications. For income classification, every economy is classified as low income, middle income (subdivided into lower middle income and upper middle income), or high income based on Gross National Income (GNI) per capita. Region groupings only low- and middle-income economies and are based on the World Bank's operational regions, which may differ from common geographic designations.

39. Knowledge Grid In University Libraries of Chhattisgarh

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**Keywords : MIS, Performance Measurements, Resource Sharing,
University Libraries, Knowledge Grid.**

ABSTRACT

Management Information Systems are tools designed to improve management decisions. A changing user population, technology enhancement transformation of scholarly communication system, digital libraries, new approaches to management, renewed commitment to planning and assessment, financial constraints, declining budget, information gluts, constant change in IT, web services, reader's expectations for 24 x 7 services, time shortage etc are compelling MIS to be mandatory in libraries. The present study offers measures to library effectiveness and automation, offers tools for better reader services through integrated and collaborative working of neighboring libraries, and projects Management Information System as the tool for realizing expectations from libraries of modern world.

As per guidelines of National Knowledge Commission Report 2009 , UGC and NAAC recommendations, creation of Knowledge Grid and resource sharing among university libraries of Chhattisgarh has been suggested. Present status of MIS in 8 University Libraries of Chhattisgarh has been studied and model has been proposed for MIS and resource sharing among them. Impact of IT on libraries, exponential growth of information, applications of MIS in libraries, and its significance and performance measurement has been elaborated. A Software has been designed that enables MIS through integrated database.

40. Application of Mathematics in Computer Programming

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ABSTRACT

Now a days many programmers work to reduce the program coding and increase the efficiency of the program. Arithmetic operations are calculated faster than the Logical Operations.

Introduced here how one can reduce length of program using mathematical formula. Implementation of mathematics in computer science to develop powerful coding is one of the aim of my project. By using it we can get best performance for time & space complexity.

41. Developing an Expert System for Fitness Assessment and Management for School Going Children and Youth

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Key Words: **Fitness Assessment, Health Related Fitness, Children Fitness, Fitness Indices, Customized Fitness Prescription**

ABSTRACT

Present study is an effort to develop a comprehensive fitness assessment and monitoring system for school children and youth in 7-20 years age categories(Margaret, 1995; Lea and Febiger, 1991; Balke, 1963). The system

so developed has been named as FitnessWatch. The system is based on assessing the health related fitness components like cardio-respiratory endurance, muscular strength, muscular endurance, flexibility and fat percentage. In developing this system the statistical indices were constructed to quantify the muscular strength, muscular endurance and fitness status of an individual.

The Fitness Watch system generates the tailor-made computerized sheets pertaining to fitness status, identifies the problem areas and provide the customized story for being in the different fitness zones on different parameters. Further it generates the customized fitness prescription for an individual, based on his/her present fitness status. The system encourages an individual to be in the healthy fitness zone all the time. For each individual 'FitnessWatch' generates comparative analysis sheet of fitness status at two different time period after following the schedule. 'FitnessWatch' provides enough motivation to an individual to maintain healthy body by providing their fitness status by means of total fitness scores (Porter, 1988) and fitness reports. Total fitness score explains overall fitness status of an individual. It is not merely an average of the scores on all the fitness parameters but has been computed by using a statistical model giving different weights. The report on possible effects due to different fitness status of an individual makes one realize as to how important it is to improve your fitness level on different fitness parameters.

'FitnessWatch' is not merely a fitness monitoring system but also encourages enjoyable regular physical activity. Besides testing fitness status, it helps an individual to observe exercise program into a lifetime habit. One of the main advantages of 'FitnessWatch' is its easy administration in different age categories. It could be used to test the effectiveness of the fitness schedule offered by the fitness expert to an individual.

'FitnessWatch' has been designed for the mass population with a view to encourage them to maintain healthy lifestyle for enhancing their productivity level. This system is applicable for the mass population. It focuses on such parameters, which are useful for carrying out day-to-day activities more energetically with the surplus energy left towards the end of the day for leisure activities.

42. Advanced of Information Technology and its Impact on Epidemiology of Cancer in India

Pranay Kr. Singh

ABSTRACT

Cancer is a class of diseases in which a group of cells display uncontrolled growth. Cancer may affect people at all ages, causes about 13% of all human deaths. Cancer scenario in India is quite alarming with nearly 25 lakh patients in the country currently suffering from the deadly disease. The Indian council of Medical Research (ICMR) initiated a network of cancer registries across the country under the National Cancer Registry Programme (NCRP) in December 1981. Compared to developed countries overall there are less cancer cases in India but this could be due to under diagnosis and under reporting. This article focuses on the steps in directions of cancer awareness and reporting in early stage for treatment by the advancement in new domain of Information Technology.

