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PRESIDENTIAL ADDRESS

President : Vineet Kumar

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**Information Technology Empowering People and
Transforming Society**

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Information and communication technologies (ICT) have brought down walls across the world - people in developing or developed markets are now just a call or a click away. It will get even smaller. Over the next few years the ICT industry will connect many more users through mobile, wireless broadband and fixed broadband systems. **By 2015, five billion users around the globe will be connected through devices of various sizes and dimensions and through different modes of communication.**

The urban divide stands out as one of the major paradoxes — some would say scandals — of this early 21st century. After all, cities concentrate what has become known as the “urban advantage”, namely, a bundle of opportunities which, from basic services to health, education, amenities and gainful employment, have never been so favorable to human development. Yet all too frequently, cities also concentrate high, unacceptable degrees of inequality as these opportunities elude major segments of the population.

More often than not, the bumpy stretch of mud that passes for a street will lead to a slum — the cruellest form of urban divide. The other paradox — or scandal — of early 21st century cities is that the opportunities that come with the “urban advantage” are often closed to women, children and young people with vital roles to play in our collective future. Beyond livelihoods, health and personal development, the whole continuum of deprivations that characterizes the wrong side of the urban divide has a tangible impact on bodies and minds, stunting the physical and intellectual potential of millions among present and future generations.

Even though India reduced poverty rate by 10% since 1990, the situation stays challenging and the poverty has stagnated at 33%. The development challenges in India get further aggravated by an estimated 75% Indian population without access to affordable essential drugs; 16% people without access to water and sanitation and 54.7% population without access to electricity.

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Biology teaches us that as tiny as technology has become, there is still plenty of room for further shrinkage. Each chromosome in your body contains the digital equivalent of around 300MB of data. That's a 100,000 page document or around 10 minutes of HD video - millions of times the density of the highest capacity digital storage devices.

Sure, technology will continue to shrink while packing in even more powerful, bandwidth-hungry features. What's more, as the world emerges from a global recession, the demand for services, and bandwidth will likely start to grow at an even faster pace. Operators, rush to invest in infrastructure to deliver more bandwidth will, in the future, clash even more conspicuously with their struggle to maintain profitability. The world might be shrinking, but there is no doubt that the challenges keep growing.

To enable this transformation, the industry will first have to tackle a few challenges. Expanding into emerging markets, where most of these new users will come from, will be difficult due to the absence of an ICT infrastructure. The connectivity revolution will not only have to address, but also drive environmental sustainability, and consumer demand for better services will have to be met while keeping costs low.

Shrinking equipment - smaller, energy-efficient PCs, mobile handsets and new category of devices in-between the two - are coming to the aid of industry in addressing these challenges. Based on their requirements, users today can choose from a variety of affordable devices offering remarkable functionality. The underlying communications networks, too, are getting smaller and smarter. From smaller base stations to flatter architectures, and from PC-based access points to femto cells, network technology is rapidly evolving to support the emerging needs of the industry.

Some of us still remember the vacuum tubes in our parents' TVs. Eventually, the tubes were replaced with dozens of components each the size of a breath mint. Then microprocessors came, which today can pack billions of components (stop and think about that) into a chip the size of your fingernail.

The incredible pace of shrinking technology has created new possibilities that were once only science fiction.

We take so many things for granted today which were impossible ten years ago, like slipping a smart phone into a pocket, reading a novel on a book-sized computer, or downloading a high-definition movie in minutes and watching it on a crystal clear TV that is light enough and thin enough to mount on the wall. Shrinking technology has made it all possible; but at what cost?

Rural markets - connecting the unconnected

Around half the world's population - almost three billion people - live in villages where telecoms infrastructure is limited or non-existent. In many countries, more than 80 per cent of the rural population has little or no access to communication technologies.

Rural connectivity is crucial because it brings immense socio-economic benefits to users. Numerous studies have shown that affordable access to connectivity leads to greater social inclusion and speeds up social and economic development. For instance, mobility in rural areas can improve healthcare by making it easier for people to access professional help and enabling more effective co-ordination between healthcare professionals in remote locations. Already, text messages are being used in South Africa to encourage people, especially those in remote areas, to get more information and counseling on HIV/AIDS. Similarly, communications technology can support and improve the education infrastructure in villages.

However, the costs and logistical challenges involved in building and maintaining networks in remote locations can be prohibitive. Service providers require innovative solutions to provide access to connectivity to rural users who can only afford to spend US\$2-3 per month. In addition, any viable business model for the rural markets has to include relevant, targeted, services and applications that make a difference to the end-users. Rural connectivity also requires the support of the local community so that the model can be self-sustaining.

One solution currently employed in emerging markets uses compact GSM access points. The access points consist of small radio base stations, power and a standard PC with access point software. The access points are connected to subscriber terminals via GSM and to regional access centers via IP. This setup eliminates the need for telecom towers and can service 200-300 users

from a single access point. Apart from GSM services, these access points can support a phone booth or an Internet café and connect to basic services, such as healthcare and microfinance, in villages.

An additional benefit of a compact solution in a rural market is that communications service providers can employ local people or sell rights to a franchisee to manage them, thus offering a new business opportunity to rural entrepreneurs. The franchisee or GSM access point operator could be responsible for the operation and maintenance of the equipment, subscriber acquisition and sale/lease of terminals to local subscribers, and handling basic customer management functions, including provisioning and billing.

Conserving the environment

As communications networks extend to untapped markets, concerns about the ICT industry's environmental impact are also increasing. According to technology research firm Gartner, the industry accounts for approximately two per cent of global carbon dioxide emissions, putting it at par with the aviation industry. This carbon footprint is expected to rise with the explosive growth in technology access and consumption.

The ICT industry has a unique role to play in environment conservation. Besides working to bring down its own emissions, it can also help reduce the environmental impact of other sectors. Speaking at a recent telecoms industry event anticipating the United Nations climate change conference in Copenhagen, UN Secretary-General Ban-Ki Moon said that the ICT industry can help reduce emissions in other sectors by at least 15 per cent. For instance, travel can be reduced to a great extent with better connectivity and new technologies.

Shrinking equipment can play an enabling role here. For instance, reducing the size of base stations can dramatically reduce the power requirement and hence, the carbon footprint of networks. After all, base stations alone account for up to 90 per cent of a mobile network's total energy consumption. Having compact equipment also means reduced energy consumption in transport and installation.

Changing lives with connectivity

Connectivity is the greatest tool of our age, building a human network where any user can easily reach out to others around the globe. It has enabled unprecedented opportunities for many people to improve their lives. Today, users are utilizing communications tools for a variety of purposes - work, fun, learning, social service and support.

With advancements in nanotechnology, tomorrow's devices will become even more compact and powerful. There will be many more connected people in the world and they will be able to meet their individual needs and enjoy a personalized experience on their devices. This will require more intelligent communications networks that recognize a user's location, device, and usage patterns and preferences to meet their requirements and improve their service experience. Smart connectivity will bring the world even closer.

Hole-in-the-Wall Education

The Computer Aided Education CAE project is a path breaking example, given that it

is the first such initiative in the North East, combining IT education with English language skills – and free of cost for the students. Besides, it is expected to give employment to over 1,000 local educated youth.

Access to state-of-the-art PCs to several thousand children in urban and rural India was provided. The computers were placed outdoors, usually mounted on walls and, hence, often referred to as “hole-in-the-wall”.



In today’s knowledge-based economy, computer literacy has become a vital workplace skill—a skill that millions of people worldwide still lack

As part of this experiment it was concluded that children can self-instruct themselves to operate computers. It was revealed that an estimated 100 children can learn to do most conventional tasks in approximately three months, using the “hole-in-the-wall” arrangement with a single PC.

ICTs are increasingly considered to include a converging spectrum of technologies that consist primarily of telecommunications, computing and broadcasting. The Internet is the latest in the range of ICTs available. The collapsing boundaries between these different kinds of communication technologies have made it possible not only to collect information that went once largely unrecorded, but also to make it relatively easy to store, analyze and retrieve in various ways.

The role of ICTs in poverty alleviation needs to be examined in the context of extreme deprivation and poverty in which a majority of people live, not only in India but in the entire developing world. The World Bank in its annual report on ‘Global Economic Prospects’ has highlighted that the population of the poor living on less than one dollar per day has increased from 474.4 million in 1987 to 552 million in the year 2000. Needless to say a dollar a day is a measure of extreme poverty. It may be worthwhile to note that the increase in the poverty in the developing world is happening in the backdrop of increasing global economic competition, fundamental transformation in the nature of the national economies as well as that of global economy itself, and falling agricultural and industrial returns coupled with downside agricultural, industrial and services work environments.

The knowledge economy does not offer permanent jobs nor permanent specialization because related skills need to be constantly upgraded and improved to be able to compete. Yet increasingly ICTs could help bring the poor closer to opportunities for economic growth, even though merely 0.25 per cent of Indians are net enabled.

The problem lies with the nature of the policies to promote ICT development and use. The Indian Government's IT task force and the National Working Group on "Taking IT to the Masses" have focused on how the profitability of the Indian IT Industry can be increased—something that hardly needs any significant focus considering India exported software and services to 95 countries around the world during 1999-2000 amounting to over US\$8 billion. But they do not have visualized how ICTs can fulfill the needs of the rural poor, nor have they examined creative ways in which the communication technologies, perhaps sequenced with some of the old ones, can help accelerate poverty eradication. Nor are the policy-makers seriously examining ways to generate employment in the IT industry, which could be done by integrating ICTs into local level development planning and work.

Despite these lacunae at the policy level, there have been some heartening developments at the local level, as well as few success stories, which should be noted:

The Gunawad success story : Nobody in Kal Singh's village of Gunawad in the central Indian state of Madhya Pradesh could afford to buy his Jersey cow. He took the problem to the local net kiosk where net-enabled software called Gram Haat (Village Market) he advertised his cow. The entrant connected 32 villages and after some e-haggling, he got a buyer from the village Dilwara for Rs.3,000 (\$75) The Gram Haat is one of the applications of Gyandoot, a rural e-governance project that is panchayat-funded (funded at the level of the village) but privately managed through kiosks in Madhya Pradesh.

The Ujjas innovation: The National Foundation of India, a nonprofit foundation in India initially offered the village women from the Western state of Gujarat's underdeveloped region called Kutch (same area that has been devastated by the recent earthquake) to bring out their own newsletter called Ujjas (which means the 'LIGHT') with the help of Kutch Mahila Vikas Sangathan, a district level NGO. The newsletter was very successful amongst the women to help fight social exploitation as well as issues such as dowry, female infanticide, drunkenness amongst the men folk, enabled them to trade and do business amongst themselves as well as share knowledge amongst themselves. The success of Ujjas attracted other funding agencies including the Ministry of Rural Development to support a 105-episode community radio programme also called the UJJAS that is broadcast by the All India Radio Bhuj station. The programme allows the women to voice their

concerns, learn from each other and interact with the rest of the world. The impact of Ujjas in one of the remotest corners of India is a testimony to the fundamental belief that the innovative use of communication technologies can be a powerful tool in the hands of the poor, particularly women and the children.

The impact of e-governance: When brothers Kartar Singh and Naib Singh from Fatehgarh Sahib in Punjab, one of the richest and most developed states from Northern India, decided to apply for a loan of Rs. 50,000 (approx. US\$1200) to buy new farm equipment, they knew it would take at least a week of legwork to get a mortgage deed registered. Amazingly, the revenue official at the district HQ told them to deposit Rs. 10 (approx. US 25 cents) and instantly gave them a copy of the record of the rights. It then took less than 10 minutes for the District Revenue office to verify the brother's ownership, put the fraud-proof computer generated photographs of them and the two witnesses on the revenue stamp paper and hand over the signed deed. Old style governance would have typically taken the Singh brothers a few days of pleading and bribing to get the record of rights out of the District Revenue Office. If a property had to be registered the owner could forget about the documents once he handed them over to the registration office. For example, in India's one of the most underdeveloped states Bihar, the backlog of property registration goes back to as much as 30 years; however it is nonexistent in Fatehgarh.

In Mafipura, a tiny village of 39 families in Dhar district of the central Indian state Madhya Pradesh, e-governance covers very basic needs. A broken hand pump meant the village lost its only source of water and with the block development officer (BDO is the official appointed by the state government responsible for a cluster of villages) absent as usual, there was no one to complaint to. Tentative residents went to the village cyberdhaba (Internet kiosk) to e-mail their complaint to the collector at the district HQ. Two days later an engineer turned up, e-mail printed in hand!!

Mafipura is part of an Internet called Gyandoot, a rural development project that won the State Government Madhya Pradesh an award last year. The Internet is administered through 32 kiosks and it has nullified the role of the lower rungs of the bureaucracy. The District Health Centers are now proposed to be linked to the district hospital something which will hopefully make an impact in the lives of the villagers.

One story making rounds in Dhar district is of Mohan Patidar, a 40-year old soyabean farmer from Tirla in Dhar, who sold his last crop at the district mandi directly for Rs.700/-Rs.600/-per quintal (US\$16-\$15 for 100 kgs.) After checking the rates in different markets on the Internet at his village cyber kiosk; paying less than 4.5 cents for the service. However,

earlier things were extremely difficult for him; as he would have spent Rs. 10/-(35 cents) on bus fare and endure a 30-minute backbreaking journey to Dhar just to find out the crop prices in the wholesale market. Then the middleman who picked up his crop would pay at least Rs. 50 (US\$ 1.20) less per quintal. Now Patedar wants to rent a truck and ferry his crop to Baroda mandi (market), more than 300 km. away, because he has accessed the highest price—a cool Rs. 900/-(US\$21) per quintal—from his village kiosk.

Incidentally, Dhar project in Madhya Pradesh; which is possibly the best digital empowerment project in India currently; was awarded the prestigious Stockholm Challenge Award. In the same district 18 “headstart” schools impart computer education in dirt-poor villages where more than 70 per cent people are illiterate and 74 per cent people live below the poverty line. Needless to say the children are very excited about the interactive learning and many walk barefoot up to 15 km. for their share of interactive learning. People are paying for their children’s interactive learning gradually - an affordable 40 cents every month.

ICT for identifying water-resources: In India’s drought-prone state Rajasthan, innovative software called “Jal Chitra” (The Water Picture) is being used by the villagers to identify water-resources in the desert.

ICT empowering blind boy: When the authorities in Dhar District of Madhya Pradesh announced a contest for any school-going boy or girl who managed to woo 10 villagers to a cyber kiosk and get them interested in the Internet; would be entitled to appear for a general knowledge exam that would fetch the topper a Rs. 1,000 (US\$ 23.25) a month-scholarship for the next five year; an 18-year old blind student Arpit Jain did not waste a minute. He coaxed 11 villagers to cyber kiosks and took the test in Braille with 175 kids. He topped scoring 72 out of 75 marks and is now learning computers on a very fast track.

ICTs Help - The Plight of Poor Indian Widow: Anandi became widow at the age of 18 in 1987. She lost her husband a youth of 19; having married by her parents in a tiny village not too far from Calcutta, one of the earliest cities colonized by the Britisher in India’s, at a tender age of 10. She could spend only 4 years at her husband’s place before cruel fate snatched her husband of any unknown, untreated disease. Anandi’s life underwent a catastrophe after that. She was thrown out of her house by her in-laws suddenly. Her long hairs were chopped and her head was shaved. Her colorful sarees and jewelry were taken away by her mother-in-law and she was asked to leave for Brindavan—over 800 miles away from her village. Brindavan was chosen for her as well as for all widows of all ages, castes and creeds from the Northern and Eastern parts of India because it was the place where Hindu’s leading deity Lord Krishna was born and grew up in a cow herdsman

family. Krishna has been worshipped in India since time immemorial and women had a special place in Krishna folklore and in the “Krishna tradition” Not only was he the savior of the downtrodden women; but he was the ultimate reincarnation of “Vishnu” who saw women in different revered forms—as a mother, sister and also as a lover. For centuries Indian women have dreamt of giving away their lives for their “Krishna” as an ultimate salvation. For widows who are supposed to have been “cursed” by the God; spending rest of their lives at the feet of Lord Krishna in Brindavan was their only hope and only way they could survive. They could not return back to their homes—either of their parents or their in-laws since an Indian widow had no place in the society other than at the feet of God.

Several social reformers from Bengal such as Raja Ram Mohan, Nobel Laureate Rabindra Nath Tagore; consistently championed the cause of Indian widows and strove for many-many years to get a rightful place for them in the society. Thankfully due to their tireless work; at least in the urban areas, the widows were given their due place in the society and in the homes. Yet a vast majority of the rural population; continued to turn a blind eye to their plight. They were expected to survive alone, without any support from the family or from society; serving the Lord.



And what a survival it has been for over 3,000—nobody knows exactly how many of these frail, pathetic women live in Brindavan; there has been no census and there has been no head count—of these creatures leading lives worst than that of animals. Ones who are beautiful, buxom and charming have been raped multiple times. There has been a

flourishing flesh trade in and around Brindavan. The temple workers called “pandas” in Hindi in nexus with the local police and administration; have been exploiting these widows for several decades now. The ones that were not so physically endowed, some times were turned over as bonded labor, home maids by the nexus prevalent in these religious places. There is no hope for these helpless widows. All they get from the “ashrams” run by some charitable trusts and religious foundations is approx. 250 gms. Of rice and 100 gms. Of pulses in the morning for their meals; and less than US 5 cents for chanting “Krishna” name for 2-3 hours every day in the afternoon.

It is unimaginable how a widow can sustain herself merely on 5 cents and 250 gms. Of rice and some pulses; and occasionally getting few clothes from donors. Severe winter in this part of the country has also killed many widows since many of them live without any shelter—on the roads—and they consider themselves lucky if they get a blanket in gift from a donor. However that is a lifetime achievement for them to get a blanket to cover themselves in the winter chill, in the open spaces in and around Brindavan, the widows can be seen “warming” themselves in groups by bonfires they set up from roadside waste and wood.



There are more than 33 million widows in India—almost 10% of the Indian female population. 50% of the widows are over 50 years of age. A study conducted by the Govt. in 1994 revealed of 88% widows who remained in their dead husband’s village only 3%

shared the same hearth with their in-laws. Less than 3% widows lived with their parents. Rest all lived in the fringes of religious cities such as Brindavan or Banaras.

Sadly for the widows; the political leadership has also turned a blind eye to their plight because the politicians are fearful of raising a controversy as well as they do not form a “vote-bank” for them. Basic health facilities are inaccessible for them. Sanitation and clean water beyond reach! It is a life of utter despair and helplessness for these unfortunate!

The widows rent shelter for themselves—many of them share rooms as well since the cost of renting a room (ranging from US\$ 5-7 per month) is beyond their reach. Most of the times they have to resort to begging to make both ends meet. Despite over all despondency and gloom; they share their sorrows with one another and live in groups often sharing their food as well as their lives with one another. But for this bonding and deep chord existing between them; their survival would have been difficult.

Being alive of the plight of Brindavan widows and their consistent exploitation by the religious forces; local administration; few voluntary groups such as the “Guild of Service” have tried to make some health-care and medical facilities available to the widows. Mobile Medical vans have been deployed to attend to basic medical needs of at least some widows. However all hospitalization and surgical cases are referred to the Govt. run hospitals who demand proof of identity as well as proof that the widows have been living in that area. Few Volunteers have been deployed to help attend basic health care needs of the widows.

Since identification is a major problem for then widows; — issuance of photo-identity cards which would gain acceptance from the local administration, hospitals as well as the police. These identification cards will also lead to the setting up of a database of the widows in a central location in Brindavan. The database will be used by the volunteers as well as the authorities; primary health and well-being of the widow apart from ensuring that she can be accessed whenever needed and whenever any benefit can be shared with her. Hopefully with the aid of database and the photo-identity cards; at least the widows of Brindavan will get a name and a face which every one will recognize and use to support them. In their sunken eyes and in their shriveled bodies, we could see a glimmer of hope! **Will ICTs help stem their plight and give them a chance to leave—is a big challenge!!**

Pampering the India Post : Our postal department is jumping into the cyber age by trying a multitude of new, feel-good stuff, some of them make great business sense too...

The postal department of India is determined to utilize the miracle called Internet as much as it can. Its ambitious agenda includes taking the internet into rural areas. And it is well on its way to change the face of rural India, which is not very well-connected. And who knows, we might be talking about bridging digital divide, rather than just an existing digital divide.

A lot of things about the India Post are brand new. And the recent change of logo for a fresh one supplements the air of freshness that has enveloped the Indian postal services. The new logo, aims to give the postal service a corporate look and reflects its new approach towards approach which shall aim to leverage technology to connect the nation better. The new logo is of bird in flight, done in bold colors like red and yellow. The bold strokes convey free flight.

The largest postal network in the world with over 1.55 lakhs post offices covering urban and rural areas, is now using web-based services to get larger than life. Some new initiatives of the Department of Posts include e-payment, instant money transfers, daknet, online franking and a new look for rural post offices.

However vast and well-connected our postal network might be, it has always been wrought by deficiencies and huge inconsistencies. A lot of it can be attributed to the fact that India is a multi-dialect country, which writes in numerous languages be it books, blogs or letters. This doesn't make the job of the post office any easier. Often, there is a problem of deciphering what is written and even a minor alphabetical or writing error can cause havoc while the letter is on its journey.

Then, there is the problem of stamping and pin codes. According to a survey done by India Post, pin code is mentioned on about 65% of the total mails that India Post handles. Out of this, around 10% are non-decipherable. And as most of the mails handled are handwritten, (only around 5% of the total volume are in the typed format) they further accelerates the problem. And it is no news that our postal services have been synonymous with delays and misplacements from money orders, to accounts and letters.

