VOLUME 1, JANUARY 2018

Technical Magazine

अन्वेषण

Exploring Digital World

Maharaja Agrasen Institute of Technology

Department of Computer Science and Engineering

VISION

To Produce "Critical thinkers of Innovative Technology"

MISSION

To provide an excellent learning environment across the computer science discipline to inculcate professional behavior, strong ethical values, innovative research capabilities and leadership abilities which enable them to become successful entrepreneurs in this globalized world.

To nurture an excellent learning environment that helps students to enhance their problem solving skills and to prepare students to be lifelong learners by offering a solid theoretical foundation with applied computing experiences and educating them about their professional, and ethical responsibilities.

To establish Industry-Institute Interaction, making students ready for the industrial environment and be successful in their professional lives.

To promote research activities in the emerging areas of technology convergence.

To build engineers who can look into technical aspects of an engineering solution thereby setting a ground for producing successful entrepreneur.

Technical Magazine Committee

MAHARAJA AGRASEN TECHNICAL EDUCATION SOCIETY
Registration No. (S-32305 Of 1998)

MATES
उद्यमेन हि सिध्यन्ति कार्याणि न मनोरथैः

Message from Founder & Chief Advisor's Desk

I am extremely happy to know that Department of Computer Science and Engineering, MAIT is releasing the Technical Magazine in month of April-May, 2018.

The magazine, I understand is designed to provide broad range of information focusing on application of existing technology, research, practical explanations anddevelopmentsin latest trends and techniques.

I acknowledge the Sponsors, HoD CSE Department Dr. Namita Gupta and the Department of CSE for their sincere efforts in release of this magazine.

I also congratulate the Editorial team in getting the magazine printed.

I wish them all success in life.

17/04/2018

Dr.Nand Kishore Garg
Founder & Chief Advisor, MATES

MAHARAJA AGRASEN TECHNICAL EDUCATION SOCIETY
Registration No. (S-32305 Of 1998)

MATES
उद्यमेन हि सिध्यन्ति
कार्याणि न मनोरथैः

Message from Chairman's Desk

I am gratified to know that Department of Computer Science and Engineering, MAIT has taken an initiative to publish the Technical Magazine in month of April-May, 2018.

This is productive as well as a great platform for the students, researchers, faculty members and industry experts to disseminate achievements in research and developments in computer science and technology.

I acknowledge the sponsors, Dr. Namita Gupta, HOD (CSE), the faculty members and the students of the Departments for their efforts in publishing the Technical Magazine.

I also applaud the coordination and efforts behind the editorial team to bring up the issue.

I wish them all a great success.

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Ref. No..... Date.....

Message from Director General's Desk

I am very happy that Department of Computer Science and Engineering, MAIT is releasing its Technical magazine to commemorate technical publications and articles of faculties, Industry experts and students for the academic year 2017-18.

This Technical magazine is a forum which could aptly be used for recording the technical articles and research papers published by the students and faculty members. I am sure that this magazine will be informative and resourceful. I owe my hearty appreciations to Dr. Namita Gupta, HoD CSE and her team for their sincere efforts to make the release of this magazine a reality. I wish them "The Very Best" in all their future endeavors.

Prof. (Dr.) M.L. Goyal
Director General, MAIT

MAHARAJA AGRASEN INSTITUTE OF TECHNOLOGY

उद्यमेन हि सिध्यन्ति
कार्याणि न मनोरथैः

(ISO 9001:2008 Certified)
APPROVED BY AICTE, MINISTRY OF HRD, GOVT. OF INDIA AND
AFFILIATED TO GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY, DELHI

Ref. No. ME/D/M/3/18 Date 25-04-2018

Prof. (Dr.) Neelam Sharma
DIRECTOR MAIT

MESSAGE

It gives me immense pleasure to know that a Technical magazine - 2018 is being published by the Deptt. of Computer Science Engineering, MAIT. It is a platform to combine the efforts of Faculty , students and the editorial team to publish their technical work going on in the department.

Industrial and productive technical material forming the contents of the magazine will definitely be a developing tool to the readers.

I applaud the HoD, Editorial and Co-ordinators of the team to publish this issue. I wish them success for future publications

Prof. (Dr.) Neelam Sharma

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MESSAGE FROM HEAD OF THE DEPARTMENT

On behalf of Computer Science and Engineering Department, Maharaja Agrasen Institute of Technology, I am pleased to announce the launching of the first Technical Magazine of Computer Science and Engineering Department and to make it available to everyone.

This Technical Magazine aims to disseminate achievements in research and developments, while featuring new break-through in the field of Computer Science Engineering and Technology.

The entire Editorial team did their best to provide a platform for distinguished faculties, researchers, industry experts and students to share the latest accomplishments with fellow researchers, faculties, Industry experts and students whereby disseminating the knowledge gained from their technical endeavors.