43. Role of IT in Removal of Corruption

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ABSTRACT

Corruption is defined as lack of integrity and honesty in an organization. It is present every where, it can be found in all spheres of life from lower to higher levels in public offices, private organizations and politics. Corruption thrives on opacity. This is today's need to have a system which can bring

transparency so that corruption can be removed. Transparency means; governance which gives access to government facility freely and institutions that respond to the citizen; freedom of information laws; protection of public interest disclosure (whistle blowing) a free press practicing investigative journalism, and a lively civil society sector campaigning for openness of all these kinds. The IT can be used in incorporating methods to stop corruption but we also have to work to make the information reach the poor people as they are poor in information also. Media which is also part of IT should be used to overcome these difficulties and weaken the hold of corruption from the world as corruption is universal. This paper presents various means through which we can bring transparency in governance in different government institutions, private institutions etc.

44. VoIP Services on Mobile Phones

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ABSTRACT

In today's fast-paced global environment, employees need to communicate and collaborate wherever their work takes them, VoIP (Voice over Internet Protocol) service, a rapidly emerging technology for voice communication makes this possible by enabling dispersed individuals to operate as cohesive teams. In this presentation transcript, we will examine how latest technology of VoIP services on mobile phones have superseded PSTN (Public Switch Telephony Network) VoIP comes with a host of advanced communication features, leading to greater financial savings. We believe that this study can be of great use in designing a better voice service in current or next-generation heterogeneous networks.

45. Reverse Engineering the Brain

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ABSTRACT

One of the major challenges for us in this 21st century is the “reverse engineering problem” in systems biology. It is about unraveling of the web of interactions among the components of protein and gene regulatory networks, so as to map out the direct or local interactions among components. These direct interactions capture the topology of the functional network. An intrinsic difficulty in capturing these direct interactions, at least in intact cells, is that any perturbation to a particular gene or signaling component may rapidly propagate throughout the network, thus causing global changes which cannot be easily distinguished from direct effects. Thus, a major goal in reverse engineering is to use these observed global responses-such as steady-state changes in concentrations of active proteins, mRNA levels, or transcription rates - in order to infer the local interactions between individual nodes. One approach to solving this global-to-local problem is the “Modular Response Analysis” (MRA). We have already begun, in fact, to reverse engineer the brain. If we separate this task into two broad categories – hardware and software – both have progressed very far but still have a long way to go. By “hardware” I mean how the neurons and other brain cells work together to create memory, information processing, and sensory perception – how does the brain physically work. By “software” I mean what information is actually in the brain and how that information and different processing areas work together to produce the net effects of mood, thought, and behavior.

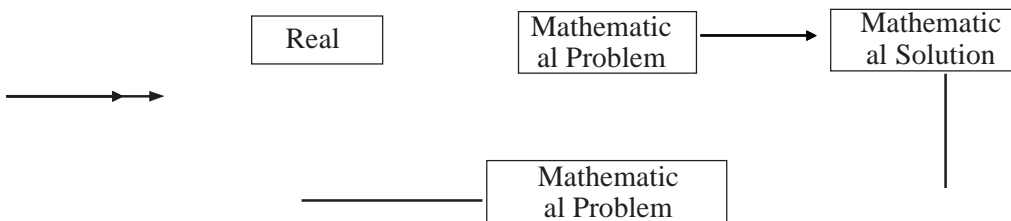
46. New Techniques of Mathematical Modelling for Information and Communication Sciences

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ABSTRACT

Mathematical modeling essentially consists of translating real world problems into Mathematical problems, solving mathematical problems and interpreting these solutions in the language of the real world and is very useful for information and communication science.



A real problem, in all its generality can seldom be translated into a Mathematical problems and even if it can be so translated it may not be possible to solve the Mathematical problem for Information and Communication Science.

The above fact is expressed figuratively by saying that we catch hold of the real world problem in our teeth, dive into the Mathematical ocean, swim there for sometime and we come out to the surface with the solution of the real world problem with us.

47. Role of Computer in Education System at School, College and University for Development of Scientific Knowledge

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Keywords: Computer, MS- Excel, Power Point, Internet, C+++, Java, E-Mail, Education School, College, University, Modern Age.

ABSTRACT

An intensive survey shows that by utilizing computer system in education curriculum in both school and colleges, it has been observed that most of the students were make brilliant results in their examinations in different phases of their education systems/different examinations in their classes in schools, colleges and universities. By prepare their study materials for applying their daily class works or at home works. They can also prepare other social works by the help of computer. The object of the present investigation was to study the effect of computer application in modern education system both in school, college and university level for enrichment of their scientific knowledge.

48. Counter Propagation Network by Recognizing Animals

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ABSTRACT

In computing world day by day great challenge and R and D in latest technology because Technology is hybrid. Research is seeing Man and Machine jointly. Pattern recognition is one of the major applications of neural networks. There are many network model used for pattern recognition using pattern recognition concept, an attempt has been made to train the network to identify the animal. It is achieved by providing the special features and behaviors of an animal. The characteristics are trained and recognized using the training algorithm of this network. In general, Counter Propagation networks use to compress, approximate or associate patterns. There are two types of counter propagation network such as full counter propagation and forward only counter propagation. This paper is concerned about the forward only counter propagation network.



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