The postal department of India is determined to utilize the miracle called Internet as much as it can. Its ambitious agenda includes taking the internet into rural areas. And it is well on its way to change the face of rural India, which isnt very well-connected. And who knows, we might be talking about bridging digital divide, rather than just an existing digital divide.

India Post has revamped the money order service and introduced an electronic mode for faster remittance of money. This move will reduce transmission of vouchers from one

place to another and provide for a centralized information system on the money order service.

Through e-MO, the money is transferred to the closest destination post office and then the postman provides a door-to-door delivery. Depending on the batch time (the time for which transactions accumulate over the server), the e-MO takes only several hours to reach as against the traditional money order which takes anywhere between 5-7 days.

Levering on enabling technology India Post want to serve, not exercise power. The post office is the only arm of the government which serves rather than tries to control. It is also proving to have an immense impact in terms of cost-saving by India Post.

If that sounds like some crazy dream, then e-Post services will perhaps sound out of this world! e-Post enables any hand-written message, photograph or simple text message to be sent between e-Post centers (post offices) all across the country. These messages can then be downloaded at the addressee e-Post center and delivered by the postman to the recipient. The service can also be availed by individuals from their home or office, or by purchasing a prepaid card from the post office.

Building the Third Mandate : More than Rs 4500 crore have been invested to provide connectivity to all 2,36,000 panchayats across the country.

Social inclusion begins when all the tiers of the government are connected to each other, and when each contributes to the productivity of the nation. Efforts are being made to revolutionize panchayats by leveraging ICT for scaling up the efficiency at the grassroots. Rs 4,500 crore can be just an estimated amount, but the total expenditure to automate panchayats and provide technology interface to citizens is much greater. The Ministry of Panchayati Raj is carrying out extensive research to assess G2G and G2C functions. The central government has indentified two agencies that would take care of training at the state level and asses the states e-readiness at the central level. "E-panchayat is an ongoing project and every year fresh targets are being made to strengthen the processes and indentify loopholes and pursue subsequent rectification," says DK Jain, joint secretary, Ministry of Panchayati Raj. The software e-Panchayat comprises decentralized database and planning, budgeting and accounting, implementation and monitoring of schemes, citizen-centric services, and unique codes to panchayats.

In the Cabinet meeting held on May 18, 2006, e-Governance in Panchayati Raj Institutions (e-PRI) had been approved as a Mission Mode Project (MMP) under the National e-Governance Plan (NeGP).

The e-panchayat initiatives would focus on the identification of information as well as services needs of stakeholders, process re-engineering and generation of Detailed Project Report (DPR). The e-Panchayat software has thirty major modules pertaining to different aspects of rural administration. The main focus is to provide services like birth certificate, caste certificate, tribe certificate, death certificate, applying for old age pension, widow pension, ration card, register land/property, registration with state employment exchange, registering grievances with Women Commission, check land records and check agriculture process online. The e-Panchayat software would be extensively used by both states and the union ministries for a whole range of activities in order to participate in the District Planning process. The software would also provide the panchayats linkages for speedy and transparent transfer of funds and help them automate their own functioning.



There e-panchayat applications run at central and state level. Core Common Applications developed at the central level and state-specific applications to be built by states.

There are twelve software applications that have been proposed to be developed for panchayats. The application areas are unique code to panchayats, panchayat portals, panchayat profiler, planning & budgeting, accounting, scheme implementation & monitoring, social audit, unique codes to asset & utilities, citizen-centric services, grievance redressal, basic GIS applications and skill management.

Intelligent Transport Systems

Imagine a future in which cars will be able to foresee and avoid collisions, navigate the quickest route to their destination, making use of up-to-the-minute traffic reports, identify the nearest available parking slot and minimize their carbon emissions. Indeed, imagine a future where cars can largely drive themselves, leaving their passengers to use the free time to watch the sports game on live TV.

The main motivation for ITS is the improvement of road safety. It is a startling fact that some 1.25 million people are estimated to die on the world's roads each year, and over 30 million are injured. How long can we allow such carnage on our roads to continue when adequate technology already exists to prevent it? Many governments of the world have embarked on programmes to halve road deaths and injuries within a decade. ITS will provide a major means to achieve this.

All of these possibilities already exist within the laboratories of car manufacturers and some are already available commercially. But they rely on communications links that must be increasingly high-capacity and long range to deal with the full range of requirements of future transport users. The generic technology they use is called **Intelligent Transport Systems (ITS)**. ITS may be defined as systems utilizing a combination of computers, communications, positioning and automation technologies to use available data to improve the safety, management and efficiency of terrestrial transport, and to reduce environmental impact. ITS incorporates four essential components,

- Vehicles, which can be located, identified, assessed and controlled using ITS;
- Road users, who employ ITS, for instance, for navigation, travel information and their monitoring capabilities;
- Infrastructure, for which ITS can provide monitoring, detection, response, control, road management and administration functions.
- Communications networks, to enable wireless transactions amongst vehicles and transport users.

Education

Through e-learning, broadband improves access to digital resources, extending education to more people of all ages, at all levels of need, including in previously deprived

communities. It also helps in training teachers and in linking databases to improve administration.

Research

Using broadband, it is now possible for universities and research institutes of all kinds to share vast amounts of data worldwide, and for students to read books in libraries on the other side of the globe. This speeds up work in countless fields, including medicine and agriculture that have an especially important impact on the lives of people in the poorest regions.

Infrastructure and industry

In the electricity industry, broadband networks can show consumers and suppliers how much power is being used in real time, and where. This means that demand and supply can be stabilized as power is delivered or stored on “smart grids”. And in “smart buildings” energy is saved through constant monitoring of heating and lighting. The manufacture and distribution of goods can be tracked using broadband networks, which are also the foundation for cloud computing that offers rapid scalability of resources for businesses — as well as flexible access for individuals.

Environment and emergencies

One particularly important area of research involves monitoring Earth’s environment, through sensors on the ground or data collected by satellite. Broadband networks ensure that data are transmitted swiftly to show, for example, the effects of climate change, crop shortages, or impending natural disasters. Broadband helps again by supporting emergency communications and medical assistance.

Transport

Safety on the roads is improved too by broadband delivering real-time information to traffic control systems and individual drivers. It helps to streamline traffic flows, cut fuel consumption and minimize accidents, and it becomes much easier to integrate all types of transport efficiently.

Lifestyle

At the same time, videoconferencing removes the need for travel, and with a broadband

connection, people will increasingly be able to work away from the office and on the move. Whether through a mobile device or at home, they can also enjoy a huge range of content produced by the publishing, music and a video industry, for which broadband has become a leading delivery system.

Health care

Network-based monitoring of chronic medical conditions and low-cost remote consultation and intervention will be increasingly favored by medical professionals, particularly those serving remote communities or ageing populations. Telemedicine, as it is known, will give many more people a better chance of health.

Democracy and culture

By putting information online, local and national governments can not only keep citizens up to date with what is happening; they can also offer immediate and interactive access to services, such as applying for licenses or registering to vote. Citizens themselves have a powerful platform on which to create spaces for sharing ideas and for expressing the creativity of their particular cultures.

Cost-effective platform for progress

At present, however, millions of people cannot enjoy these benefits because broadband networks might be seen as unprofitable to construct, or, even where they exist, access is prohibitively expensive. Broadband subscriptions cost fewer than 2.5 % of Gross National Income (GNI) per capita in the 40 most connected nations. But at the other end of the scale, in the 30 countries with the lowest level of broadband penetration, subscriptions cost over 100% of per-capita GNI.

And yet a report issued by the OECD in December 2009 (“Network Developments in Support of Innovation and User Needs”) suggests that broadband networks can pay for themselves within ten years, because of the savings made in delivering services. In Australia, for example, it has been estimated that cost savings in health care alone could pay for the National Broadband Network twice over. For developing countries, the solution is likely to be found in mobile broadband — using a mobile phone, of which there are now some five billion worldwide, to connect to the information society. By improving education, medical services, trade and more, broadband Internet access can make a tremendous difference. High-speed networks can lead to high-speed growth.

In the same way that the construction of electricity grids and transport links spurred innovation far beyond the dreams of their builders, high-speed broadband networks stimulate greater efficiency and the creation of new businesses. For society as a whole, they are a platform for progress, and the Broadband Commission for Digital Development will do its best to encourage government and industry leaders to take action on installing broadband for all

In broad terms, the changing face of global communications is affecting science and technology in three ways:

First, advances in modern communication are revolutionizing “peer-peer” and “peer-lay” information exchange. Twenty years ago, rooting out scientific information was a physical adventure. I remember cycling between libraries, chasing up reference trails, lugging weighty tomes around while wandering along seemingly endless shelves of books. I could get quite nostalgic about time spent surrounded by piles of journals in musty libraries. Nowadays of course nothing is further than the click of a mouse away. And it’s not just journals—the internet is flooded with a wealth of information which is richer than could ever be imagined 20 years ago. Researchers have access to vast arrays of new information in their own field, as well as new findings in other disciplines. The result is a cross-fertilization that is driving the generation of new scientific knowledge and technology innovation at an unprecedented rate.

But the same information is also available to non-experts—the “lay public.” Now, anyone can in principle access in-depth information on the latest scientific breakthroughs. And where they might struggle with esoteric science, there are a growing number of resources that translate and repackage the knowledge into more manageable chunks. As a consequence, science and technology are being democratized.

It’s still a relatively select community that is benefiting from this increasing access to information. But the day is quite possibly coming when the current intellectual hierarchies will begin to crumble, and a new science and technology order will emerge.

Secondly, advances in modern communication are revolutionizing the exchange of ideas. Ideas propagate along lines of communication and change individuals and groups who come into contact with them. In the past, geographical and technological barriers have limited the growth and influence of ideas around the world. But with the advent of Web 2.0 and whatever comes next, traditional barriers are being blown away. And as a

result, new ideas are spreading and potentially changing how people think and behave faster and more unpredictably than ever before.

This new interconnectedness will have profound implications on global society. And this will include a clear impact on science and technology—one that we are already seeing. Through advances in global communication, individuals and groups will form opinions and ideas on emerging science and technology as new knowledge and abilities are developed. In effect, the old intellectual command and control model is disappearing. Which means that the debate over how science is done, what areas of science are pursued, and which new technologies are developed (and how) is now very public, and very global. And there is no guarantee that the participants will have the same understanding of or respect for hard data as the people generating them.

This global exchange of ideas leads into the third way in which advances in communication will affect science and technology: Decentralization. Advancing communication is empowering citizens to influence the course of science and technology in ways that transcend traditional boundaries. If a group of people decide they don't like a new technology, it's relatively easy for them to mobilize and hinder the progress of that technology. It happened with genetically modified organisms, and there have been concerns that it could happen in other areas like nanotechnology or synthetic biology (for example). And with this increasing decentralized influence, scientists can scream and shout until they are blue in the face about the authority of hard data—if people don't want something, it isn't going to happen.

Which means, that if science and technology are to be used wisely and beneficially over the next century, this new communication landscape needs to be understood and navigated

First, I wanted to illustrate the rapidity with which communication networks are growing around the world, and how information and ideas propagate along these. I chose Twitter, and one particular user; the British comedian and raconteur Stephen Fry—this is the trivial example.

The growth of interest in Twitter has been phenomenal, and only matched by the growth in stature of users like. For the uninitiated, Twitter builds on text messaging by allowing users to send messages of 140 characters or less to other users. Any message you post can be read by anyone else, although it is delivered directly to your “followers.” And likewise, any message posted by someone you “follow” is delivered directly to you.

You can then (if you so choose) decide to redirect—or “ReTweet”—that message to your own followers.

Twitter is just one example of how people are interacting through the web and information and ideas are propagating in ways that are completely alien to how the world worked a few years ago. But there’s another side to this. A flood of information with inadequate filtering and interpretation is simply noise, and becomes more ineffective the more of it there is. For the communication revolution to go anywhere, there need to be new ways of handling the mass of information we are exposed to.

Ten years ago at the close of the 20th century, people the world over were obsessing about the millennium bug – an unanticipated glitch arising from an earlier technology. I wonder how clear it was then that, despite this storm in what turned out to be a rather small teacup, the following decade would see unprecedented advances in technology – the mapping of the human genome, social media, nanotechnology, space-tourism, face transplants, hybrid cars, global communications, digital storage, and more. Looking back, it’s clear that despite a few hiccups, emerging technologies are on a roll – one that’s showing no sign of slowing down.

So what can we expect as we enter the second decade of the twenty first century? What are the emerging technology trends that are going to be hitting the headlines over the next ten years?

Emerging technology trends to watch over the next decade

Geoengineering : 2009 was the year that geoengineering moved from the fringe to the mainstream. The idea of engineering the climate on a global scale has been around for a while. But as the penny has dropped that we may be unable – or unwilling – to curb carbon dioxide emissions sufficiently to manage global warming, geoengineering has risen up the political agenda. My guess is that the next decade will see the debate over geoengineering intensify. Research will lead to increasingly plausible and economically feasible ways to tinker with the environment. At the same time, political and social pressure will grow – both to put plans into action (whether multi- or unilaterally), and to limit the use of geoengineering. The big question is whether globally-coordinated efforts to develop and use the technology in a socially and politically responsible way emerge, or whether we end up with an ugly – and potentially disastrous – free for all.

Smart grids: It may not be that apparent to the average consumer, but the way that electricity is generated, stored and transmitted is under immense strain. As demand for electrical power grows, a radical rethink of the power grid is needed if we are to get electricity to where it is needed, when it is needed. And the solution most likely to emerge as the way forward over the next ten years is the Smart Grid. Smart grids connect producers of electricity to users through an interconnected “intelligent” network. They allow centralized power stations to be augmented with – and even replaced by – distributed sources such as small-scale wind farms and domestic solar panels. They route power from where there is excess being generated to where there is excess demand. And they allow individuals to become providers as well as consumers – feeding power into the grid from home-installed generators, while drawing from the grid when they can’t meet their own demands. The result is a vastly more efficient, responsive and resilient way of generating and supplying electricity. As energy demands and limits on greenhouse gas emissions hit conventional electricity grids over the next decade, expect to see smart grids get increasing attention.

Radical materials: Good as they are, most of the materials we use these days are flawed – they don’t work as well as they could. And usually, the fault lies in how the materials are structured at the atomic and molecular scale. The past decade has seen some amazing advances in our ability to engineer materials with increasing precision at this scale. The result is radical materials – materials that far outperform conventional materials in their strength, lightness, conductivity, ability to transmit heat, and a whole host of other characteristics. Many of these are still at the research stage. But as demands for high performance materials continue to increase everywhere from medical devices to advanced microprocessors and safe, efficient cars to space flight, radical materials will become increasingly common. In particular, watch out for products based on carbon nanotubes. Commercial use of this unique material has had its fair share of challenges over the past decade. But I’m anticipating many of these will be overcome over the next ten years, allowing the material to achieve at least some of its long-anticipated promise.

Synthetic biology: Ten years ago, few people had heard of the term “synthetic biology.” Now, scientists are able to synthesize the genome of a new organism from scratch, and are on the brink of using it to create living bacteria. Synthetic biology is about taking control of DNA – the genetic code of life – and engineering it, much in the same way a computer programmer engineer’s digital code. It’s arisen in part as the cost of reading and synthesizing DNA sequences has plummeted. But it is also being driven by scientists and engineers who believe that living systems can be engineered in the same way as other

systems. In many ways, synthetic biology represents the digitization of biology. We can now “upload” genetic sequences into a computer, where they can be manipulated like any other digital data. But we can also “download” them back into reality when we have finished playing with them – creating new genetic code to be inserted into existing – or entirely new – organisms. This is still expensive, and not as simple as many people would like to believe – we’re really just scratching the surface of the rules that govern how genetic code works. But as the cost of DNA sequencing and synthesis continues to fall, expect to see the field advance in huge leaps and bounds over the next decade. I’m not that optimistic about us cracking how the genetic code works in great detail by 2020 – the more we learn at the moment, the more we realize we don’t know. However, I have no doubt that what we do learn will be enough to ensure synthetic biology is a hot topic over the next decade. In particular, look out for synthesis of the first artificial organism, the development and use of “BioBricks” – the biological equivalent of electronic components – and the rise of DIY-biotechnology.

Personal genomics: Closely related to the developments underpinning synthetic biology, personal genomics relies on rapid sequencing and interpretation of an individual’s genetic sequence. The Human Genome Project – completed in 2001 – cost taxpayers around \$2.7 billion dollars, and took 13 years to complete. In 2007, James Watson’s genome was sequenced in 2 months, at a cost of \$2 million. In 2009, Complete Genomics were sequencing personal genomes at less than \$5000 a shot. \$1000 personal genomes are now on the cards for the near future – with the possibility of substantially faster/cheaper services by the end of the decade. What exactly people are going to do with all these data is anyone’s guess at this point – especially as we still have a long way to go before we can make sense of huge sections of the human genome. Add to this the complication of epigenetics, where external factors lead to changes in how genetic information is decoded which can pass from generation to generation, and and it’s uncertain how far personal genomics will progress over the next decade. What aren’t in doubt though are the personal, social and economic driving forces behind generating and using this information. These are likely to underpin a growing market for personal genetic information over the next decade – and a growing number of businesses looking to capitalize on the data.

Bio-interfaces: Blurring the boundaries between individuals and machines has long held our fascination. Whether it’s building human-machine hybrids, engineering high performance body parts or interfacing directly with computers, bio-interfaces are the stuff of our wildest dreams and worst nightmares. Fortunately, we’re still a world away from some of the more extreme imaginings of science fiction – we won’t be constructing the

prototype of Star Trek Voyager's Seven of Nine anytime soon. But the sophistication with which we can interface with the human body is fast reaching the point where rapid developments should be anticipated. As a hint of things to come, check out the Luke Arm from Deka (founded by Dean Kamen). Or Honda's work on Brain Machine Interfaces. Over the next decade, the convergence of technologies like Information Technology, nanoscale engineering, biotechnology and neurotechnology are likely to lead to highly sophisticated bio-interfaces. Expect to see advances in sensors that plug into the brain, prosthetic limbs that are controlled from the brain, and even implants that directly interface with the brain. My guess is that some of the more radical developments in bio-interfaces will probably occur after 2020. But a lot of the groundwork will be laid over the next ten years.

Data interfaces: The amount of information available through the internet has exploded over the past decade. Advances in data storage, transmission and processing have transformed the internet from a geek's paradise to a supporting pillar of 21st century society. But while the last ten years have been about access to information, I suspect that the next ten will be dominated by how to make sense of it all. Without the means to find what we want in this vast sea of information, we are quite literally drowning in data. And useful as search engines like Google are, they still struggle to separate the meaningful from the meaningless. As a result, my sense is that over the next decade we will see some significant changes in how we interact with the internet. We're already seeing the beginnings of this in websites like Wolfram Alpha that "computes" answers to queries rather than simply returning search hits, or Microsoft's Bing, which helps take some of the guesswork out of searches. Then we have ideas like The Sixth Sense project at the MIT Media Lab, which uses an interactive interface to tap into context-relevant web information. As devices like phones, cameras, projectors, TV's, computers, cars, shopping trolleys, you name it, become increasingly integrated and connected, be prepared to see rapid and radical changes in how we interface with and make sense of the web.

Solar power: Is the next decade going to be the one where solar power fulfills its promise? Quite possibly. Apart from increased political and social pressure to move towards sustainable energy sources, there are a couple of solar technologies that could well deliver over the next few years. The first of these is printable solar cells. They won't be significantly more efficient than conventional solar cells. But if the technology can be scaled up and some teething difficulties resolved, they could lead to the cost of solar power plummeting. The technology is simple in concept – using relatively conventional printing processes and special inks, solar cells could be printed onto cheap, flexible substrates; roll to roll solar

panels at a fraction of the cost of conventional silicon-based units. And this opens the door to widespread use. The second technology to watch is solar-assisted reactors. Combining mirror-concentrated solar radiation with some nifty catalysts, it is becoming increasingly feasible to convert sunlight into other forms of energy at extremely high efficiencies. Imagine being able to split water into hydrogen and oxygen using sunlight and an appropriate catalyst for instance, then recombine them to reclaim the energy on-demand – all at minimal energy loss. Both of these solar technologies are poised to make a big impact over the next decade.

Nootropics: Drugs that enhance mental ability – increasingly referred to as nootropics – are not new. But their use patterns are. Drugs like ritalin, donepezil and modafinil are increasingly being used by students, academics and others to give them a mental edge. What is startling though is a general sense that this is acceptable practice. Back in June I ran a straw poll on 2020 Science to gauge attitudes to using nootropics. Out of 207 respondents, 153 people (74%) either used nootropics, or would consider using them on a regular or occasional basis. In April 2009, an article in the New Yorker reported on the growing use of “neuroenhancing drugs” to enhance performance. And in an informal poll run by Nature in April 2008, 1 in 5 respondents claimed “they had used drugs for non-medical reasons to stimulate their focus, concentration or memory.” Unlike physical performance-enhancing drugs, it seems that the social rules for nootropics are different. There are even some who suggest that it is perhaps unethical *not* to take them – that operating to the best of our mental ability is a personal social obligation. Of course this leads to a potentially explosive social/technological mix, that won’t be diffused easily. Over the next ten years, I expect the issue of nootropics will become huge. There will be questions on whether people should be free to take these drugs, whether the social advantages outweigh the personal advantages, and whether they confer an unfair advantage to users by leading to higher grades, better jobs, more money. But there’s also the issue of drugs development. If a strong market for nootropics emerges, there is every chance that new, more effective drugs will follow. Then the question arises – who gets the “good” stuff, and who suffers as a result? Whichever way you look at it, the 2010’s are set to be an interesting decade for mind-enhancing substances.

Cosmeceuticals: Cosmetics and pharmaceuticals inhabit very different worlds at the moment. Pharmaceuticals typically treat or prevent disease, while cosmetics simply make you look better. But why keep the two separate? Why not develop products that make you look good by working with your body, rather than simply covering it? The answer is largely due to regulation – drugs have to be put through a far more stringent set of

checks and balances that cosmetics before entering the market, and rightly so. But beyond this, there is enormous commercial potential in combining the two, especially as new science is paving the way for externally applied substances to do more than just beautify. Products that blur the line are already available – in the US for instance, sunscreens and anti dandruff shampoos are considered drugs. And the cosmetics industry regularly use the term “cosmeceutical” to describe products with medicinal or drug-like properties. Yet with advances in synthetic chemistry and nanoscale engineering, it’s becoming increasingly possible to develop products that do more than just lead to “cosmetic” changes. Imagine products that make you look younger, fresher, more beautiful, by changing your body rather than just covering up flaws and imperfections. It’s a cosmetics company’s dream – one shared by many of their customers I suspect. The dam that’s preventing many such products at the moment is regulation. But if the pressure becomes too great – and there’s a fair chance it will over the next ten years – this dam is likely to burst. And when it does, cosmeceuticals are going to hit the scene big-time.

Perhaps the most accurate answer to the question I raised above is to say that we must set our priorities carefully, and ICTs alone can’t bring about rural development. The basic problem in India still remains one of quality of education to all walks of life — 40% OF INDIA’S POPULATION IS ILLITERATE. All modern economies have demonstrated in the past that education is the first step to building the capacity which people can then use. If the Indian economy grows at 5-6 per cent per annum as it has been growing over last 2-3 years, then over 10-15 years the size of the Indian economy would have doubled. Even with this level of growth it cannot by any means bridge disparities and eradicate poverty. Therefore introducing ICTs alone will not meet the development challenge. For ICTs to succeed in India, quality education for all must be the first priority.

It’s a sign of a new digital age. Forget the Web - last century’s invention. Think about a world where your trousers talk to your watch. Your watch talks to your eyeglasses. And your eyeglasses are talking to the advert which is right beside you while you wait for a train. Not one of these devices is on the traditional Web. The future will be billions of devices talking to each and exchanging information in a way which creates whole generations of new products and applications. The most important thing to understand is that the future is not about technology—it’s about emotion—how people feel about technology. The rapid usage of text messaging compared to the mixed reception given to 3G video phones are examples of this. If we want to look into the future, we need to get close to how people think and feel and understand their future behaviors in a world where we have many new toys to play with.

Nanotech has been a dominant emerging technology over the past ten years. In terms of the emerging technologies, it was tough to whittle this down to trends.

And one final word, many of the technologies I've highlighted reflects an overarching trend: convergence. Although not a technology in itself, synergistic convergence between different areas of knowledge and expertise will likely dominate emerging technology trends over the next decade.

98th Indian Science Congress

January 3-7, 2011, Chennai

II

ABSTRACTS OF PLATINUM JUBILEE LECTURE

PLATINUM JUBILEE LECTURES

Information Technology Empowering Society & People

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Keywords: *Information Technology, Innovative Ecosystem, Intelligent enterprises, Digital divide, rural empowerment, Women Empowerment*

Information Technology is empowering the society & people at all levels. It is making our people & society aware of their rights & responsibilities. It is also providing tools & techniques to be productive & meaningful in the knowledge based society. To achieve the higher degree of empowerment of the Indian society the country will have to focus urgently on solving the problems of the poor & under privileged at the bottom of the pyramid.

As the whole universe is contained in the self, so is the Indian Society contained in the village. The village epitomizes the soul of India with about 73% of the Indian Population living in rural areas.

IT is empowering the people by providing knowledge, tools, Technology & techniques to change their mindset from negative cynicism to positive optimism with hope for limitless opportunities in this ever changing society. Empowering India through Information Technology means to develop the system for providing education to all, infrastructure every where innovative ecosystem, imaginative entrepreneurs, intelligent enterprises, internet energized and increasing expectation.

Isolation of rural communities from the mainstream economy and their lack of access to information because of societal, cultural and market constraints have led them to become distant from the global pool of information & knowledge. The one resource that liberates them from poverty and ignorance is knowledge & its wide spread dissemination. The beneficial impact of Information Technology on the rural economy & quality of Life is now widely recognized.

Digital divide is the uneven diffusion of Information technology and inequality in access to the same with significant social, economic, political, cultural & environmental consequences. It exists in rich & poor masses, rural & urban areas, men & women, skilled & unskilled citizens and large & small enterprises. There are different reasons for the creation of these divides, but it is certain that if these issues are not taken care of immediately, the situation will keep on worsening for the economic structure of the country.

Now, Information Technology opportunities, on the contrary are the efforts to bridge the digital divide. The paper mainly focuses on importance of IT & its effective & optimum utilization to bridge the digital divides from the State level to National level by giving prime impotence to the rural empowerment, women empowerment in particular and empowering the people & society in general.

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III

ABSTRACTS OF YOUNG SCIENTIST AWARD PROGRAMME

YOUNG SCIENTIST AWARD PROGRAMME

SA Based Novel Thermal Cell Placement in 3D ICs

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Dominance of on-chip power densities has become a critical design constraint in high-performance VLSI design. This is primarily due to increased technology scaling, number of components, frequency and bandwidth. The consumed power is usually converted into dissipated heat, affecting the performance and reliability of a chip. Moreover, recent trends in VLSI design entail the stacking of multiple active (device) layers into a monolithic chip. These 3D chips have significantly larger power densities than their 2D counterparts. In this paper, we consider the thermal placement of standard cells and gate arrays (modules) taking total wirelength as well as TSVs (through silicon via) into consideration. Our contribution includes a novel algorithm for placement of the gates or cells in the different active layers of a 3D IC such that: (i) the temperatures of the modules in each of the active layers is uniformly distributed, (ii) the maximum temperatures of the active layers are not too high, (iii) the maximum temperatures of the layers vary in a non-increasing manner from bottom layer to top layer, (iv) the estimated total interconnect length connecting the modules of the different layers are also improved, and (v) the total number of interlayer vias is quite reasonable. Experimental results on randomly generated and standard benchmark instances are quite encouraging.

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IV

ABSTRACTS OF SYMPOSIUM/INVITED LECTURE

PROCEEDINGS
OF THE
NINETY EIGHTH SESSION OF THE
INDIAN SCIENCE CONGRESS
CHENNAI, 2011

PART II : ABSTRACTS OF SYMPOSIUM / INVITED LECTURE

SECTION OF
**INFORMATION AND COMMUNICATION SCIENCE &
TECHNOLOGY (including COMPUTER SCIENCES)**

President : Vineet Kumar

INVITED TALK

1. ICT and sustainability under perturbed ecosystem state

Prof. (Dr.) Rattan K. Datta

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As one opens a newspaper, radio, TV or any other communication media, two set of news take place of prominence. One is the news about the rapid development of “Information & Communication Technologies” (ICT) and its all pervasive applications. The other equally prominent is the rapid changes in climate & ecosystem. Getting bored by the continuous use of the term ‘global warming’, one is coining new term as perturbation in the global atmosphere. There could be other stories on terrorism & killings; it is good to ignore these.

It is well known that every scientific invention or technological innovation has two faces, one for the welfare of community and the other face based on ignorance or greed causes disaster to the humanity as well as the surrounding ecosystem.

Industrialization & two world wars in the early 1900s brought a big divide between haves & have-nots. Wealth increased, but was confined to a few countries. The development of ICT in the later half of the 1900s shrunk the planet of ours to a level of global village. This helped to increase the wealth rather rapidly even in the countries which were not necessarily industry savvy but were intellectually sound & logical. Countries like India, Brazil, China and others became rich as a consequence of all pervasive use of ICT. This growth of soft wealth generated further desire to gather more wealth leading to cut throat competition in order to hit the market first. The technology which could last 10 to 15 years became obsolete in less than 5 years. In hurry the competitors tended to lose sight of the growing waste and its impact on the ecosystem.

This paper consists of two parts. The first part describes the ecosystem & the perturbations or anomalies which are worrying the humanity all over the world. The degradation has taken place, but it can be controlled through universal efforts if these can be in complete harmony. In the second part, the rapid growth of ICT is discussed to visualize its use for sustained development. This would require intensive use of technology for reversing the degradation trend without significantly slowing the development process.

It is concluded that if the growth can be governed through stringent laws of ethics, sustained development is possible. The technologies which can help this happens are ICT & their allied disciplines. The developers of these technologies & their applications have to perceive the impact of obsolescence right at the initial phase & plan zero level tolerance to the ecosystem.

2. Sharing scientific knowledge: an issue of ICT and international cooperation?

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Sharing scientific knowledge is something researchers by nature (should) do. In order to make progress in their own work they have to discuss their progress with colleagues

and peers and they need to learn about the progress in the work of others that are working on similar, related topics. Scientific conferences like the Indian Science Congress and the World Computer Congress of the International Federation for Information Processing (IFIP) are logic opportunities for this. Also the proceedings that result from such conferences are a good way to share the knowledge. This worked reasonably well for many years since the first world conference on information processing in 1959 in Paris organized by UNESCO and the establishment of IFIP in 1960 as a result of that conference. Sharing knowledge between “persons interested in electronic computers” with the purpose of advancing the field of computer technology was the goal in those days.

Since then a lot has happened and a lot of progress has been made in computer technology. The emphasis has shifted towards advancing technologies for information and knowledge societies. This means an even greater need to share knowledge. However, as more and more people came to work in the computer science field over the years and also the developing countries began to have a growing interest in getting access to this knowledge, the old-fashioned ways of conferences and printed proceedings are no longer sufficient. For two reasons: only a relatively small number of people can attend a conference and also access to printed proceedings is limited, mostly because of cost reasons.

Starting to organize more conferences creates a problem of quality and financial viability. Moving the proceedings from printed books to electronic versions in digital libraries only helps if these are then widely available at affordable prices. ICT as technology for making scientific knowledge easy to use and accessible is not the problem. The problem is an economic one, namely the financial viability of models to make this knowledge available at an affordable price, and the protection of commercial interests. A second problem is the availability of content and the quality of this. Concerning the content an additional problem are the constraints of the academic system worldwide that requires students and scientists to publish their work in journals and proceedings of a certain standing (measured in a number of ways). International cooperation is needed here to overcome this obstacle.

Moving towards a increased use of ICT to share knowledge via for instance webinars, Wikipedia’s and digital libraries requires serious attention for quality control mechanisms in order to maintain the attractiveness and to meet requirements for scientific acknowledgement.

Another issue concerning the sharing of knowledge is the digital divide. Access to information is a key word in achieving the Millennium Development Goals and the information society as envisaged by the World Summit on the Information Society (WSIS). Especially for developing countries access to scientific information is essential for their development and at the same time difficult because of infrastructure and cost issues. Many initiatives

already are undertaken to address this but more needs to be done. International cooperation is instrumental here to enhance the effective and efficient use of ICT to make sharing scientific knowledge possible, easy and affordable.

3. Power Line Communications and the Smart Grid

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Communications over power lines is an old idea that dates back to the early 1900's, when the first patents were filed in this area. Since then, utility companies around the world have been using this technology for remote metering and load control, using at first single carrier narrowband solutions operating in the Audio/Low Frequency bands that achieved data rates ranging from few hundred bps to a few kbps. As technology matured and the application space widened, broadband PLC systems operating in the High Frequency band (2-30 MHz) and achieving data rates up to a 200 Mbps started to appear in the market. In the last few years, industry interest has also grown around the so-called high data rate narrowband PLC based on multi carrier schemes and operating in the band between 3-500 kHz. PLC is also used to provide Broadband Internet access to residential customers and LAN connectivity within home, office and vehicles. The basic incentive for using PLC is that the power grid provides an infrastructure that is much more extensive and pervasive than any other wired/wireless alternative, so that virtually every line-powered device can become the target of value-added services.

In spite of the PLC promise of being the enabler of a multitude of present and future applications, PLC has not yet reached the mass market penetration that is within its potential. However, a new compelling reason for using PLC is today emerging: the recent impetus in modernizing the aging power grid through an information highway dedicated to the management of energy transmission and distribution, the so called Smart Grid. It is commonly recognized that the Smart Grid will be supported by a heterogeneous set of networking technologies, as no single solution fits all scenarios. Nevertheless, an interesting question is whether the Smart Grid will have a pivotal role in fostering the success of PLC in the market.

In analyzing the role PLC in the Smart Grid, we provide an overview of what PLC can deliver today by surveying its history and highlighting the variety of PLC technologies available today. We then address Smart Grid applications as instances of sensor networking and network control problems and discuss the main conclusion one can draw from the literature on these subjects. The application scenario of PLC within the Smart Grid is then analyzed in detail on all sections of the grid. Since a necessary ingredient of network planning is modeling, we also discuss two aspects of engineering modeling that relate to our question. The first aspect is modeling the PLC channel through fading models. The second aspect we review is the Smart Grid control and traffic modeling problem which allows us to achieve a better understanding of the communications requirements. Finally, this paper reports recent studies on the electrical and topological properties of a sample power distribution network. Power grid topological studies are very important for PLC networking as the power grid is not only the information source but also the information delivery system - a unique feature when PLC is used for the Smart Grid.

4. Empowering People and society through technologies

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Societal Living has evolved from merely helping just a few of one's physical neighbors to an all inclusive relationship establishment, maintenance and augmentation among all its members at several levels and without limitations. This evolution has occurred within a short time span and is transforming all societal strata.

Structural limitations have given way to open and welcoming attitudes at all generational groupings. Distinctions such as academe, fields of endeavors or cultures are increasingly bridged to create more holistic view of both the problems and their solutions. This evolution is likely to accelerate as families become more global and come to face situations that need cooperation from many, if not all, of the societal institutions.

Information delivery technologies such as the land lines, mobile phones, television and internet with methodologies such as texting, twittering and linking have greatly improved the connectivity among the various groups of our societies. It has paved the way for the above described societal evolution.

However, great barriers to real communication, understanding and cooperation still exist due to the many constraints created on the way to this level of societal evolution. Future evolution can morph into many species of societal living or can evolve into single specie that is highly advanced. The choice of which one would become a reality is very much in the hands of the people that populate the earth at any given time.

Since the origin of technologies, humanity has gained much capability in its development and management. It would seem we are always at the threshold of using that capability in a much more beneficial way than in the times past. There in lie the opportunities.

It has become common knowledge that empowering people is the best way to maximize the outcome of the available opportunities while at the same time increase the number of opportunities as well. Democratic processes empower people faster than any other means, provided there is a well developed mechanism to communicate with all the segments and also directly with the individual memberships. Communication is neither the delivery of some information nor the understanding of that delivered message but is a much more complex set of activities that lead to the desired outcomes for all involved. It is this “complex set of activities” aspect of the word communication – some time referred to as “response” or “reaction” to any information that needs more sophisticated tools and techniques to overcome the afore mentioned barriers.

5. An enhancement of information technology using recursive key rotation & arithmetic operation (RKRAO)

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Key words: *Cipher text, Block cipher, Session Key, Recursive Key Rotation & Arithmetic Operation (RKRAO)*

Recursive Key Rotation & Arithmetic Operation (RKRAO) technique is a bit level technique, the stream of bits corresponding to the source file to be encrypted is to be decomposed into a finite number of blocks that are advised to be varying length. For each of the blocks, the RKRAO technique is applied to generate the corresponding target block.

From a source block of size, say, n , an intermediate block of size $(n-1)$ is generated by applying the X-OR operation between each two consecutive bits. Any intermediate blocks can be considered as an encrypted block for further processing. There is a tendency that execution time of this cipher linearly changes with the size of the file to be encrypted. The cipher is tested to be fast, easy to implement, and require a long key, breaking which is computationally infeasible. The cipher is analyzed to be a strong tool to enhance the security of information communicated through a transmission medium.

6. A review of Spatial Data Mining: Prospective and Challenges in view of Agriculture and Environment Applications

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Keyword: *GIS, Spatial Data Mining, Spatial Databases, Spatial Classification, Multidimensional Data Analysis.*

With the rapid development of the sensing technology to obtain the geographical information in all respect, make the spatial data more complex, more challengeable and bigger in the spatial database which has been beyond the human ability to analyze and interpret for handling the various problems specifically in environment and agriculture under the Remote Sensing. The serious effort has been carried out by world wide to acquire, store, manage, process, analyze and interpret the spatial data under different components like EIS, GIS, DSS, etc to tackle these problems. These components require integration to handle the various issues under one roof to take an appropriate decision. However, Implementation of such integration generate new requirement like data interoperability, data description by metadata, reverse engineering from existing applications. Major issues of such integration come under the spatial data mining to take an appropriate decision. This leads to reconsider the analysis and design methodology of the system and its implementation. This paper takes the overall review about the methods and techniques of spatial data mining along with its merit and demerit.

7. Solution to the wave equation for the vibration of L-Shaped membrane

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Keywords: *L-Shaped Membrane, Wave equation, Eigenvalues, Eigenfunctions. Finite difference & finite element methods*

A membrane is a pliable sheet of tissue that covers or lines or connects the organs or cells of animals or plants. Several white papers came using various pictures of it ever since The MathWorks was founded almost twenty years ago, but it only recently became the official company logo. The MathWorks Logo is an Eigenfunction of the Wave Equation. This paper produces the solution of the wave equation for the vibrations of an L-shaped membrane in MATLAB. The solution is expressed as a linear combination, with time-dependent coefficients, of two-dimensional spatial Eigenfunctions. The Eigenfunctions are computed during initialization by the function MEMBRANE. The first of these Eigenfunctions, the fundamental mode, is the MathWorks logo. The L-shaped geometry is of particular interest mathematically because the stresses approach infinity near the reentrant corner. Conventional finite difference and finite element methods require considerable time and storage to achieve reasonable accuracy. The approach used here employs Bessel functions with fractional order to match the corner singularity.

8. Soft Computing-sensor Based Fruit Growth Systems

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For thousands of years, people tried to understand how a handful of information can perceive, understand, predict and manipulate the larger world. The 21st century is influenced by the convergence of digital technologies namely Information, Computer, Communications and Nano-technologies. This convergence has profound effect on all walks of life. Due to

the impact of the convergence of digital technologies the human activity, world over, got wired into a connectivity that has transcended national frontiers, geographical boundaries and even cosmic contours. The digital technologies coupled with Artificial Intelligence addresses problems in every conceivable area of life and to myriad activities. It helps in decision making in a split second on issues ranging from personal to international. Globalization is, in a sense, synonymous with networking, computers and telecommunications.

Artificial intelligence is sciences of making machines do things, which require intelligence. In the years knowledge systems have been developed from a small scale laboratory science into a technological and industrial success. At present all governmental organizations, business and medical establishments are making use of the systems. Information technology also plays an important role in rural development. Various aspects of agriculture, veterinary, medical, economical and social science are to be studied carefully for designing respective modules. These modules are to be integrated to have a comprehensive system to view the day-to-day problems of rural people. By combining the infrastructure of Information technology with infrastructure of green revolution in agriculture white revolution for milk production, blue revolution for fish and prawn culture, red revolution for production of meat, yellow revolution for oil seed production, we can obtain a new technical/knowledge revolution for rural development.

The present talk introduces and explains some of the concepts of basic components of soft computing and application in the context of rural development by presenting model systems in the respective fields. The author of this presentation is developing several interactive web portals in the areas of agriculture, horticulture, health, animal health, economic and social sciences for providing time to time advises to the rural people. The website www.indiakisan.net is one such portal. This portal provides information regarding the selection of suitable crops, suitable varieties for cropping, soil information, pest & disease control, weed and fertilizer management etc. in different cropping patterns. The web portal www.bharathgramarogya.net provides information regarding the various health problems of the rural people and also acts as the basis for health awareness programs to be conducted for educating the rural people for their good health. The expert systems integrated in the web portals are interactive systems which takes the relevant information in the form of a questioner and provides expert advices for the problems.

9. Cloud Computing – A new computing dynamics

Prof. Rohit Singh

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Cloud computing is a style of computing in which dynamically scalable and often virtualized resources are provided as a service over the Internet. Cloud computing offers a lot of benefits by sharing the same platform, the same servers or mainframe across multiple requirements. That is a huge source of benefit. But there's additional overhead in cloud computing. The organisation needs additional software, they need to build an engine and there are a lot of challenges around maintaining service-level agreements.

Those overheads can kill the benefit of cloud computing in the virtualized environment. Since the Internet is the primary communication mechanism for the public cloud, its reliability and performance need to be questioned whenever considering third party cloud offerings. Private clouds provide better control, reliability, and performance but what is the real difference between those and existing data centers? In my opinion, aside from following a different architectural model of allocating computing resources, nothing. On-demand computing is a great concept but making it work effectively is a tough task. Technologies exist today to dynamically divert unused resources to those applications that need them most.

In testing, it's not that you want to leverage one platform across multiple applications, it's that you suddenly need the platform, and the next day you don't. So of course, having the opportunity to have the platform one day and not have it the next day will make cloud computing a valuable solution.

Platform-as-a-service is an interesting and smart concept. Looking at cloud computing, it gives you a platform to develop your applications, then test them and host them right there. It's a very convenient way of building new applications. When you virtualized your internal environment, you do essentially what the cloud computing is trying to achieve. You put multiple applications on the same platform. So some of the benefit that cloud computing offers will already have been taken, and additional overhead comes in.

10. Internet enabling calibrations and testing of measuring instruments

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The paper deals with the use of Internet in the calibrations and testing of measuring instruments. Since calibration of all laboratory, testing & inspecting equipments at defined periodic intervals is a routine operation the same are required to be sent to the Manufacturers or NABL/KOLAS accredited laboratories for recalibration. This implies a downtime for every particular instrument under calibration thereby affecting the functioning of the respective departments. It also increases cost due to maintenance of standby equipments on one side and also loss of production on the other side.

The development of automated measurement instruments, evolution of the computer networks and growing number of quality standards in the industrial and research fields in recent years has led to the realization of internet-enabled calibration systems, specifically for industrial applications.

Internet-enabled metrology as a wider concept is a term that covers the use of telecommunication systems to provide convenient access to a range of measurement and calibration services.

Many people do a field comparison check of two instruments, and call them “calibrated” if they give the same reading. This isn’t calibration. It’s simply a field check. It can show you if there’s a problem, but it can’t show you which instruments is right. If both instruments are out of calibration by the same amount and in the same direction, it won’t show you anything. Nor will it show you any trending-you won’t know your instrument is headed for an “out of cal” condition.

The remote testing and calibration of measuring instruments is an interesting application that is still not fully exploited, mainly due lack of awareness, technology and cost issues besides some legal issues due to lack of security, which is associated with the operations outside of a calibration laboratory

11. BFP – A Multimedia Network Protocol

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Since the beginning, the Internet has been dominated with traffic from text based applications such as telnet, ftp, and recently by http. With the emergence of new technologies and an increased diversity of Internet use, there has been a new demand for non-text based applications, particularly multimedia. Examples of multimedia applications include video on demand and teleconferencing.

Text-based applications have some characteristics and requirements in common. Most, such as telnet, ftp, and http, require guaranteed delivery. Every unit of data must be delivered without loss or error. Otherwise, the result could be corrupted files and invalid commands. As a result, these applications use the Transport Control Protocol (TCP), which provides guaranteed delivery by automatically retransmitting lost or corrupted data packets.

Certain applications, such as TFTP or DNS, may not need a strictly reliable protocol, but rather a simple protocol with minimal delay and overhead. These applications commonly use the User Datagram Protocol (UDP). UDP does not provide any protection against loss, however, it does not have the overhead of retransmission allowing it to provide a fast, “best effort” delivery.

Multimedia applications have different requirements from text-based applications. An audio stream, for example, requires that data is received in a timely fashion and is more forgiving of lost data. If a data packet arrives at the player too late, it misses the time it is needed to be played. This phenomenon, called jitter, causes gaps in the sound heard by the user. In many cases, a late data packet in a multimedia application contributes nothing to the playback and is equivalent to a loss. Small losses in the playback stream can be replaced with substitute data or concealed so that the listener does not notice.

When designing a multimedia application, a protocol must be chosen that provides a solution for timing issues such as jitter as well as loss. TCP is ineffective due to the

overhead of retransmission and ignorance of timing factors. While it provides a service with no loss of data, it does not support any time constraints. Data can arrive at a receiver with unbounded delay. UDP, conversely, provides a “best effort” service that is timely. It does not, however, offer any guarantees on data loss. With UDP, potentially all data sent can be lost.

To provide a balance between the delay of TCP and the loss of UDP, we propose the Best Fit Protocol (BFP). BFP retransmits only a percentage of the data that was lost, providing a compromise between TCP, which retransmits all lost data, and UDP, which retransmits no data. The amount that is retransmitted depends on several Quality of Service (QoS) factors including current loss and latency, round-trip time, network congestion and the desired quality requested by the user.

The performance of BFP was evaluated using an isolated test network and a simulated audio stream. A quality comparison of the protocol was performed against TCP and UDP where high quality was defined as low average loss and low average latency. Several tests were performed with network conditions of low loss/low latency, low loss/high latency, and high loss/high latency.

12. Perspectives of Climate Change and Environmental Challenges through Nuclear Power Development using Information and Communication Technology

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Climate change is a long-term change in the statistical distribution of weather patterns over periods of time that range from decades to millions of years. It may be a change in the average weather conditions or a change in the distribution of weather events with

respect to an average, for example, greater or fewer extreme weather events. Climate change may be limited to a specific region, or may occur across the whole Earth. The energy sector, from primary energy extraction to end-use, is one of the main sources of greenhouse gas (GHG) emissions, in particular carbon dioxide (CO₂), that raise concerns because of their potential risk to induce global warming and climate change. The carbon dioxide emissions related to energy use are estimated to represent some 75 to 90 per cent of the anthropogenic CO₂ emissions. Climate change is a major global issue on the agenda of policy-makers. Accordingly, a key policy-making objective will be the implementation of measures aiming towards reducing GHG emissions from the energy sector in the medium and long term. In recent usage, especially in the context of environmental policy, climate change usually refers to changes in modern climate. It may be qualified as anthropogenic climate change, more generally known as global warming or anthropogenic global warming (AGW). ICT innovation is a key element to spur green growth in the economic crisis and recovery. However, literature review suggests that most government and business initiatives are still following business-as-usual paths and do not sufficiently tap the sector's innovation potential.

Owing to the fact that the burning of fossil fuels contributes about three quarters of man-made GHG emissions, the implementation of less carbon intensive energy systems is high in the list of possible measures for reducing GHG emissions. Information and communication technologies (ICTs) can improve environmental performance and address climate change across the economy. The biggest gains for smarter environmental and economic strategies and applications are in power generation and distribution, buildings and transportation-three areas which contribute to the bulk of greenhouse gases.

The "ecological driven scenario can be characterized by: (a) sustained technological progress and enhanced international co-operation; (b) economic growth being moderate, but with significant technology adaption and transfer from industrialized to developing countries reducing present regional economic disparities, and (c) technology progress, adaption and transfer, together with high policy measures, resulting in the energy intensity of the world economy by some 1.4% year up to 2050 (compared with an average reduction of 1 % year over the past decade or so).

13. The Role of Information Technology on The Development of Micro, Small and Medium Enterprises.

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Key Words: MSME; EM; Online; Technical Efficiency.

The Micro, Small and Medium Enterprises (MSME) sector contributes 8 percent of the country's GDP, 45 percent of the manufactured output, 40 percent of its exports; provide employment to 60 million persons through 26 million enterprises. There is need for study on the role of Information Technology on the development of MSME. The study reveals that there is high significant, correlation and technical efficiency for online filing of Entrepreneur Memorandum (EM) Part-I than Part-II in TamilNadu. There is also more response for Online filing of Capital Subsidy application and district-wise webpage information. The other states in India should implement like TamilNadu.

14. A framework for Integrating ICT with Universities' Curricula

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Both the Indian IT and Education are now trillion dollars sectors. In deed, it is a matter of pride. However, the potential of our Nation is much more than the above – given its demographics. The Indian Education System has seen a phenomenal growth in terms of quantity and quality - making it the third largest education system in the world after US and China. It is also having the potential to become the best education system with strong

relationships among education, research and industry sectors. On the other hand, the ICT share in India's GDP has been on the rise for almost two decades and is expected to rise further.

There are a few encouraging indicators suggesting the ICT industry has geared up for "intellectual arbitrage" and not merely for "labour arbitrage". The knowledge process outsourcing opportunities are plenty for which the universities need to prepare the graduates. Due to overdependence on the "labour arbitrage", the full potential of our graduates could not be utilized by the industry. At present, we have either CS/IT graduates (ignorant of applications domains - banking, mfg, healthcare, governance etc.) or the non-CS/IT graduates including arts/commerce/science (ignorant of computing/IT). The ICT industry hires the graduates (even post graduates) of all disciplines together, trains and assigns almost at par - aggressively for 6 months or so. The above makes - all that is learnt during their studies- irrelevant.

The research is another casualty. The universities are heavily oriented towards teaching whereas the industry is primarily aiming the development and deployment. The research is confined within research laboratories – which are resource hungry. To harness the true potential of our graduates and to cater to the needs of the stakeholders – there is a need to adapt an appropriate blended approach. The ICT has been the key enabler and driver for growth business, industry, government, academia, research and consultancy sectors. However, the high-end ICT research is yet to begin.

The professional societies and associations can play a crucial role in changing the above scenario. These can become an effective platform – something similar to virtual universities – offering/supporting a plethora of courses to address the limitations in the framework of university education system. These courses can be offered to augment the university curricula and/or a few of these can be assimilated into the curricula. A blended-learning approach using ICT will prove productive and effective.

Based on the author's experience (in the industry, academia and professional societies), the paper proposes a model framework for integrating ICT with the universities' curricula. The framework deals with the finding/outcomes of a few important national conferences including as CSI National Conferences on Education & Research, National Conferences Computational Science & Engineering and National Student Conventions.

The framework includes five major building blocks and objectives for-Strategic Committee of Professors and Experts (SCOPE), Steering/Programme Advisory Committee for Educational excellence (SPACE), Subject Matter – Academic Research & Training (SMART), Sponsored Project Execution and Entrepreneurship Development (SPEED) and Sector-wise Committee for ensuring Orientation, Relevance and Effectiveness (SCORE).

The paper also briefly introduces a model curriculum for a postgraduate programme on Computational Science & Engineering – a relatively new discipline of higher education, as opposed to Computer Science & Engineering (related to science/engineering of building computers).

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**ABSTRACTS OF
ORAL/POSTER PRESENTATION**

**PROCEEDINGS
OF THE
NINETY EIGHTH SESSION OF THE
INDIAN SCIENCE CONGRESS
CHENNAI, 2011**

PART II : ABSTRACTS

**SECTION OF
INFORMATION AND COMMUNICATION SCIENCE &
TECHNOLOGY (including COMPUTER SCIENCES)**

President : Vineet Kumar

1. Applying Instructional Design to Improve User Interactivity and Usability in e-Learning Environment

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Keywords: *Instructional Design, Learning Objects, LCMS*

With the technological growth on Internet, e-Learning has gained vital part in educational delivery system. But the impact is minimal in Higher Education. Many of the e-Learning course materials are either published in PDF formats or using HTML pages which includes few multimedia animation for illustrations. These are utilized as reference material and do not ensure knowledge acquisition and feedback on learning. It is mainly because of the minimal considerations on psychological reactions and the independent learning ability while developing the learning content. The success of e-Learning course

material can be achieved by considering the pedagogical principles with the technological advancements. Few of the principles are curriculum design with specific objectives, consideration of different social groups, learner engagement, learner style, ease of use, and ensure the acquisition of learning objectives with formative and summative assessment. This paper aims on the organization of learning materials around small pieces of semantically enriched learning objects (LO) with high user interactivity and usability.

2. Computer Forensic Authentic Technology for Examination of Counterfeit Currency (Indian Bank Notes) Prepared by Scanning & Printing

Ankit Srivastava, Seema Srivastava, Asim Kumar

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Keywords: *Counterfeit, Genuine, Authentic technology, EnCase Version 5, Hard Disk, RBI Specifications.*

In the modern era of science and technology, the access to high quality and relatively inexpensive electronic devices like computers, multimedia devices, laser and electronic colour copiers, scanners, printers and digital image software has been increased. With the advent of these new technologies, counterfeiting is being carried out more efficiently and its detection has become difficult. In recent past it has been observed the cases of Counterfeiting of Indian currency of Rs 100/-, 500/-and 1000/- are mostly produced by counterfeiters with the help of computer, high quality scanners and printers. These cases seized by police, security features examined in the lab to ascertain the counterfeiting. The circulation of counterfeit currency is generally two types, one is being made with genuine currency paper and printing ink and another one is scanned genuine currency with high quality scanners, printers and digital image software. However, authors have successfully tried a new approach for the identification and preparation of counterfeit currency of Rs. 100/-,1000/-by using EnCase Version 5 software through Fast Bloc Write Blocker in Window XP Operating System, forensically imaged Hard Disk removed from counterfeiter's computer.

3. Prospects Of It Jobs & Hrm In E-commerce In Eastern U.P.

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&

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Jobs in IT and HRM are flourishing via internet. Many websites like naukri.com, *monster.com* and so forth are being surf by people of Eastern U. P. The user is sitting beside the desktop or laptop and surfs the best suited job for him. This is making trouble-free to go here and their for distributing CV or bio-data in search of jobs. By this facility users are connecting themselves on new world of cyber to earn their bread and butter.

The eminence of E – commerce has changed the mindset of Eastern U.P. people. The strugglers are making the best use of IT and HR personals also prefer to use it widely. This paper is an attempt to discuss prospects of IT, HRM and Marketing with e-advertising and their new emergence in form of pyramid for e-commerce in eastern U. P.

4. Pivotal Role Of Wireless Sensor Networks In The Science Of Monitoring - To Incorporate In The Individual Connection Of The Electricity Board

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Keywords: *Wireless Sensor Networks, Sensors, Wireless Network, Data Acquisition, Data Distribution.*

Innovative ideas in Wireless Sensor Networks (WSN) are of great challenges and Conservation of energy is main theme of this paper and we should not misuse the future

generation power. Our challenge of this paper is to implement Wireless Sensor Networks in the individual connections of the Electricity Board. The work is all about monitoring, measuring and updating the daily consumption of electricity by the industries and the households. Data Acquisition is done through the Sensors and Data Distribution is made through the Wireless Network. The consumption of units will be observed and measured through the sensors, to be kept at each individual connection and the measured data is updated to the Data Centre of the Electricity Board through the Wireless Network. The data is updated in the data base of the substation of a particular area and in the Data Centre of the Electricity Board as well. The consumption of Electricity units will be sent to the customer daily (through SMS to their cell phones) in the case of need and can be viewed in the internet (through their personal account). The data base will be provided with the information viz., the daily utilization and monthly utilization of the customer, also the amount to be paid for the consumption.

5. Design of Computer Games: Software, Models and Intelligence

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Games technology has undergone tremendous development. In this paper we report the rapid advancement that has been observed in the way games software is being developed, as well as in the development of games content using game engines as well. One area that has gained special attention is modeling the game environment such as terrain and buildings. We present the Continuous Level of Detail (CLOD) terrain modeling techniques that can help to generate and render realistic terrain in real-time. Deployment of characters in the environment is increasingly common. This requires strategies to map scalable behavior characteristics for characters as well. We present two important aspects of crowd simulation: the realism of the crowd behavior and the computational overhead involved. A good simulation of crowd behavior requires delicate balance between these aspects. Our focus in this paper is on human behavior representation for crowd simulation. To enhance the player experience, we present the concept of Player Adaptive Entertainment Computing (PAEC), which provides a personalized experience for each individual when interacting with the game. The current state of game development involves using very small (typically 4-12%) percentage of CPU time for game AI. Future game AI requires

developing computational strategies that have little involvement of CPU for on-line play, while utilizing CPU's idle capacity when the game is not being played, thereby emphasizing the construction of complex game-AI models off-line. We introduce a framework of such non-conventional game-AI models.

6. Information Technology Aplomb solution for the affrighting vectors

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The stateliness of any technology would be absolutely acknowledged when it liberates the end-users from the real world problems. Information technology has been proving this pragmatism in vector biology, by well-disposed tools and applications towards 'Vector control and management' endorsed by the approaches of Biology Division, IICT armed by ENVIS (Environmental Information System), a plan programme by Government of India, themed on Vector borne diseases. The peninsula is perimetered with a variety of natural and social traits attesting the prevalence of vector borne diseases. Environmental and health issues, especially cohered to mosquitoes are always complex problems requiring information from many sources. And not only the just requirements, but also the processing and presentation of such information in an enhanced way to the community, constitutes the major target. The ultimate goal thus became the stipulation of support for knowledge discovery applications through data mining and bioinformatics tools. Our affirmation is marched through updates on the outbreak information tagged along with the development of web applications and databases, decision support systems etc... on major vector borne diseases like Malaria (Database on Malaria), Dengue(DDSS), Filariasis Monitoring Visualization system (FMVS), Japanese Encephalitis (JEBNET) etc...in the website dedicated for the purpose (<http://iictenvis.nic.in>). The essence of this objective lies in accepting the challenge to play an active role in the local and global networks, through transfer of technology (http://www.iictindia.org/IICT_WEB/Filariasis.htm), for the receipt of the solutions necessary in the disease endemic zones. Furthering the utilities with advancements in the world of communication to keep on pace with the springing up trepidations in vector control, forms the principal deed at this instant.

7. Publish and Query the Semantic Data of Molecular Structure, Biological Activity and Nutritional Properties of the Natural Food Sources

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Keywords: *Semantic Web, RDF, OWL, Linked Data*

The etiology of most chronic diseases involves natural foods, chemicals and biological activities that modulate important physiological processes. Nutritional factors of Natural Food are implicated in many common conditions such as asthma, cancer, diabetes, hypertension disease; however, the molecular mechanisms underlying these correlations are not well understood.

Applying semantic concepts to find more related information from the domains of Chemical Compounds, Biological Activities, Diseases and Natural Food sources is the objective of this work.

The Semantic Web proposes the content on the Web using ontologies, the structure underlying data for the purpose of machine understanding. This allows asking sophisticated queries from the different datasets linked together. Knowledge bases are playing important role in enhancing the intelligence of the web.

8. A Study On The Application Of RFID Technology In Health Care Monitoring System

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and A. Jayashree Sundaram**

SRM University & Pondicherry University

Keywords: *Ubiquitous Computing, RFID, Hospital Information System.*

Radio Frequency Identification (RFID) is getting popularity among identification technologies due to its low cost, light weight and reduced size. Due to the recognition of

RFID in the area of manufacturing, retail, and pharmaceuticals, it is now in consideration for use in different areas like Ubiquitous computing, Health care, Agriculture, Transport and Security. In recent years, there exists deficiency in the number of doctors and increase in medical cost. In this, a wearable vital sensor is being developed which can be used in the hospital. Health monitoring system can be used to confirm and share the sensor information received from the Personal Computer attached to the wearable sensor, immediately through the browser. Using RFID, the location of a doctor in the hospital can be traced out. This system produces an emergency alert based on the sensor information to the doctor. This paper analysis the application of RFID Technology in Health Care Management System and its related issues.

9. Net Based Rural Health Care System

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Keywords: *Web Based Medical information system: using latest cutting edge technology -OLAP - Smart card-Three layer architecture spread across villages, taluks, and state capitals-Fourth layer a control at single point for the whole country.*

For the past four decades, Clinicians, physicians, Health service Researchers, and others have been investigating in bringing the advanced telecommunications and information technologies to improve Healthcare for our vastly populated nation. The main objectives of a health system are to respond to people's expectations and needs by providing services in a fair and equitable manner. This paper focuses on Intranet based Rural Healthcare system. The Healthcare centers are organized as a hierarchy of three layers, where the layers are Sub-center, Primary health center and state-wide Community health center. . The proposed system is going to make the functionalities of each layer as computerized one. In order to exploit the latest cutting-edge technologies of Information Communication Technologies (ICT), this paper defines the technologies recommended to be deployed in each layer of three layer architecture. The fourth one, visualized as of now could be the Central terra-database (Mega) for the population across the country.

10. Three – Dimensional Spatial Information Visualization In Geologic Exploration Engineering

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Keywords : GThree-Dimensional, Data Model, Visualization, Geologic Exploration Engineering

Visualization is the important means of understanding and explaining the geologic phenomena from the bore huge data sources. In this paper, taking the geologic exploration engineering as research objects, the authors discuss the three-dimensional geologic phenomena, propose a blended data model integrated vector and raster data, analyze the necessity and technique route of visualization, and several techniques for geologic exploration engineering visualization and modeling are proposed.

11. An Efficient Neighborhood Keying Method To Preserve Session Secrecies In Ad-hoc Environments With Node Level Security Measurements

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An ad hoc network is a collection of wireless nodes dynamically forms a temporary network without the use of any existing network infrastructure or centralized administration. As adhoc network maintains transient topology there is a possibility for network partitioning. Trust management is the most critical security issue in mobile adhoc network. In order to safeguard the messages sent through nodes, a key management and encryption scheme, called Neighborhood key method is presented. In this each node shares secrets only with authenticated neighbors in the ad-hoc network. Thus preserving session secrecies i.e., backward and forward secrecy maintained using neighborhood keying method. Existing techniques utilize on-demand AODV network routing protocol which undergoes some well

known attacks. To overcome these attacks a model is proposed based on nodes known as node level security monitoring. Node level security behavioral is recorded to identify any misbehavior of each other nodes in the network. In such case any suspicious activity identified by isolation of that particular node is possible. Initial configuration parameters are assigned for simulation environment setup and effectiveness of neighborhood keying method which are evaluated using simulation results. This paper presents performance and security measurements of an application layer overlay approach and also aims highly to maintain authentication, confidentiality, data integrity for the messages that pass through application overlays.

12. Disaster Medicine, Telemedicine and Integrated Vector Management : Un-spider's Space-based Information Program For Disaster Management for Developing Countries

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Key Words: UN-SPIDER, Disaster-medicine, Telemedicine, Vector Management.

UN-SPIDER-United Nations Platform for Space-based Information for Disaster Management and Emergency Response is United Nation's new programme which was established as per UN's resolution 61/110 of 14 December 2006 at their General Assembly meet, with the following mission statement: "Ensure that all countries and international and regional organizations have access to and develop the capacity to use all types of space-based information to support the full disaster management cycle". It is a gateway to space information for disaster management support, by serving as a bridge to connect the disaster management and space communities and by being a facilitator of capacity-building and institutional strengthening, in particular for developing countries. UN-SPIDER is being implemented as an open network of providers of space-based solutions to support disaster management activities. Besides Vienna, the programme also has an office in Bonn, Germany and will also have an office in Beijing, China. This paper communicates about Emergency / Disaster Medicine, Telemedicine and Vector-borne Disease Management which are the space-based solutions for prevention and control of harmful health effects due to disasters and optimizing benefits to both health and environment.

13. Laser Printers - Health Hazards on Use & Action Points

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Keywords : *Laser, hazards, VOC, OEL*

Laser printers have occupied a significant place in market. They are friendly when used occasionally and serviced regularly. Laser printers are very risky to health if badly positioned, poorly maintained and used frequently or for long runs. The risks include hazards that are unexpected and out of general people thought. Irritated eyes, nose & throat, dermatitis, headaches, premature ageing and reproductive and cancer hazards are some of the health affects. As a preventive measure proper ventilation and maintenance are required. The present paper includes the health hazards & their preventive measures..

14. A Double Layered Security for Fingerprint Biometric Authentication

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Keywords: *Biometrics, Security, Fingerprint, Authentication, Encryption;*

Security plays a vital role from foyer to finale of essentials. According to research, Biometric is the pinnacle of high level of security, even though, recently Pilfering is strangely increasing in case of all biometric authentications, hence security of the biometric data is very essential for the real world applications. Fingerprint Biometric identification is very popular among the various biometric techniques and also where major pilfering was happening.

In this paper, we propose a more secure biometric fingerprint authentication, which addresses the concerns of user's privacy, security, and authentication. A small area sensor is used as an external device for laptop and desktop for fingerprint authentication. Fingerprint matching can be used as an additional to the password as a security measure in many secure sectors like online banking, online shopping or even replace online digital signatures. In this authentication system, we use the user's id and password as the initial level of security. The client and server do not exchange the user's extracted feature, i.e., fingerprint directly. Instead, a third party Enrollment Server is used to authenticate and encrypt the extracted fingerprint using an asymmetric encryption. The Enrolment server even sets the threshold value and sends the data to the actual server providing more security. This biometric authentication is designed to provide high security over public networks and trustworthy identity verification system through which the level of pilfering can be greatly reduced.

15. Wireless Sensor network: An Introduction

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Keywords: *WSN, routing algorithm, energy efficient.*

Wireless Sensor Network (WSN) is one of the new era technologies of computer network domain. WSN is consist of large number of tiny nodes based on sensing, data computation and communication abilities. This sensed information forwarded to Base Station (BS) with the help of routing algorithms. For designing a routing algorithm two factors are considered first one is shortest path and another one is energy efficiency. This paper reveals various standards involved in designing WSN and network topologies, routing protocols. want to focus basic knowledge of WSN i.e. routing algorithm, protocols e.t.c.

16. Enhanced Security of UID Biometric System with Cancelable Biometrics

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Biometric Security Systems are now widely used to control access to a system or an area. Most of the systems are now shifting from password based and card based identification to biometric identification. Even nationwide identification system of UID is also implementing biometric system for identifying the residents of the country. But, these biometric systems are themselves insecure and if a biometric template is stolen it is not feasible to cancel it like passwords and issue a new template as humans have limited number of biometric traits. Cancelable biometrics is considered as the solution to this problem. In this work we are presenting the current state of affairs in cancelable biometrics research and analyze its applicability in a large identification system like UID in India.

17. Combating Natural Calamities- Cloud Computing Solutions for Chennai city

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Keywords: Cloud Computing, Natural calamities, Earthquakes, Rising Sea Levels

Natural calamities are occurring in all parts of globe, every year in the recent past.

They cause havoc and chaos for the people. Hence there is a need for preparedness and mitigation measures. These issues need to be addressed by all emerging technologies including Information Technology. And the recent prodigy of IT family is Cloud Computing, which is Internet based computing. This article explores the avenues of Disaster Management where cloud computing services can be used, focused on Chennai City.

18. Study of significance of object-oriented Paradigms in Modeling

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Keywords: *Object-oriented Modeling, Analysis Models, System Analysis*

In Object Oriented Paradigms, Modeling in particular, the application of analysis Models has gained growing interest among academicians, researchers and software analysts in last few years. The major reason behind their beliefs of advocating analysis Models are to support knowledge reuse and produce more reliable conceptual design at reduced time frame. The purpose of documenting analysis Models is to incarcerate proven expert solutions to recurring business problems. However, the strength of analysis Models is not fully achieved and their reuse is still limited. In this paper, we formally give an overview on the state of Object-oriented modeling using Models. In order to strengthen the groundwork for object oriented analysis Models (OOAP), five future OOAP research directions have been suggested which are establishing theoretical/empirical foundation, proposing appropriate structure, understanding influences on different system analysts, enriching modeling capabilities and suggesting other kinds of measurement.

19. Ad Rotator Using ASP.NET Code :

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The Ad Rotator web server control cycles through a series of clickable ad banners, and allows some ads to be weighted more heavily than others. In order to generate ads on your Web page you will need the image files and accompanying URLs. The intent of this article is to get a good experience in developing using the Ad Rotator web server control for beginners. This application will teach you how to develop a website with an ad management system. This uses XML to change ads in the web page. Create an XML file containing references to ad banners and their associated properties. Write your own logic to select an ad banner in the Ad Created event.

20. Rural Marketing In India: A Road Ahead

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The concept of Rural Marketing in Indian economy has always played an influential role in the lives of rural population of India. In India, except few metropolitan cities, almost all the districts and industrial townships are well connected with rural markets. Though rural marketing is a new concept and ideology in the arena of marketing, it has left a strong feeling among the people that without giving appropriate weight to rural areas and its development, it could never be possible to ensure the overall growth and well being of the country. Since past few years considerable developments are taking place to reconstruct the rural part of India.

Many corporate houses have entered into the field of rural marketing to contribute in rural development of the country. Godrej, Birla, ITC, Reliance and many others has established rural retail hubs as a result of that economic status has been significantly improved. Farmers are getting access to market to sell their product as well as keeping themselves updated and informed regarding the going on trends of market.

21. Women Empowerment Through Education

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Key words: Women, Literacy, Empowerment, India

Today Indian women have excelled in each and every field from social work to visiting space station. There is no arena, which remained unconquered by Indian women. Whether it is politics, sports, entertainment, literature, technology everywhere we can hear applauses for her.

Although the census of 2001 gives us very optimistic picture with regard female literacy. But actually there are still many remains to be done. Generally when we measure the gap between man and women literacy all over India, we find approximately 20% gap in literacy between man and women.

22. Ambiance of internet advertising on E-shopping: A study from eastern U.P.

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KeyWords: *Know-how, Eminence, Ambiance, E-Advertising, E-Shopping.*

E – Advertising is becoming the most pervasive event for the promotion of product and services. Through this technology the business and industry are boosting up their sales thus profit. The user is sitting on his / her table and ordering the product for him / her and

enjoying its usage without moving to the shop or showroom physically. The user is viewing the ads on its *lapi* or desktop via internet and orders it using this know-how of e-shopping. This is making trouble-free to the user to search particularize about the product or services assessing them via websites.

The Internet Advertising is igniting the user instinct to know and purchase the required need without moving to shoppers top. This know-how has changed the current scenario of shopping. The eminence of E – Shopping has changed the lifestyle of Eastern U.P. people. They prefer to pay online than to travel with cash or make DDs. They are not going to insurance office, instead comparing the schemes on internet and calling the advisor at their home. This paper discusses the ambience of Internet Advertising on E – Shopping on the study based on seven cities of Eastern Uttar Pradesh.

23. Carbon Credit Market in India : Past, Present & Future

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Day by day the cycle of climate on earth is changing. Global warming has led to season shifting, changing landscapes, rising sea levels, increased risk of drought and floods, stronger storms, increase in heat related illness and diseases all over the world. This has resulted due to emissions of Green House Gases (GHG's) from various anthropogenic activities. Since the inception of Kyoto Protocol in the year 1997, countries all over the world have become more concerned about 'Global Warming'. Industrialized countries are the major contributors to these emissions compared to the developing countries. The article "Carbon Credits Market in India: Past, Present & Future" describes how India has emerged as one of the leading Carbon traders under the Clean Development Mechanism (CDM) of Kyoto Protocol. The paper also tries to explore present and future scenario of carbon trading market beyond the present deadline of Kyoto Protocol of 2012.

24. Security as a New Dimension in Embedded System Design

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Keywords : *Secure Computing, Embedded Systems, Security, Encryption.*

The security of embedded systems and propose a design methodology that can help designers and developers to deliver more secure systems. Security of embedded systems provides new business opportunities and prevents losing many opportunities. Embedded systems are an established part of life. Their security requirements underline the importance of properly formulated, implemented, and enforced security policies of Information. Currently, security is just an afterthought, and most solutions are meant to thwart particular attacks. However, the increasing number of security breaches, the ensuing economical losses, and potential dangers all emphasize the importance of fundamental security solutions. This paper comprises basic purposes of embedded systems in respects of security concern and factors involved in security vulnerabilities. Further reveals, system embeds design analysis and the underlying architecture involved with available tools.

25. Microfinance and Information and Communication Technology – The Road Ahead

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Keywords: *Microfinance; Information and Communication Technology (ICT); MIS*

Microfinance and Information and Communication Technologies (ICTs) are both new age paradigms on the development and the corporate canvas. Hence it was only a matter of time before the two were thought to form a two edged samurai sword which would greatly enhance the effectiveness of the efforts being made towards the empowerment of the poor and contribute to broad-based sustainable economic development. Due to their

nascent state and tremendous potential both Microfinance and ICT continue to evolve at mind-boggling speeds. Information and communication technology (ICT) plays a very critical role in not only letting the microfinance institutions (MFIs) purvey their services efficiently, but has also let the clients of these MFIs access the financial services more comfortably and cheaply. Application of ICT has also resulted in better and more efficient back-office operations, the MIS, of the MFIs. Some of the tools of ICT that have been used across the world to provide the MF services are PCs, Mobile Phones, PDAs, ATMs, Smart Cards, etc. The paper analyses the role and relevance of ICT in the front end and the back office operation of the MFIs in the specific context in which they operate.

26. An Introduction to Classical Encryption Algorithms

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There are many aspects to security and many applications, ranging from secure commerce and payments to private communications and protecting passwords. One essential aspect for secure communications is that of cryptography. Cryptography is necessary for secure communications. The word cryptography in Greek means “secret writing”. However the term today refers to the science and art of transforming messages to make them secure and immune to attacks. It is “the study of various ways to disguise message in order to avoid the interception from unauthorized interceptor”. The cryptography is a complex field, which needs knowledge of mathematics, electronics and programming. This paper has two major purposes. The first is to define some of the terms and concepts behind basic cryptographic methods, and to compare the myriad cryptographic schemes in use today.

27. Water Security In India- Challenges and Initiatives

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There is a popular saying about water that the most precious thing on the earth is free of cost. However the things have changed greatly and water which used to be cost free is now no more cost free in many parts of the country. India is facing several challenges related to water like consistently reducing per capita availability of water due to increasing population, overexploitation of ground water resources leading to fall in ground water table in many areas, deterioration in availability of quality water, etc. In spite of several tall claims not even one city in India provides 24 hours, 7 days a week water supply. Slum and remote areas do not even have piped water connections and many people live by purchasing water for their day to day uses. This paper deals with the challenges being faced by the country at the front of availability of water and the initiatives being taken to overcome those challenges. It also deals with the measures which should be taken to ensure total water security in India.

28. Simultaneous compression and encryption using trigonometric based scheme

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Key words: *Cryptography, Compression, Encryption and Trigonometry.*

In computing world day by day great challenge in the area of compression and encryption. In recent years there has been a tremendous increase in the demand for encryption and compression. It is desired to transmit redundant data over an increase and

bandwidth constrained channel, it is customary to first compress the redundant data and then encrypt it for security reasons.

This paper concentrates on a trigonometry approach that does simultaneous compression and encryption. This implementation methodology works well for encryption when the cipher is transmitted without storage and works as a Lossy compression algorithm when stored in Unicode format analysis proves that this algorithm consumes less execution time and effective compression is done.

29. Web Based Shopping : Prospects & Problems of IT Industry

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Key Words: *E-Commerce, Web, Product, Shopping Cart, Electronic Money*

Web-based shopping also termed as online shopping is one aspect of the business-to-consumer electronic commerce (e-commerce), the act of purchasing products or services over the Internet. Online shopping has grown in popularity over the years, mainly because people find it convenient and easy to bargain shop from the comfort of their home or office. One of the most enticing factor about online shopping, particularly during a holiday season, is it alleviates the need to wait in long lines or search from store to store for a particular item. Consumers find a product of interest by visiting the website of the retailer directly, or do a search across many different vendors using a shopping search engine. Once a particular product has been found on the web site of the seller, most online retailers use shopping cart software to allow the consumer to accumulate multiple items and to adjust payment and its quantities. This paper is intended to reveal the evolution of business over the internet world. It briefs the various technological aspects along with advantages / disadvantages associated with web shopping.

30. Research in Indian Medical Universities Its status and Implications

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Keywords: Healthcare, Research, India, Medical Education

Indian Medical Education one of the largest in the world, pivot for the robust expansion of the healthcare industry is in dire straits today. There is an alarming level of mistrust among the general public for medical graduates and a crucial matter of contention is Professional Accountability of Doctors. Commercialization of medical profession is cited as a common reason for the dilution of quality, doubts have been raised regarding the quality of training. This has given rise to many issues two of which discussed in this paper are

1. Are the doctors well qualified to discharge their clinical responsibilities?
2. Whether the teaching in medical college is static with little or no emphasis on practical knowledge and research. Both the questions are complementary and the fact that research is the keystone on the advancement of medicine and solution to the present problem could not be thus denied. This paper intends to draw attention on the poor status of research in medical colleges, its possible reasons and implications on the development of nation in a globalised economy.

31. Role of Information Technology in Rural Development Of India: Emphasizing Indian Projects

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and

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Keywords: India, information technology, Internet, rural development.

How can information technology (IT) contribute to rural development? What are the

channels through which impacts can be realized, and what are the practical means for realizing potential benefits? This paper examines several ongoing projects that aim to provide IT-based services to rural populations in India. These projects are distinguished by the goal of commercial sustainability, which supports scalability and, therefore, more widespread benefits. The analysis highlights the common building blocks required for successful implementation, and the relative strengths and weaknesses of different approaches.

32. The Voice Of Customer (voc Table): Understanding Customer Needs For Six Sigma Process

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Quality can be defined as meeting customer needs and providing superior value. Meeting customer needs requires that those needs be understood. The “voice of the customer” is the term to describe the stated and unstated customer needs or requirements. Voice of the customer (VOC) is the first step of six sigma process in either of the methodology like DMAIC and DMADV or any other. For Six sigma process the voice of customer is the most important process to start a quality process. This paper initially introduces the voice of customer table; common problem in capturing voice of customers, process of capturing customer needs and organizing the customer needs in a systematic way so that they can be used effectively in six sigma process.

33. The Effective Utilization of Soft Computing Techniques for Academic Performance Evaluation

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This research paper highlights the relevance of a relatively new quantitative methodology known as fuzzy logic, vague set and Artificial Neural Network (ANN) to the task of evaluating student academic performance. It introduces the principles behind fuzzy logic and illustrates how these principles could be applied by educators to evaluating student academic performance. Several approaches using fuzzy techniques have been proposed to provide a practical method for evaluating student academic performance. However, these approaches were largely based on expert opinions and also difficult to explore and utilize valuable information embedded in collected data. We have proposed four new methods for evaluating student academic performance based on Fuzzy Logic Techniques, Vague Set and Artificial Neural Network (ANN). A suitable fuzzy inference mechanism and associated rule has been proposed. The new methods have been applied to perform the evaluation of student academic performance and also made comparisons with typical existing methods, revealing significant advantages of the present work.

34. Knowledge Management in Insurance Industry through Data Warehousing System

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Data has come to occupy a very important place in several management functions, irrespective of the domain to which an organization belongs. There has also been a growing realization that decision making based on statistical bases tends to be closer to accuracy,

for obvious reasons. Lack of data also hampers steady growth of business. Particularly in a domain that has to do with large numbers and accuracy of assessment, the need for collection and generation of data-based information needs no emphasis. The importance of data for successful conduct of business cannot be over emphasized. This holds true for almost all types of businesses universally, as business decisions have to be taken considering the past experiences, present scenario and future projections. The importance of data is most paramount in the insurance industry. For insurers to generate actuarial assumptions which are so vital for such important management functions like underwriting and pricing; the quality of data is required to be of a high order viz. comprehensive, clean and meaningful. The process of collecting data; apply the standards of cleansing and storage; compiling the data and storing it in a usable form are all replete with huge costs and deployment of precious manpower resources. Insurance companies should take cognizance of this fact while creating a database.

35. Integration of Soft Biometric with Primary Biometrics

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Unimodal Biometric systems are not perfect to recognize the person. It is difficult to achieve very high recognition rates using unimodal systems due to problem like noisy sensor data and non-universality and lack of distinctiveness of the chosen biometric traits, unacceptable error rate and spoof attacks.

However using multiple traits will increase the enrollment and verification times, cause more inconvenience to the users and increase the overall cost of the system. Therefore we propose another model to reduce the error rates of the biometric system without causing any additional inconvenience to the user. Our proposed model is based on integrating soft identifiers of human identity like age, height, weight, gender, ethnicity, skin color, eye color, birth mark etc., into a (Primary) biometric identification system.

36. The Prospects of IPv6: An Introduction

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Keywords: Datagram, Headers, Networking, IP.

Internet Protocol version 4 (IPv4) one of the power-full phenomenon in computer networking technologies, that are in use for the last 10 years. Although most of the address-space issues have been resolved for the time being other features that IPv6 enabled are very useful and will only enhance the capabilities of the Internet Protocol in the future. The IP protocol is a connectionless, unreliable protocol. TCP uses IP to establish sessions with remote computers and provide the reliability of the data transactions. IP, however, provide the hierarchical address space used by IPv4. Yet this address space is limited to fields in the IP datagram that are only 32 bit in length. When first created, it seemed like this address space would provide enough IP address to least four decades or more, but now it not true. This paper concentrates on the future of the Internet Protocol. This paper begins by assessing the strength and limitations of the current version of IP, and then considers an entirely new version of IP.

37. Upgrading Small & Medium Scale Enterprises (SME's) Through Science & Technology

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The 21st century is characterised by globalisation and systemic innovation, where new products and services are increasingly emerging from complex interactions and cross-pollination of ideas among individuals, organisations and environmental factors. The changing scenario with the globalisation of technologies and the shift in emphasis from manufacturing to a knowledge-based economy has immensely affected the competitiveness of countries and enterprises. Yet in this changing scenario, small- and medium-scale enterprises (SMEs)

occupy an important and strategic place in economic growth and equitable development in all countries. Constituting as high as 90% of enterprises in most countries worldwide, SMEs are the driving force behind a large number of innovations and contribute to the growth of the national economy through employment creation, investments and exports. Their contribution to poverty reduction and wider distribution of wealth in developing economies cannot be underrated. This paper looks at SMEs from the view-point of Science & Technology interventions, examined the global scenario of SMEs, status of the Indian perspective, and looked into various schemes in existence in India and finally suggested ways to improve the health of SMEs and impart them an edge to compete in the global market. The factors – strengths coupled with opportunities – that work in favour of Indian SMEs include their high contribution to domestic production, significant export earnings, low investment requirements, operational flexibility, location wise mobility, low intensive imports, capacities to develop appropriate indigenous technology, import substitution, contribution towards defence production and competitiveness in domestic and export markets. Thus this paper looks into new approaches to strengthen them effectively, one has to understand the limitations of SMEs, which include low capital base, concentration of management functions in one/ two persons, inadequate exposure to international environment, inability to face impact of WTO regime, inadequate R&D and lack of professionalism. Besides these, the most formidable problem faced by the SMEs has been in accessing technology and maintaining competitiveness.

38. A New Approach for Measuring Semantic Similarity between Words via Concepts and Hierarchical Structure

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Keywords: Concept, Semantic Similarity, Information content similarity.

Semantic similarity relates to computing the similarity between conceptually similar but not necessarily lexically similar terms. Evaluating semantic similarity of concepts is a

problem that has been extensively investigated in the literature in different areas, such as artificial intelligence, cognitive science, databases and software engineering. Currently, it is growing in importance in different settings, such as digital libraries, heterogeneous databases and in particular the Semantic Web. In such contexts, very often concepts are organized according to taxonomy (or a hierarchy) and in addition, are associated with structures (also referred to as feature vectors). We investigate approaches to compute the semantic similarity between natural language terms. In this paper, a method for evaluating similarity of concepts is presented, where only concept taxonomy is considered. This paper presents new approach for measuring semantic similarity between words via concepts and hierarchical structure is used to present information content.

39. Indian Contribution On Nanotechnology A Bibliometric Study

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Nanotechnology and nanoscience, a new scientific and technology field that has generated a huge number of publications during the past two decades. The research output on nanotechnology and nanoscience have been analysed by number of eminent personalities such as Kostoff¹, et.al., Lin and Zhang², Braun³, et.al., Glanzel⁴, et.al., Willson⁵, et.al., Lalit Mohan⁶, et.al., There are many similar studies are carried out on nanotechnology⁷⁻¹⁰. This study elucidates the Indian contribution on nanotechnology during the period 1990 to 2009.

The main objective of the present study is to find the publication trend on nanotechnology. The other objectives are :

- To measure the quantum of literature on Nanotechnology during the period 1990 to 2009.
- To examine the subject profile, growth rate & doubling time, in the field of Nanotechnology.

- To study the authorship pattern, Degree of Collaboration , Author Index in the field of study.
- To rank the journals, institution and authors in the field of study.

For the purpose of the study, the SCOPUS an international database was searched for all records of papers published by scientists/academicians from the part of the R& D activity that has resulted in publication in peer-reviewed journals. Data was collected from SCOPUS database till 2009. Glanzel, et. al.⁴ and Wilson,et.al.⁵ used the several comprehensive search strings used by to elicit records relevant to nanoscience and nanotechnology. The same search string was used for the study. The bibliographic indicators such as Authorship Pattern, Author Index, Degree of Collaboration, Growth Rate, Doubling time were employed to verify the objective of the study. The findings of the study will reveal the coherent dynamic nature of the subject. Further it will enable to understand the institutional, geographic and temporal dimensions of spread of nanotechnology and Nanoscience which is crucial factor in application areas and research directions.

40. OBS Architecture for Pervasive Grid Computing – A Review

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Keywords: Grid, Computational, Architecture, Network

Grid computing offers high levels of computational, storage and network capacity by bundling and sharing resources through a uniform interface. In its current form, Grids are restricted to only a small application area, and deployment proceeds mainly for specific problems. However, if Grids are to become as ubiquitous as electrical power delivery by making it available to the public at large, several network-related problems will have to be solved first. In this paper, we show the limitations of the currently deployed optical networks, by evaluating future applications for the Grid. Subsequently, we propose a novel architecture based on Optical Burst Switching, and clearly show the advantages of our approach.

41. Scientific Equipment Sharing System (SESS)

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Keyword: *Web enabled, Equipment sharing, software, scientific equipments, inventory*

The experiments are vital part of a research work. This required measuring the process parameters and output variables. Key indicators of the quality of a measuring instrument are the reliability and validity of the measures. Using tests or instruments that are valid and reliable to measure such constructs is a crucial component of research quality. The higher accuracy and faithful measurement can be achieved by costly equipments. The basic research in science and technology is mostly funded by government or university support. There is always crunch for fund for such projects. In such a situation sharing of scientific equipments not only save money but also speed up the research activity. This web based software helps in managing the inventory of scientific equipments and their sharing. This provide due recognition to sharer as well as borrower. This software is fit for multi user environment in a medium to large size organisation and its access is control by password.

42. Flexible Software Reliability Growth Model for Extracting Project Quality Metrics and Release Time Determination

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Keywords : *Debugging Index, Failure intensity function, Generalized NHPP, Learning Index, Quality Metrics, Software release time, SRGM,*

Software reliability engineering has remained an active research subject over the past 40 years, challenges and open research problems still exist. In particular, vital future goals include the development of new software reliability engineering paradigms that take

software architectures, testing and debugging techniques, and software failure manifestation mechanisms into consideration. Subsequent to the publication of Goel Generalized Non-Homogenous Poisson Process (NHPP) Software Reliability Growth Model (SRGM) in the year 1985, a number of new flexible models have been proposed by researchers to improve the goodness-of-fit and predictive validity measures while modeling practical industrial failure data. In this paper a Generalized NHPP model with failure intensity function of the same form as that of modified generalized exponential function is used to determine the software release time with software failures data. It is found that the model seems to determine the release time accurately, consistently. In addition the SRGM also provides vital quality metrics immensely useful to the software developers.

43. Eye Interface Technology Electro Oculography Control of Computer with Eyes

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Today the use of computers is extended to every field. Many sophisticated devices like touch screen, track ball, digitizers etc made interaction with computer ease from novice to professional. But physically disabled individuals are deterred from using computers due to their inability to control mouse. However, if directional and hardware design. As my contribution to this paper I introduce a new keyboard design, some modifications in design to overcome the drawbacks in existing model

In single statement my paper deals with controlling, operating computer with the aid of eyes. And this was the project which I am doing under the precise guidance of Indian institute of technology madras (IITM) in which a live working model costs around 10 lakhs is being built by our team members.

44. PERM pushes CAPTCHA to oblivion

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Keywords: *DoS attack, CAPTCHA, Piezo electric resistive material, finger pressure, keyboard*

Denial-of-Service (DoS) attacks pose a significant threat to the Internet today. Techniques that try to detect such an attack and throttle down malicious traffic prevail today. CAPTCHA is one of the standard technologies used, which requires human-cognitive-processing abilities. Usability and robustness are two fundamental issues with CAPTCHA, and they are often interconnected with each other. But, these are compromised by various factors. For instance, usability issues in CAPTCHAs are that the text or image embedded is very badly distorted for the humans to identify them. It is a real challenge for people with low vision. Secondly many confusing characters are used which really makes it very difficult even for normal system users. Thirdly font size, type, image size, colours, background all together gives a very bad presentation, which confuses the humans instead of bots. It clearly shows that it requires a considerable study on the usability issues on the CAPTCHAs. As spammers advance, the puzzles get progressively harder and more of a burden is placed on humans. What is required is a new test that does measures user heuristics without requiring additional user input. Keeping these usability issues in mind, in this paper we propose a pressure sensitive computer keyboard which does not require an additional input from the humans.

Pressure sensitiveness is made possible in keyboards by the use of PERM (piezo electric resistance material). In this device, pressure exerted by the fingers is converted to resistance. This resistance can be measured and used as an aid to replace CAPTCHA techniques. The measured resistance is converted to digital signals and it is attached to the data for verification.

45. Cotton Expert Advisory System Using Rank Based Genetic Algorithm

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and N.Thirupathi Rao²**

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Keywords: Expert Systems, machine Learning, Genetic Algorithm, Selection, Cross over operator, Mutation, Cotton, JSP & MYSQL.

This paper deals with the design and implementation of Genetic Algorithm with Rank based selection mechanism on online web based Cotton Expert Advisory Systems. This cotton expert advisory system is aimed to identify the diseases in cotton and suggests the farmers with proper cure through online. Expert systems are computer programs that capture some knowledge and allow its dissemination to others. Machine Learning is the branch of Artificial Intelligence which gives a wide variety of solutions in realistic problems through its algorithms. By using the genetic algorithm on an expert advisory system, its selection and cross over would be processed for finding a disease in an expert system at each interval. To overcome this large number of iteration problems, the standard genetic algorithm had been modified depending on the rank based and selection mechanism in which the numbers of iterations were reduced for each time search in the database for finding the proper matching diseases. This advisory system is designed by using JSP as front end and MYSQL as backend.

46. Expert System on Seed Spices: An ICT initiative for Knowledge Management in Agriculture

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Key Words : Expert System, Knowledge Base, Inference Engine, Forward Chaining

Seed Spices are the spices that are consumed and used as seed in the same form.

Seed spices are important export oriented commodities and about 12% of the total spices production (75,100 tonnes/year) is exported in raw as well as value added products, realizing foreign exchange worth Rs. 208.36 crore. For getting the maximum yield and increase production the choice of the variety plays a very important role. Varieties of greater significance have been developed by NRCSS Ajmer and other State Agricultural Universities that had numerous characteristics in terms of plant, Grain and some of the vital characteristics important for farmers. To organize these varieties scientifically an Expert System on Seed Spices has been developed by IASRI, New Delhi in collaboration with NRCSS, Ajmer. The system carries information about varieties of 10 major seed spices that have been stored in its knowledge base. The system gives a procedural approach to get new knowledge, rules and heuristics and disseminates the information on varieties to the farmers, Researchers and policy makers based on their requirement.

47. An Implementation of Ant Colony Optimization Algorithm on Lady Finger Expert Advisory System

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Key words: *Expert Systems, Machine Learning, PSO Algorithm, Ongole breed cattle, JSP & MYSQL.*

The present paper deals with the development of web based expert systems using machine learning techniques to advice the farmers in villages through online. An expert system is a computer program, with a set of rules encapsulating knowledge about a particular problem domain. In the present paper Ant Colony Optimization Algorithm has been taken and this algorithm mainly focuses on finding the diseases affected to the Lady Finger plants and crop. At First, the symptoms provided by the user are processed by a rule based expert system, if the rules required for processing the data by the above are not present in the database, then the system automatically calls the machine learning algorithm technique. As a whole, the system results global solution for recognizing the diseases in Lady Finger plants. And corresponding treatments to the diseases may also be suggested to the users. This expert system is a web based online application for online users with java as front end and MySQL as backend.

48. Exotic Bird Expert Advisory System Using Back propagation Algorithm with Calming Rate

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Keywords: *Expert Systems, Artificial Intelligence, Machine Learning, ID3 Algorithm, Mammals, JSP & MYSQL.*

This paper deals with the design and implementation of ID3 Algorithm on online web based Mammals Expert Advisory Systems. This Mammals expert advisory system is aimed to identify the diseases in Mammals and suggests the farmers with proper cure through online. Expert systems are computer programs that capture some knowledge and allow its dissemination to others. Its main emphasis is to have a well designed interface for giving Mammal Animals related advices and suggestions from pet owners by providing facilities like online interaction between expert system and the user without the need of expert all times. The division of user interface into three categories is having a number of advanced features such as addition of questions to existing questions in the database, modifying the existing questions, deleting the existing questions, adding the new rules to the existing rules in the database and modifying the existing rules in the database, adding and modifying the existing diseases and cure in the database. This advisory system is designed by using JSP as front end and MYSQL as backend.

49. Design of On-Board Communication system for Nano Satellite

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Ram Rohan Dantu and Reuben Fernandes**

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An efficient On board communication system is essential for transfer of payload data and housekeeping data from nanosatellite to the Ground Station and reception of telecommands by the nanosatellite from the Ground Station. In this paper, a model design of On board communication system for SRMSAT, a nanosatellite being designed and developed by SRM University, India, has been described by taking into consideration the

mass and power constraints and cost effectiveness. The data transmitted is sent with proper preamble, sync bit and incorporating error detection mechanism to receive data signals efficiently.

50. Development and Evaluation of a multimedia CAL system on Circuit and Electronic Technology Experiments

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Key words : Computer Assisted Learning (CAL) , Multimedia, Simulation.

Multimedia and simulation techniques are becoming very popular tool in circuit design and electronic technology for industries and educational institute CAL systems are reported to improve the design and testing of electronic system design. In this paper we have reported a CAL system developed on Electronic circuit design and experimentation for the undergraduate laboratory experiments. As the system developed uses multimedia, which make system user-friendly and having powerful simulation ability. The system is developed for utilized for the first year Electronic-Science Class. The evaluation results are reported with statistical analysis.

51. Critical Analysis of Digital Library

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A digital library is a library in which collections are stored in digital formats accessible by computers. The digital content may be stored locally with remote access and computer

net work facilities. Digitization is the process of representing an object, an image, or a signal by a discrete set of its points or samples. The perspectives of digital library involves the full potential of digital electronics technology in which users enable seamless and open access to all types of information without limits to format or geography of the system. Digital library system confirm its success only with users cooperation and partnership among cultural institutions. This paper elucidates the Digital Library Center's activities in digital preservation. Also, various technical considerations associated with Digital Archive developments enlist various activities in which the digital library plans to engage with the digital preservation community.

52. Fault-Based Time-Aware Test Case Prioritization for Regression Testing

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Keywords: *Test suite, prioritization, maintenance, fault detection.*

Regression testing is a complex and necessary activity for maintenance of software development. As the size of test suite for regression testing generally increases its successive maintenance, it is not feasible to execute all of its test cases due to limited time budget. Hence, a prioritization technique that reorders the test cases in test suite is always needed. Various test case prioritization techniques have been proposed by different researchers. A Fault-Based Time-Aware Test Case Prioritization (FTCP) technique has been proposed in this paper that reorders test cases such that a fault which is allocated minimum time in test

suite for its detection is retrieved first. Through a comparative study, it has been observed that proposed technique performs equally well as other two parallel prioritization techniques; Average Percentage of Fault Detection (APFD) based prioritization, and Optimal Test Case Prioritization (OTCP) with minimum number of random selections of test cases.

53. Development of an Improved Data Mining Algorithm with Cloud for Crime Pattern Detection

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Keywords: *Intelligence agents, enforcement of laws, crime detection, cloud computing, data mining techniques*

The invention of new technologies and the increase in man power due to the increase in the population undoubtedly will make the country to move towards the development in different fields and these developments also make the country to move towards the path of disasters on the other side as well. The new developments in the technology are used against the nations world wide, destroys the peace, also increase the crime rate in a huge range. It is observed day by day through different attacks over different countries and the concern about national security is needed to have still more attention to identify the crimes. Intelligence agents, various public and private departments are involved in the process of crime detection and in the enforcement of laws. Hence, it is needed to collect data on crimes, classify data according to the crime type, analyzed to identify important areas of crime to concentrate and finally to find the predictions over the protection of future crimes. The process of data collection acquired through the ocean of cloud computing, analyzed in cluster analysis and applied with the various data mining techniques to extract the needed data in the context of law enforcement and intelligence analysis. An improved K-means algorithm has been designed and developed to organize, analysis, and to make predictions over the data on crime detection.

54. Use of Metrics Framework for Reengineering Process

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Keywords: *Software Metrics, Software Reengineering, Partial Reengineering.*

In the reengineering process use of metrics can be very helpful. With the help of metrics it can be estimated that whether there is requirement to reengineer the system/part of the system or not. Metrics can help to provide an opportunity to look at existing design and to identify opportunities for improvements. Instead information given by metrics can be used to make a more efficient study of the source code based on the points of interest, indicated by the metrics result. In this paper a metric framework has been proposed that helps in reengineering process in different phases. This metric framework has been implemented on software downloaded from the web site <http://www.sourcecodesworld.com/source/show.asp?ScriptId=1221>. Rainfall model is used as candidate model to show the use of software metrics.

55. Polymerization environment and Sensational bio active molecular complexes

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Normally matter exhibits in solid and fluid forms, Fluids are bio active molecules which exhibit special chemical and physical properties. Dielectric properties lead to multiple

reactions, aggregation or polymerization Polymers are the part and partial unites of the life. Molecular clusters of macro, micro & nano structures directly or indirectly sustains our daily life The life complex molecules exhibit the special property of growth and sensational moments. Polymers are widely used for this purpose because of the ease of their synthesis and the myriad of controllable properties polymeric material can range from insulating to conducting, from hydrophobic to hydrophilic and soft to hard. core structures The life is a special polymerized molecular structures, environmental modification completely depends upon concentration gradient. The transition alters the states of fluids - gels - softmater,- mater and visa versa. The nutritional elements in the life cycle of the plants and animals results several polymer structures. The P^H of plant sap and blood alters the body structural properties. Proper proportions leads to the stable structures can be standardized as good health and deviation defines hazards in health conditions. This paper sounds keen observation of natural and synthetic polymers and polymerization. Body health is directly proportional to intake of nutritional ingredients and environmental conditions. It is also depends upon molecular stress, strain, orientation, temperature with other physical properties inside & outside. Stabilization of the body & required elemental compositions specifies the environment, nature of food, medicinal buffering systems Natural Polymers are Back bone of the bio technology and controlled polymerization can emerge the supper molecular sensational information technology. If imaginations & understanding of such a study is given a logical reasoning then it becomes engineering. Out come of such logical reasoning and Accelerating intelligence, new ideas, Application, Autoimmunization, supper technologies are never end able process

56. Design of Zigbee Enabled Wireless Pen Using Surveillance Camera For Obstacle Detection

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Keywords: Surveillance camera, camera resolution, obstacle path determination, audio speaker.

This paper offers an unexplored way of facilitating a navigational aid for visually

impaired people which is being used for finding obstacles on road in unfamiliar environments. The land vehicles and other obstacles can be captured by using a surveillance camera and the obstacle information can be analyzed by a picture analyzer. The output of the picture analyzer is given as obstacle information to the head phones attached with the speakers. On receiving this information, the blind person is able to understand that there is an obstacle. This is a prototype and future enhancement in classifying the obstacles is required. The main goal of this paper is how the picture analyzer analyzes the picture and converts this picture in to corresponding voice. We are trying to achieve this with the existing Zigbee technology for data transfer for informing the person about the obstacles in any unfamiliar environments.

57. Tagging 2D Shapes using Connectionist Approach

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Keywords: *Automatic image tagging; hierachical classifer ; feedforword neural network; shape features.*

Automatic image tagging is process to generate tags or keywords by understanding contents of the image, which is used in image retrieval. Simple and hierarchical classifier using neural networks for object images are proposed here in this paper. In preprocessing a shape feature vector is prepared by extracting shape based features of images. The vector is applied to single neural network and then to a neural classifier which is built by using group of networks in a hierarchy. To form this hierarchy fuzzy c mean clustering is used. MPEG7 dataset is used to train each individual neural network. 34 neural networks formed a hierarchical system that generates output which is further used for tagging purpose. The paper reports effectiveness of the proposed shape tagging system using hierarchical classifier of feed forward neural networks.

58. Multi-Agent Coordination for Task Overlapping in Project Scheduling: Priority Rules Based Resource Allocation

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Keywords: *Multi-agent coordination, project scheduling, task overlapping, priority rules, resource allocation.*

Project scheduling results in allocation of resources and integration of activities that can share the resources for activity scheduling. The integration can be achieved by relating the activities of the project and hence improved coordination and flow of resource information between activities become essential to minimize the project makespan. Each activity is viewed as an autonomous agent and process can be carried out by using Multi-Agent System (MAS). The effective resource allocation process depends on task interdependencies, resource interdependencies and constraints. Crucial for the multi-agent coordination in project scheduling is the availability of an effective algorithm for resource allocation. Priority rules such as Resource require Time Point (R_rTP), Resource release Time Point (R_lTP), Longest Resource usage Time Period (LRTP) and Shortest Resource usage Time Period (SRTP) have been designed. This research work proposes a model for resource allocation based on priority rules in order to minimize the project duration by overlapping the activities of the project. A scheduling algorithm has been developed and employed for better resource allocation and task scheduling and the results show that the prototype is producing significant percentage of reduction in project makespan.

59. Onboard Computer Software for Small Satellite System

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and Rasmi Chimakurti

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Keywords : SRMSAT, I/O, Kernel, Deadlock, ECC, IGRF, FPU, WDT

This paper highlights the challenges faced in developing a robust software for a small satellite system. The Software is designed for any small satellites with a single controller and extensible to multi processors through a UART for communication. The process manager controls the frequency of execution of the processes with 5 process states. The software architecture contains scheduler, buffer manager, timers in the kernel layer. ECC, Protocol libraries, etc in the Utilities layer. The drivers exist in version specific layer.

60. A Single Microcontroller Based On Board System for Small Satellites

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Abhishek Jain and R.B Jagdeesh

SRMSAT,
SRM University.

Keywords: SRMSAT-1 ,Microcontroller- AT91SAM9RL64,OBC

This paper deals with description of the interfacing of all the components in the satellite with a single 32-bit microcontroller. A single microcontroller helps in reducing the complexity of internal communication links, low power, reducing hardware redundancy, easy to develop the software. The efficiency can be best measured in term of power consumption resource utilization and flexibility in using the same system for next mission with less modification. SRMSAT-1 will be launched with a single AT91SAM9RL64 microcontroller.

61. Modified Progressive Coding Of Stereo Images Using Wavelets

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Keywords: *Image Compression, Stereoscopic Image Compression, Disparity Compensation, Interpolation.*

Image compression is minimizing the size in bytes of an image file without degrading the quality of the image. A stereoscopic picture consists of two views, one for each eye, and gives the viewer an illusion of 3D when seen with a suitable instrument, assuming that the viewer has two functioning eyes. Generally an image occupies more space than any other type of data. The amount of data, which is necessary to store stereo images, is twice as much as for normal images. Since two images are required, the amount of data, which has to be coded, doubles. To overcome this, compression has to be used. Hence we present a modified coding scheme which is based on Discrete Wavelet Transform. Our coding algorithm exploits the redundancy of the stereo image much more efficiently. We compared the compression results with the existing methods and our method give better performance.

62. Objective Evaluation of different Segmentation Techniques

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Unsupervised image segmentation is an important component in many image understanding algorithms and practical vision systems. However, evaluation of segmentation algorithms thus far has been largely subjective, leaving a system designer to judge the

effectiveness of a technique based only on intuition and results in the form of a few example segmented images. This is largely due to image segmentation being an ill-defined problem. So in this paper we have presented different segmentation methods (Region Growing and KMeans) implemented on same set of images for comparing the difference or objective evaluation of each method.

63. Applying Instructional Design to Improve User Interactivity and Usability in e-Learning Environment

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Keywords: *Instructional Design, Learning Objects, LCMS*

With the technological growth on Internet, e-Learning has gained vital part in educational delivery system. But the impact is minimal in Higher Education. Many of the e-Learning course materials are either published in PDF formats or using HTML pages which includes few multimedia animation for illustrations. These are utilized as reference material and do not ensure knowledge acquisition and feedback on learning. It is mainly because of the minimal considerations on psychological reactions and the independent learning ability while developing the learning content. The success of e-Learning course material can be achieved by considering the pedagogical principles with the technological advancements. Few of the principles are curriculum design with specific objectives, consideration of different social groups, learner engagement, learner style, ease of use, and ensure the acquisition of learning objectives with formative and summative assessment. *This paper aims on the organization of learning materials around small pieces of semantically enriched learning objects (LO) with high user interactivity and usability.*

64. Parallel Computation & Mobile Agent Cloning

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Key Words: Mobile Agent, Clone agent, MMS Model

Mobile Agents have motivated the new creation of methodology for parallel distributed computing systems. This paper primarily addresses the mobility for parallel computing. Our main focus will be the divides the developer's program into sub program and distribute to several clone agent to enhance the performance of the system through mobile agents, which forms automatically adaptive multi granularity parallel computing. In this paper we proposed MMS Model for performing the task and distribute to other agents, and then we discuss its applicability on the distributed network resource management. To run efficiently in dynamic environment, the application must be able to execute on a heterogeneous collection of hosts. Whose size is varies unpredictably during execution. Moreover the application may adapt dynamic environment by changing the distribution of computing leads among the nodes.

Our proposed Master-Slave model is based on a divide and conquers strategy in which a master delegates tasks to one or more slaves that in turn are distributed throughout the system and work in parallel. Mobile Agents have been the focus of much speculation and hype in recent years.

65. Exotic Bird Expert Advisory System using Back propagation Algorithm with Calming Rate

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Key words: Expert Systems, Neural Networks, Back Propagation Algorithm, Calming Rate, Exotic Birds, JSP & MYSQL.

This paper deals with the design and implementation of Back propagation Algorithm

with Calming rate on online web based Exotic Birds Expert Advisory Systems. This exotic bird expert advisory system is aimed to identify the diseases in exotic birds and suggests the pet lovers with proper cure through online. Expert systems are computer programs that capture some knowledge and allow its dissemination to others. Neural Networks is the branch of Artificial Intelligence which gives a wide variety of solutions in realistic problems through its algorithms. A neural net is an artificial representation of the human brain that tries to simulate its learning process. By using the back propagation algorithm on an expert advisory system, its calming rate would be around 3000 to 4000 iterations for finding a disease in an expert system at each interval. To overcome this large number of iteration problems, the standard Back propagation algorithm had been modified depending on the calming rate in which the numbers of iterations were reduced to nearly 100 to 500 iterations for each time search in the database for finding the proper matching diseases. This advisory system is designed by using JSP as front end and MYSQL as backend.

66. Implementation of PSO Algorithm on Ongole Breed Cattle Expert Advisory System

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Key words: *Expert Systems, Machine Learning, PSO Algorithm, Ongole breed cattle, JSP & MYSQL.*

The present paper deals with the development of web based expert systems using machine learning techniques to advice the farmers in villages through online. An expert system is a computer program, with a set of rules encapsulating knowledge about a particular problem domain. In the present paper Artificial PSO algorithm has been taken and this algorithm mainly focuses on finding the diseases affected to the Ongole Breed Cattle. At First, the symptoms provided by the user are processed by a rule based expert system, If

the rules required for processing the data by the above are not present in the database, then the system automatically calls the machine learning algorithm technique. As a whole, the system results global solution for recognizing the diseases in Ongole Breed Cattle. And corresponding treatments to the diseases may also be suggested to the users. This expert system is a web based online application for online users with java as front end and MySQL as backend.

67. Optimal Detection of Abnormal Sequences Caused Due To Mutations In Malignant Brain Tumors

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Keywords: *Genes, Nucleotide sequence, Swarm Intelligence, Grid Technology*

It is crucial for cancer diagnosis and treatment to accurately identify the site of origin of tumour and recognition of the genes which are responsible for the particular type of cancer. With the rapid advancement of DNA microarray technologies, constructing gene expression profiles have already become popular. Here we try to segregate the abnormal sequences caused due to mutations in glioblastoma, severe brain cancer by comparing the sequences of affected samples with healthy samples. We have proposed Swarm Intelligence technique to speed up the process.

68. Comparison of Algorithms for Minimum Execution Time for Sequential Pattern Mining with Progressive Database

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Data Mining is the process of extracting interesting information or patterns from large information repositories such as relational database, data warehouses, XML repository etc. Database mining is motivated by the decision support problem faced by most large retail organizations. Development of bar-code technology has made able retail organizations to collect and store massive amounts of sales data, referred to as the basket data. A record in such data typically consists of the transaction date and the items bought in the transaction. A sequence database consists of sequences of ordered elements or events, recorded with or without a concrete notion of time. There are many applications involving sequence data.

In this paper we have presented an application of data mining on grocery shop database. This warehoused database is mined using PISA, which stands for Progressive mIning of Sequential patterns algorithms whose results can be utilized for decision making and comparing the performance of this algorithm with other algorithms like GSP+, SPAM+, and DirApp. They all are coded in C++

69. Web-based Corporate Training System (CTS)

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The Corporate Training System (CTS) is a web-based training system that is used to train the employees of a company or organization. It mainly deals with the customized solutions for knowledge development that meet the organizational needs that, in turn, improves

the business performance. Several such CTSs have been designed earlier by various business organizations but could not implement them efficiently as the designed systems have their inherent problems in various aspects. The main drawbacks of the earlier CSTs are such as: no online facilitation, not much user friendly, unable to handle huge amount of data processing, no forecasting analysis, less secure etc. Hence in order to overcome these limitations, in the present research work we designed and developed a new web-based Corporate training System that has a view of distributed architecture with centralized storage of database. The system has been developed using distributed client-server technology. The internal database has been selected as MS-SQL server, as it provides the constructs of high reliability and security. The front end was implemented using ASP.Net technologies. The database connectivity was planned using the latest SQL connection technology. The system contains three main modules: (1) Administrator (2) Trainer (3) Trainee. The designed system has been implemented to bring a new developed system that is quite efficient and operational for user by subjecting the designed system for proper testing and evaluation techniques.

70. Design and Development of a Web-Application for Web-based Counseling System

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The web-based counseling is a web application that is used by various government organizations, universities or colleges to counsel a large number of applicants for admission into various professional courses at a time. In general this application is accessible over the Internet and helps the students to select the list of college and courses according to their performance and block a seat for pursuing their studies in any college or institution. These applications are mainly developed to reduce the maintenance cost on servers by using the advantages and services offered by using cloud computing concept. However, practically these systems have certain drawbacks like crashing of servers during peak time (counseling time). Also another drawback is to maintain these servers till the next counseling, a year later which may lead to further maintenance and handling cost. In

order to overcome these difficulties and drawbacks, in the present paper we have proposed to design and develop a modified application for web counseling using Flex and deploy it on Amazon Cloud which gives infrastructure as service. The present application will overcome all the above mentioned drawbacks and provide the following utilities. (1) It facilitates the users to register with web counseling. (2) It helps the administrator to allot seats according to the performance of the student. The present application has been successfully implemented overcoming the drawbacks of the earlier system.

71. Simultaneous compression and encryption using trigonometric based scheme

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Key words: *Cryptography, Compression, Encryption and Trigonometry.*

In computing world day by day great challenge in the area of compression and encryption. In recent years there has been a tremendous increase in the demand for encryption and compression. It is desired to transmit redundant data over an increase and bandwidth constrained channel, it is customary to first compress the redundant data and then encrypt it for security reasons.

This paper concentrates on a trigonometry approach that does simultaneous compression and encryption. This implementation methodology works well for encryption when the cipher is transmitted without storage and works as a Lossy compression algorithm when stored in Unicode format analysis proves that this algorithm consumes less execution time and effective compression is done.

72. Analysis of Distributed cache updation for enhancing the Performance of Dynamic Source Routing Protocol

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&

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Key words: *Dynamic Source Routing, Cache, Topology, Nodes.*

The present paper ascribes the efficiency of on-demand routing protocols. The main idea of on-demand routing is to find and maintain only needed routes. A route to some destination is tried to be discovered only when a sending node generates a data packet addressed to that node. In order to avoid the need for such a route discovery to be performed before each data packet is sent, such routing protocols must cache previously discovered routes. The entire route is included in each packet, so that spatial information about the network topology can be extracted from packets and used to form a cache. In DSR (Dynamic Source Routing), the route returned in each Route Reply that is received by the initiator of a Route Discovery represents a complete path (a sequence of links). By caching each of these paths separately, a path cache can be formed. Alternatively, a link cache could be created, in which each individual link in the routes returned in Route Reply packet is added to a unified graph data structure of node's current view of the network topology. A link cache can effectively utilize all of the potential information. A mechanism to delete invalid links from the cache is necessary. The goal of our work is to implement a mechanism which depends on the topology. In our approach all reachable nodes that have cached a broken link are notified proactively when a link failure occurs. In this case, the cache will be updated as soon as a link failure is detected, and not after timeout as in usual approach, so the usage of broken links and stale routes will be avoided. To achieve this goal, it is necessary to keep which node has cached which link, in a distributed manner. To do this each node, forwarding either a route reply or a data packet, will store the links of the route and the neighboring nodes, which learnt these links from it. Using this local

information, each node can determinate which neighbors have to be informed when a link failure occurs. In case of failure, the information about the failure will rapidly propagate through the network. Every node, that cached that link, will be aware of the failure and delete the invalid information from its cache.

73. Securing Messages Using Recursive Arithmetic Operation and Transposition on pairs of Bits (RAOTP)

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Keywords: *Securing Messages using Recursive Arithmetic Operation and Transposition on Pairs of Bits (RAOTP), Cipher text, Block cipher, Session key.*

The technique considers a message as binary string on which a Recursive Arithmetic operation and Transposition on Pairs of Bits (RAOTP) is applied. A block of n bits is taken as an input stream, where n varies from 8 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 homogeneity of source and encrypted files.

74. Interfacing RFID Reader with 8051 Microcontroller

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Keywords: *Interfacing, RFID (Radio Frequency Identification devices), Keil IDE 4.0 version, RTC (Real Time Clock), I2C Protocol*

The main objective of the project is to interface an RFID reader, which is Radio Frequency Identification device with 8051 microcontroller. This is an important industrial project that has many complications, techniques and technology used in the project. For this project the knowledge of both hardware and software is needed. Along with the reader other modules such as LCD, KEYBOARD, RTC (Real Time Clock) and EPROM are also being interfaced with the 8051 microcontroller. All the interfacing is done by programming the 8051 microcontroller IC in embedded-C programming language on Keil IDE 4.0 versions named as “keil uvision4”. RTC is being interface along with I2C protocol to manage the time (seconds, minutes, hours) and date (days, months, years) where I2C protocol acts as a bus controller. By interfacing the RFID reader with 8051 microcontroller we mean that when the card holder swaps the card or tag on the reader it gives the card number to the 8051 microcontroller and then the controller compares this number with the previously loaded database in the EPROM or in the controller’s memory. After this comparison if the card number matches from one of the card number’s of the database access is granted by the controller.

75. Development of an Efficient Cryptographic Protocol

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Key words: *Cipher text, Block cipher, Session Key.*

In this paper a novel cipher based on private key block ciphering protocol is proposed

which is to be implemented in bit level. It considers the source file as a stream of bits, which is then divided into a no of 2,4,8,16,32,64,128,256. This technique directly involves all the bits of blocks in a Boolean operation. The same operation is repeated for different block sizes as per the specification of a session key to generate the final encryption stream. As this is symmetric in nature, hence decoding is done following the same procedure. There is a tendency that the execution time of this cipher linearly changes with the size of the file to be encrypted.

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.

76. Remote-Controlled Power-Off Switch Circuit

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Keywords: *Integrated Circuit (IC), Relay, Decade Counter, Timer, Voltage Regulator.*

This paper presents a new type of Remote-Controlled Power-Off Switch Circuit, which can be used to switch off the electronic goods in the home appliances such as television, audio-video systems and many others. The circuit has been designed using IC NE555, IC HCF4017, IC TSOP1738, Relay, voltage regulator IC 7806 and some discrete components such as resistance, capacitance, diode, transistor and LED. These components are arranged in such a manner that our aim is satisfied. Timer IC 555 is configured as a stable multi-vibrator. This model can switch OFF the appliance by remote-control provided for the appliance. Thus, efforts have been made to improve the electronic circuitry of the home appliances.

77. Bandwidth Enhancement of Rectangular Compact Dielectric Resonator Antenna (DRA) for Broadband Applications

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The present day technology demands continuing growth in electronic systems operating in the RF and microwave spectrum. These systems are designed to provide high efficiency, wide bandwidth and reduced equipment size. Recent advances in wireless communications has resulted in development of antennas that can be embedded into wireless products. Since the last two decades two classes of antennas i.e., the microstrip patch antenna and the dielectric resonator antenna have been under investigation for modern wireless applications. However, compared with the microstrip antenna, DRA has a much wider impedance bandwidth. This is because the microstrip antenna radiates only through two narrow radiation slots, where as the DRA radiates through the whole antenna surface except the ground part. Therefore, in this presentation the main focus has been done on compact rectangular DRA for bandwidth enhancement for the application of wireless communications systems. The obtained results have been simulated using Ansoft HFSS.

78. Control of Heat in the stator windings of three phase induction motor using filters

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Most of the industrial AC motor works for long duration the working of AC motor current depends on the type of load is used. In this paper the heat generated in the stator windings of three phase induction motor is studied experimentally with drive the motor using PWM technique without filter and with filter, it is presented that stator windings heat can be minimized, since the heat generated in stator windings of the induction motor is a premature windings failure, since the property of enamel coated on the windings three phase induction motor will reduce.

79. Study of Stator Temperature of a 3-Phase Induction motor with pulse width modulation angle $\alpha = 15^\circ$ **Mr. Manjasha and Dr. Jyothibalakrishnan**Department of Electronic Science
Bangalore University.

Most of the three phase inverter drives use PWM techniques. In this paper a measurement of Stator temperature of 3-phase induction motor is presented experimentally, the motor temperature exist due the effects of parasitic torque produced, when a current harmonic in the rotor interacts with an air gap flux harmonic of the same order resulting a pulsating torque, produces temperature in stator windings of the induction motor this effect can be reduced with PWM technique with pulse width modulation angle $\alpha = 15^\circ$. The results have been compared with the stator temperature obtained with PWM (actual drive) technique.

80. Speed control of Single Phase to three phase inverter drive with stator winding temperature measurements of three phase induction motor**Mr. Manjasha**Assistant professor
Department of Electronic Science,
Bangalore University.**Dr. Jyothibalakrishnan**Professor
Department of Electronic Science,
Bangalore University.

Heat in the stator windings are common problems in the induction motor. Induction motor drives have large applications in industry, most of the drives use MOSSFETS, and IGBT's. In this paper a single phase to three phase open loop control of induction motor is presented practically, and winding temperature is common problem in induction motor, the heat generated in the windings of the induction motor is also studied and minimized using filters is presented.

81. Study of Heat In Windings of Three Phase Induction Motor Spwm Signals with Ac Filters

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Keywords: *SPWM, stator temperature, AC filter.*

Many Industries prefer induction motors due to their low maintenance and high efficiency. The life time of the windings of the induction motor is accountable while operating the motor. The life time of the windings depends on the enamel coated on the windings of induction motor. The windings of induction motor heats up for every working operation of the induction motor results drastic reduction of life time of the windings of induction motor. There are various techniques are used to minimize the rate of rise of heat in stator windings, In this paper a Sinusoidal Pulse Width modulation (SPWM) technique with AC filter is used to minimize the stator temperature of induction motor is presented experimentally, which results the life time improvement in the stator windings.

82. Spatial Data Mining: Prospective and Challenges in view of Agriculture and Environment Applications

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Keyword: *GIS, Spatial Data Mining, Spatial Databases, Spatial Classification, Multidimensional Data Analysis.*

With the rapid development of the sensing technology to obtain the geographical information in all respect, make the spatial data more complex, more challengeable and

bigger in the spatial database which has been beyond the human ability to analyze and interpret for handling the various problems specifically in environment and agriculture under the Remote Sensing. The serious effort has been carried out by world wide to acquire, store, manage, process, analyze and interpret the spatial data under different components like EIS, GIS, DSS, etc to tackle these problems. These components require integration to handle the various issues under one roof to take an appropriate decision. However, Implementation of such integration generate new requirement like data interoperability, data description by metadata, reverse engineering from existing applications. Major issues of such integration come under the spatial data mining to take an appropriate decision. This leads to reconsider the analysis and design methodology of the system and its implementation. This paper takes the overall review about the methods and techniques of spatial data mining along with its merit and demerit.

83. Interesting manipulations of complex variables

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Keywords: *Complex variable, Function of complex variable, complex analysis, Symbolic object*

Complex random signals compete an increasingly important role in array, communications, and biomedical signal processing and related fields. However, the mathematical foundations of complex-valued signals and tools developed for handling them are dotted in literature. There appears to be a need for a brief, unified, and exact treatment of such topics. In this paper such a treatment is provided. Moreover, we establish connections between seemingly unrelated objects such as real differentiability and circularity. In addition, a complete MATLAB implementation is presented with output of each major step.

Let $f(z)$ be a function of a complex variable. Judge the domain formed by the unit disc (displayed below in polar coordinates). The height of the surface is the real part, $\text{REAL}(f(z))$. The color of the surface is the imaginary part, $\text{IMAG}(f(z))$. The color map varies the hue in the HSV color model.

84. Impact Evaluation Of Multimedia Package

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Keywords : *Multimedia package, utilization focused evaluation, knowledge*

Technology kit consisting of multimedia package was developed to impart knowledge to the rural women. Utilization focused evaluation was conducted to see the effectiveness of various media in terms of gain in knowledge to the respondents. Pre and post experimental design was used for conducting field trial.

Results revealed that all the respondents of experimental group had low level of knowledge prior to conducting of experiment. After conducting field experiments through the multimedia package, level of knowledge of the experimental group increased up to medium level. Retention of the knowledge by the respondents of experimental group was 20.10 and 19.37 at the interval of 15 days and 30 days, respectively. Media wise utilization focused evaluation shows that electronic media was found as most effective in comparison to lecture cum demonstration and literature because gain in knowledge was found to be more in the respondents of electronic media. Similarly retention of knowledge at the interval of 15 days and 30 days was also more in case of electronic media.

85. A Novel Web Structure Mining Approach For PAGE RANK**Bharat Bhushan Agarwal**

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Keywords : *Web Mining, Web structure Mining, Page Rank, Sink, Sources.*

Web mining is used to categorize users and pages by analyzing the users' behavior, the content of the pages, and the order of the URLs that tend to be accessed in order. . Page Rank algorithms in Web Structure Mining treat all links equally when distributing rank scores. PageRank is an algorithm that tries to rank the importance of web pages based on the hyperlink structure between them. It measures the importance of the pages by analyzing the links. Page Rank is used to measure the relative importance of Web pages. The key idea is that a page has high rank if it is pointed to by many highly ranked pages. So the rank of a page depends upon the ranks of the pages pointing to it. It is used by the famous search engine Google, the search result of Google is ranked according to order of page importance. Page Rank ranks all web pages purely based on the web graph structure without regarding the content of these pages. In this paper, we take a closer look at sinks and sources. Furthermore, we also show the variations of page rank.

86. A novel algorithm for suppressing of impulse noise from the corrupted image using fuzzy methodology**Stuti Asthana, Rakesh Bhujade and Nilesh Sharma**

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Keywords : *Edge detection, Fuzzy methodology, Gradient, Standard deviation, Fuzzy system*

In digital image processing the detection of object edge is a very important feature.

Today now various methods available for edge detection such as prewitt, Sobel, Canny methods, these entire algorithms required a threshold value at the time of edge detection. So these processes each and every time required a value of threshold. In this paper, we propose a fast algorithm for edge detection using the perception of fuzzy methodology and automated number generation means the threshold value automatically adjusted. In this process first gradient and standard deviation values are computed and utilized this value in fuzzy system. Then this value used to decide whether the determined pixel is edge pixel or not using fuzzy if then rules. These output values are aggregated and defuzzified to take new Gray level value of the pixel. Finally we have compared result of proposed algorithm with other algorithm such as Sobel, Prewitt and Canny algorithm. Experimental result shows the very efficient algorithm for noisy image for finding the real object image. Most of the existing edge detection techniques are either very sensitive to noise and do not give satisfactory result in low contrast areas. A fuzzy theory based edge detector avoids these problems and is a better method for edge information detection and noise filtering than the traditional methods. Edge detecting using fuzzy logic provides an alternative approach to detect edge.

87. Supervisory Control & Data Acquisition : (scada) Systems For Efficient Power Distribution

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Keywords: *Power Distribution Spread Out Installations Information & Control Systems Master Control Station Remote Terminals Scada Systems Real Time Processing*

Supervisory Control And Data Acquisition (SCADA) Information & Control Systems have been in existence for quite a number of year now. These are extensively used in various applications, involving Simultaneous Acquisition of a large amount of Data from

Spread out Installations, Real-Time Processing & Analysis, Mimic Board Single Line Display & Supervisory Control & Monitoring.

The main components of SCADA Systems are Master Control Station at the Main Receiving Station, Remote Terminal Units at each of the Spread Out Installation & Sub-Stations, Communication Equipment, Computer Systems including its peripherals & the requisite SCADA Software.

Computer based System for SCADA are used to assist the Control System Operators to achieve Real-Time Data Acquisition, Processing, Analysis, Display & Supervisory Control of Data pertaining to a large processing environment, like a Big City, Industrial Township, Industrial Unit, etc. The main components of SCADA Systems are as follows :

1. Master Control Station at the Main Receiving Station.
2. Remote Terminal Units at different Spread Out Sub-Stations.
3. Communication Equipment.
4. Computer Systems & its peripherals.
5. SCADA Software according to the Designed parameters.

Multiple System Engineering Approach & Techniques are incorporated to provide Solutions by optimally configuring the State-of-the-art Hardware & appropriate Software, to achieve the ultimate aim of Efficient Power Distribution Management, resulting in benefits as follows :

1. The Solutions for SCADA Systems are designed To suit the specific needs of particular users in a well defined area.
2. The user is NOT restricted by the existing product lines.
3. Adequate provision is made for add-on Consoles for future development.

This paper highlights the salient features of SCADA Systems.

88. A New Algorithm To Determine The Termination of Triggers In Active Databases

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Key words: Active rules, triggers, active databases, termination

Active Databases are a combination of traditional static databases and active rules, meant to be automated mechanisms to maintain integrity and facilitate in providing database functionalities. Active database systems can react to the occurrence of some predefined events automatically. In many applications, active rules or triggers may interact in complex and sometimes unpredictable ways, thus possibly yielding infinite rule executions by triggering each other indefinitely causing non-termination. The termination of active rules is an unpredictable problem, except when rule languages with very limited number of rules are used. This paper presents new algorithms for detecting termination / non-termination of rule execution using triggering graph and complex triggering graph, and these algorithms do not pose any limitation on the number of rules.

89. A Reference Image Approach for Invisible Digital Steganography using the Concept of Run-length and Encryption Technique

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Keywords: Encryption, alternative steganography, reference image, hiding, run length.

In this paper, the notion of steganography has been redefined as an alternative approach

where no updating is done in the cover medium but the cover medium is used as a reference for recreating the target medium. Here we have used an image as a reference to hide another image. For a pixel of the target image, a pixel of the cover medium is identified with the same grey value as of the target image and that position of the cover image is stored along with the run length of that pixel in the target image in a text file. This text file is encrypted before sending. Only the encrypted text file and the cover image is send to the receiver end. At the receiver end the target file is recreated from the decrypted text file and the cover image as a reference.

90. On Measurement of Universal Computing Capability in Phase Space of Cellular Automata for Meteorological Data Processing

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Keywords: *Cellular Automata (CA); Meteorological Processing, Phase Space, Universal Computing Capability*

Present paper reports a measure of universal computing capabilities in Cellular Automata (CA) phase space. This measurement is crucial and essential with respect to choices of proper CA for Meteorological Data Processing. The challenge of complexities involved in CA based meteorological modelling can be encountered with choosing CAs with higher universal computing capability. Knowledge on universality of computing paradigm like CA, will enable theoretical analysis of meteorological modelling with greater flexibility and precision. In this regard, a mathematical model has been proposed to measure universal computing capability of CA phase space.

91. ICT strengthens Environmental Sustainability Green ICT Roadmap

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Keywords: *Sustainable ICT, green ICT, green IT, sustainable consumption, smart energy, smart buildings, Lifecycle efficient production, sustainable manufacturing, adaptive networks, optimized networks, Environmental sustainability, sustainable development, roadmap.*

Here in this research paper, the role of ICT in Environmental sustainability is discussed. It presents a roadmap on ICT for Environmental sustainability based on the assessments and evaluations made by world wide experts. We adopt a broad and systematic view to the issue. In other words, we believe that, ICT's effectiveness depends on mutual understanding and changing the system level activities i.e. the complex web of behavior of people, institutions, organizations and political jurisdiction like nation-states. In this paper, the roadmap is divided into three themes. Empowering people means using ICT to raise people's awareness of the environmental impact of their actions and to channel their behavior in a more environmentally friendly direction. Extending natural resources involves reducing the use of diverse environmentally unsustainable resources through ICT-based solutions. Optimizing systems refers to minimizing the environmental load of diverse systems by optimizing their operation. As a synthesis, we identified four focal topics within the roadmap themes that are most promising for further investigation. These are:

- (1) Environmentally sustainable consumption
- (2) Smart energy and buildings
- (3) Lifecycle efficient production and
- (4) Optimized and adaptive networks.

92. Introducing A Sorting Technique- Left Right Swap Sort

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Keywords: *Sublist, stability, left right swap sort, selection sort, swap, worst-case, best-case and average case complexity analysis, and implementation.*

Here in this paper, we have introduced a different type of sort algorithm named “Left Right Swap Sort”. It is basically an in-place comparison sort algorithm. It can be referred as a cousin of the selection sort. Finding the smallest element and then comparing its left and right side elements, this method is performed. The algorithm is discussed here. It is a simple sorting technique having advantages over more complicated algorithms in certain situations. This algorithm works very well for small files. The implementation of this sort technique is also introduced in this paper. Its best case, average case and worst case time complexity are of $O(n^2)$

93. Honeypots for Intrusion Detection System

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Keywords: *Honeypots, Honeynets, Intrusion Detection, Network Security & MIS*

A honeypot is an information system resource whose value lies in unauthorized or illicit use of that resource. Has no production value, anything going to or from a honeypot is likely a probe, attack or compromise. Primary value to most organizations is information. A honeypot is a trap set to detect or deflect attempts at unauthorized use of information systems. Generally it consists of a computer, data or a network site that appears to be part of a network but which is actually isolated and protected, and which seems to contain

information that would be of value to attackers. The honeypot can be hidden amongst production systems. This allows to identify easily actions brought against these systems. The honeypot can be isolated on a DMZ. This will allow to unmask curious people who are too interested by the equipments on the DMZ. Intrusion-detection systems aim at detecting attacks against computer systems and networks, or against information systems in general, as it is difficult to provide provably secure information systems and maintain them in such a secure state for their entire lifetime and for every utilization. Sometimes, legacy or operational constraints do not even allow a fully secure information system to be realized at all. Therefore, the task of intrusion-detection systems is to monitor the usage of such systems and to detect the apparition of insecure states. They detect attempts and active misuse by legitimate users of the information systems or external parties to abuse their privileges or exploit security vulnerabilities. Intrusion Detection is the art of detecting inappropriate, incorrect, or anomalous activity. Among other tools, an Intrusion Detection System (IDS) can be used to determine if a computer network or server has experienced an unauthorized intrusion. An Intrusion Detection System provides much the same purpose as a burglar alarm system installed in a house. In case of a (possible) intrusion, the IDS system will issue some type of warning or alert. An operator will then tag events of interest for further investigation by the Incident Handling team. Traditionally, Host Based Intrusion Detection Systems (HIDS), Network Based Intrusion Detection Systems (NIDS) are available. A new type of Intrusion Detection system is becoming more and more popular: the Intrusion Prevention System, or IPS. This is a system that actively monitors a network or host for attacks and prevents those attacks from occurring.

94. Optimal Detection Of Abnormal Sequences Caused Due To Mutations In Malignant Brain Tumors

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Keywords: *Genes, Nucleotide sequence, Swarm Intelligence, Grid Technology*

It is crucial for cancer diagnosis and treatment to accurately identify the site of origin

of tumour and recognition of the genes which are responsible for the particular type of cancer. With the rapid advancement of DNA microarray technologies, constructing gene expression profiles have already become popular. Here we try to segregate the abnormal sequences caused due to mutations in glioblastoma, severe brain cancer by comparing the sequences of affected samples with healthy samples. We have proposed Swarm Intelligence technique to speed up the process.

95. The Design of Embedded System to tackle Environmental challenges through ICT

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Keywords : *Sensor, Embedded System, Environment, ICT & OECD*

This topic is dedicated to open a discussion regarding the involvement of Information and Communication Technologies (ICT) and its implementation in environmental policies and information exchange among different stakeholders. The rapid diffusion of ICT has been accompanied by an increasing body of research exploring both the potential and challenges associated with the use of these tools, particularly in developing countries. Research in the ICT for Development field has advanced by often aiming at moving targets, as new technologies are continuously developed, different priorities emerge, traditional technologies merge with newer ones in development practice, and players and agendas at the local, national and international levels constantly transform. Finding the Balance: Environmental Sustainability, Growth and the Role of ICT. In a context of pressing environmental challenges, developing countries are facing the haunting task of balancing the achievement of economic development goals, particularly in the poverty reduction front, with the need for environmental sustainability. This challenge is especially serious for countries that are highly dependent on agriculture, often the most vulnerable to the impacts of climate change and variability. ICT plays an important role in the economy, but ICT also embodies other possibilities that will improve the well being of the citizens of the world. The entire world has been suffering from the financial crisis and the rising levels of unemployment, but all are doing tremendous work to contribute to a sustainable future. Current environmental challenges include the world-wide and the rampant over-consumption

of resources, air pollution, the loss of biodiversity, waste and, most important for the world's development, climate change. Such problem areas, especially those relevant to environmental degradation, clearly indicate the need to raise the level of a combined discussion on the economic, environmental and social objectives in relation to sustainable development. Boosting sustainable economic growth is high on government agendas. Sensor based Embedded System networks play an important role in tackling environmental challenges. Sensor applications in smart power grids, smart buildings and smart industrial processes make significant contributions to more efficient resource use and reduce greenhouse gas emissions and other pollutants. Finally develop a report, that gives an overview of sensor technologies and applications, and quantifies their environmental impacts.

96. A Double Layered Security for Fingerprint Biometric Authentication

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Tamil Nadu

Keywords : Biometrics, Security, Fingerprint, Authentication, Encryption;

Security plays a vital role from foyer to finale of essentials. According to research, Biometric is the pinnacle of high level of security, even though, recently Pilfering is strangely increasing in case of all biometric authentications, hence security of the biometric data is very essential for the real world applications. Fingerprint Biometric identification is very popular among the various biometric techniques and also where major pilfering was happening.

In this paper, we propose a more secure biometric fingerprint authentication, which addresses the concerns of user's privacy, security, and authentication. A small area sensor is used as an external device for laptop and desktop for fingerprint authentication. Fingerprint matching can be used as an additional to the password as a security measure in many secure sectors like online banking, online shopping or even replace online digital signatures. In this authentication system, we use the user's id and password as the initial level of security. The client and server do not exchange the user's extracted feature, i.e., fingerprint directly. Instead, a third party Enrollment Server is used to authenticate and encrypt the extracted fingerprint using an asymmetric encryption. The Enrolment server even sets

the threshold value and sends the data to the actual server providing more security. This biometric authentication is designed to provide high security over public networks and trustworthy identity verification system through which the level of pilfering can be greatly reduced.

97. Webometrics of Law Universities in India

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There is a greater need to inculcate in the minds of the young students a sense of concern, discipline, duty and social responsibility towards the society. Thus, the law universities in India play a significant part in shaping the individuals as advocates and also help in their capacity building and outreach. University websites are increasingly used for a wide variety of purposes, such as uploading the prospectus, library catalogue, promote achievement of individuals, research groups, new publications, etc. Therefore, there is a necessity and desire to know about websites of academic organizations in general and Indian universities in particular. This paper aims to evaluate law Universities in India through webometrics method.

98. Applying Instructional Design to Improve User Interactivity and Usability in e-Learning Environment

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Keywords: *Instructional Design, Learning Objects, LCMS*

With the technological growth on Internet, e-Learning has gained vital part in

educational delivery system. But the impact is minimal in Higher Education. Many of the e-Learning course materials are either published in PDF formats or using HTML pages which includes few multimedia animation for illustrations. These are utilized as reference material and do not ensure knowledge acquisition and feedback on learning. It is mainly because of the minimal considerations on psychological reactions and the independent learning ability while developing the learning content. The success of e-Learning course material can be achieved by considering the pedagogical principles with the technological advancements. Few of the principles are curriculum design with specific objectives, consideration of different social groups, learner engagement, learner style, ease of use, and ensure the acquisition of learning objectives with formative and summative assessment. This paper aims on the organization of learning materials around small pieces of semantically enriched learning objects (LO) with high user interactivity and usability.

99. Publish and Query the Semantic Data of Molecular Structure, Biological Activity and Nutritional Properties of the Natural Food Sources

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SRM University

Keywords: *Semantic Web, RDF, OWL, Linked Data*

The etiology of most chronic diseases involves natural foods, chemicals and biological activities that modulate important physiological processes. Nutritional factors of Natural Food are implicated in many common conditions such as asthma, cancer, diabetes, hypertension disease; however, the molecular mechanisms underlying these correlations are not well understood.

Applying semantic concepts to find more related information from the domains of Chemical Compounds, Biological Activities, Diseases and Natural Food sources is the objective of this work.

The Semantic Web proposes the content on the Web using ontologies, the structure underlying data for the purpose of machine understanding. This allows asking sophisticated queries from the different datasets linked together. Knowledge bases are playing important role in enhancing the intelligence of the web.

100. Net Based Rural Health Care System

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Keywords: *Web Based Medical information system:using latest cutting edge technology -OLAP-Smart card-Three layer architecture spread across villages, taluks, and state capitals-Fourth layer a control at single point for the whole country*

For the past four decades, Clinicians, physicians, Health service Researchers, and others have been investigating in bringing the advanced telecommunications and information technologies to improve Healthcare for our vastly populated nation. The main objectives of a health system are to respond to people's expectations and needs by providing services in a fair and equitable manner. This paper focuses on Intranet based Rural Healthcare system. The Healthcare centers are organized as a hierarchy of three layers, where the layers are Sub-center, Primary health center and state-wide Community health center. . The proposed system is going to make the functionalities of each layer as computerized one. In order to exploit the latest cutting-edge technologies of Information Communication Technologies (ICT), this paper defines the technologies recommended to be deployed in each layer of three layer architecture. The fourth one, visualized as of now could be the Central terra-database (Mega) for the population across the country.

101. An Efficient Neighborhood Keying Method To Preserve Session Secrecies In Ad-hoc Environments with Node Level Security Measurements

P. Visalakshi

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Department of Computer Applications,
SRM University, Chennai

An ad hoc network is a collection of wireless nodes dynamically forms a temporary network without the use of any existing network infrastructure or centralized administration.

As adhoc network maintains transient topology there is a possibility for network partitioning. Trust management is the most critical security issue in mobile adhoc network. In order to safeguard the messages sent through nodes, a key management and encryption scheme, called Neighborhood key method is presented. In this each node shares secrets only with authenticated neighbors in the ad-hoc network. Thus preserving session secrecies i.e., backward and forward secrecy maintained using neighborhood keying method. Existing techniques utilize on-demand AODV network routing protocol which undergoes some well known attacks. To overcome these attacks a model is proposed based on nodes known as node level security monitoring. Node level security behavioral is recorded to identify any misbehavior of each other nodes in the network. In such case any suspicious activity identified by isolation of that particular node is possible. Initial configuration parameters are assigned for simulation environment setup and effectiveness of neighborhood keying method which are evaluated using simulation results. This paper presents performance and security measurements of an application layer overlay approach and also aims highly to maintain authentication, confidentiality, data integrity for the messages that pass through application overlays.

102. Pivotal Role Of Wireless Sensor Networks In The Science Of Monitoring To Incorporate In The Individual Connection Of The Electricity Board

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Keywords: *Wireless Sensor Networks, Sensors, Wireless Network, Data Acquisition, Data Distribution.*

Innovative ideas in Wireless Sensor Networks (WSN) are of great challenges and Conservation of energy is main theme of this paper and we should not misuse the future generation power. Our challenge of this paper is to implement Wireless Sensor Networks

in the individual connections of the Electricity Board. The work is all about monitoring, measuring and updating the daily consumption of electricity by the industries and the households. Data Acquisition is done through the Sensors and Data Distribution is made through the Wireless Network. The consumption of units will be observed and measured through the sensors, to be kept at each individual connection and the measured data is updated to the Data Centre of the Electricity Board through the Wireless Network. The data is updated in the data base of the substation of a particular area and in the Data Centre of the Electricity Board as well. The consumption of Electricity units will be sent to the customer daily (through SMS to their cell phones) in the case of need and can be viewed in the internet (through their personal account). The data base will be provided with the information viz., the daily utilization and monthly utilization of the customer, also the amount to be paid for the consumption.

103. A Study on The Effectiveness of ICT Tool with Specific Reference to Fastalerts

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Key Words: *ICT, Effectiveness, Efficient and Services.*

The study on the effectiveness of ICT tool with specific reference to FastAlerts was carried out among the employees of IT companies in IT Park, Chennai with the sample size of 100. This study reveals that only 33% of the IT employees are aware of the ICT

tool. In this competitive world, it is necessary to implement the latest technology in order to provide efficient services. This will provide a WIN-WIN strategy to both the employees and the company.

104. A Double Layered Security for Fingerprint Biometric Authentication

Sasi Rekha SankarPoornima.SBooma Sankari

SRM University, Kattankulathur,
Tamil Nadu

Keywords: *Biometrics, Security, Fingerprint, Authentication, Encryption;*

Security plays a vital role from foyer to finale of essentials. According to research, Biometric is the pinnacle of high level of security, even though, recently Pilfering is strangely increasing in case of all biometric authentications, hence security of the biometric data is very essential for the real world applications. *Fingerprint* Biometric identification is very popular among the various biometric techniques and also where major pilfering was happening.

In this paper, we propose a more secure *biometric fingerprint* authentication, which addresses the concerns of user's privacy, security, and authentication. A small area sensor is used as an external device for laptop and desktop for fingerprint authentication. Fingerprint matching can be used as an additional to the password as a security measure in many secure sectors like online banking, online shopping or even replace online digital signatures. In this authentication system, we use the user's id and password as the initial level of security. The client and server do not exchange the user's extracted feature, i.e., fingerprint directly. Instead, a third party Enrollment Server is used to authenticate and encrypt the extracted fingerprint using an asymmetric encryption. The Enrolment server even sets the threshold value and sends the data to the actual server providing more security. This biometric authentication is designed to provide high security over public networks and trustworthy identity verification system through which the level of pilfering can be greatly reduced.

105. A New Algorithm To Determine The Termination Of Triggers In Active Databases

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Key words : Active rules, triggers, active databases, termination

Active Databases are a combination of traditional static databases and active rules, meant to be automated mechanisms to maintain integrity and facilitate in providing database functionalities. Active database systems can react to the occurrence of some predefined events automatically. In many applications, active rules or triggers may interact in complex and sometimes unpredictable ways, thus possibly yielding infinite rule executions by triggering each other indefinitely causing non-termination. The termination of active rules is an unpredictable problem, except when rule languages with very limited number of rules are used. This paper presents new algorithms for detecting termination / non-termination of rule execution using triggering graph and complex triggering graph, and these algorithms do not pose any limitation on the number of rules.

106. Laser Printers - Health Hazards on Use & Action Points

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Keywords : Laser, hazards, VOC, OEL

Laser printers have occupied a significant place in market. They are friendly when used occasionally and serviced regularly. Laser printers are very risky to health if badly

positioned, poorly maintained and used frequently or for long runs. The risks include hazards that are unexpected and out of general people thought. Irritated eyes, nose & throat, dermatitis, headaches, premature ageing and reproductive and cancer hazards are some of the health affects. As a preventive measure proper ventilation and maintenance are required. The present paper includes the health hazards & their preventive measures..

107. An efficient neighborhood keying method to preserve session Secrecies in ad-hoc environments with node level security measurements

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An ad hoc network is a collection of wireless nodes dynamically forms a temporary network without the use of any existing network infrastructure or centralized administration. As adhoc network maintains transient topology there is a possibility for network partitioning. Trust management is the most critical security issue in mobile adhoc network. In order to safeguard the messages sent through nodes, a key management and encryption scheme, called Neighborhood key method is presented. In this each node shares secrets only with authenticated neighbors in the ad-hoc network. Thus preserving session secrecies i.e., backward and forward secrecy maintained using neighborhood keying method. Existing techniques utilize on-demand AODV network routing protocol which undergoes some well known attacks. To overcome these attacks a model is proposed based on nodes known as node level security monitoring. Node level security behavioral is recorded to identify any misbehavior of each other nodes in the network. In such case any suspicious activity identified by isolation of that particular node is possible. Initial configuration parameters are assigned for simulation environment setup and effectiveness of neighborhood keying method which are evaluated using simulation results. This paper presents performance and security measurements of an application layer overlay approach and also aims highly to maintain authentication, confidentiality, data integrity for the messages that pass through application overlays.

108. A Reference Image Approach for Invisible Digital Steganography using the Concept of Run-length and Encryption Technique

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University of Calcutta

Keywords : Encryption, alternative steganography, reference image, hiding, run length.

In this paper, the notion of steganography has been redefined as an alternative approach where no updating is done in the cover medium but the cover medium is used as a reference for recreating the target medium. Here we have used an image as a reference to hide another image. For a pixel of the target image, an pixel of the cover medium is identified with the same grey value as of the target image and that position of the cover image is stored along with the run length of that pixel in the target image in a text file. This text file is encrypted before sending. Only the encrypted text file and the cover image is send to the receiver end. At the receiver end the target file is recreated from the decrypted text file and the cover image as a reference.

109. The Design, Implementation and Application of Hardware- Evolvable Digital Artificial Neural Network [HEDANN] Methodologies through a selective set of Electronics Hardwares

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&

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Sonapat, Haryana

Soft computing refers to a consortium of computational methodologies. Some of its principal components include Fuzzy Logic (FL), Neural Networks (NN) and Genetic

Algorithms (GA), all having their roots in Artificial Intelligence (AI). In today's highly integrated world, when solutions to problems are cross-disciplinary in nature, soft computing promises to become a powerful means for obtaining solutions to problems quickly, yet accurately and acceptably. Also, a combination of one or more of the methodologies mentioned-termed hybrid systems-has resulted in the emergence of a new class of systems such as neuron-fuzzy, fuzzy-genetic and neuron-genetic systems. Their healthy integration has resulted in extending the capabilities of the technologies to more effective and efficient problem-solving methodologies used in the design of intelligent systems. Considering the plethora of findings and developments that have taken place during the past few years, it would be a Herculean task to present the entire gamut of information in the field of intelligent systems.

110. New Techniques of mathematical modeling for information and communication sciences

Dr. G. Rabbani & H. Ara

Ranchi University

In this research paper we have developed a new technique for translating real world problems into mathematical problems, solving the mathematical problems and interpreting these solutions in the language of the real world.

This is expressed by saying that we catch hold of the real world problem in our teeth, live into the mathematical ocean swim these for some time and we come out to the surface with the solution of the real world problem with us. We soar high into the mathematical atmosphere along with the problem, fly these for mathematical atmosphere along with the problem, fly these for some time and come down to the earth with the solution.

A real world problem, in all its generality can seldom be translated. It may not be possible to solve the resulting mathematical problem. As such it is quite often necessary to "idealise" or "Simplify" the problem by another problem which is quite close to original problem and yet it can be translated and solved mathematically.

111. Dynamic Data Logging for Power Theft Monitoring

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Electronics & Instrumentation,
SRMIST

This Paper would cover the description of electronic meter which has been specially made to meet the specific requirements of a digital device which will be able to track power theft through continuous data feeding to the utility center so keep the complete track of the power being used by a individual house. The software to be used to track these records would be any designed software company based software like Lab view. Here we've taken the reference of Lab view but at later stage can be skipped to other own based software's. Data is being transferred by RF modules for small sub units and for long range transfer is to be done by transceiver modules giving range of max 10 km. So this device would have a wide network of signal processing and data transmission preventing energy theft and ease of use by utility operators. The present invention generally relates to methods and apparatus for detecting power theft, and more particularly to methods and apparatus for detecting, locating, and communicating power theft in a power distribution system

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