As Editor-in-Chief, I am open to exploring the opportunities for making this Technical Magazine an exciting and definitive forum for attracting and publishing high impact research contributions that are innovative and transformative, and for making this technical magazine serve as a forum for disseminating timely and exciting ongoing research that can stimulate innovation.

At the end, I would like to thank editorial board members, faculties, Industry experts and students and hope that our collective efforts stimulate further progress in this domain of activity with strong determination at both national and international levels.

Dr. Namita Gupta
Editor- in- Chief
Technical Magazine
Department of Computer Science and Engineering

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FACULTY CORNER

Technical Article

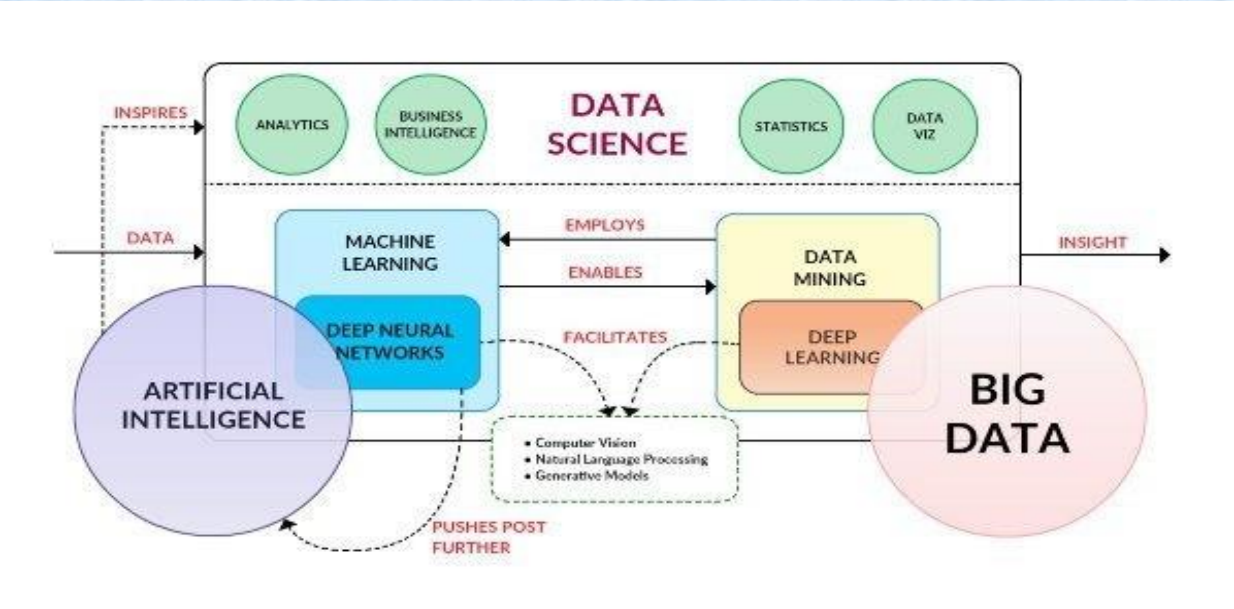
Data Science, Data Mining, Machine Learning

Dr. Namita Gupta
H.O.D (CSE)

The amount of digital data that currently exists is growing at a rapid pace resulting in new terms associated with processing and handling data coming up. These include data science, data mining and machine learning.

What is Data Science?

Data science combines the programming, logical reasoning, mathematics and statistics. It captures data in the most ingenious ways and encourages the ability of looking at things with a different perspective. Data Science deals with both structured and unstructured data. It is a field that includes everything that is associated with the cleansing, preparation and final analysis of data.



Example: Everyday Google receives tremendous amount of data. These data need to be pre-processed and analysed by the Data Scientists. One of the duty of a data scientist at Google (Chrome for instance) is to create and run NLP algorithms to yield the most optimal results.

What is Machine Learning?

Machine Learning is one of the tools used by data scientist, where a model is created that mathematically describes a certain process and its outcomes, provides recommendations and monitors the results once those recommendations are implemented and uses the results to improve the model. It is responsible for providing computers the ability to learn about newer data sets without being programmed via an explicit source.

Example: When Google provides a set of results for the search term “FitBand”, people might click on the first 3 entries and ignore the 4th one. Over time, that 4th entry will not appear as high in the results because the machine is learning what users are responding to.

What is Data Mining?

Data mining is the process of garnering information from huge databases that was previously incomprehensible and unknown and then uses set of various methods that are used in the process of

knowledge discovery for distinguishing the relationships and patterns that were previously unknown. Data mining is a confluence of various other fields like artificial intelligence, pattern recognition, visualization of data, machine learning, statistical studies and so on.

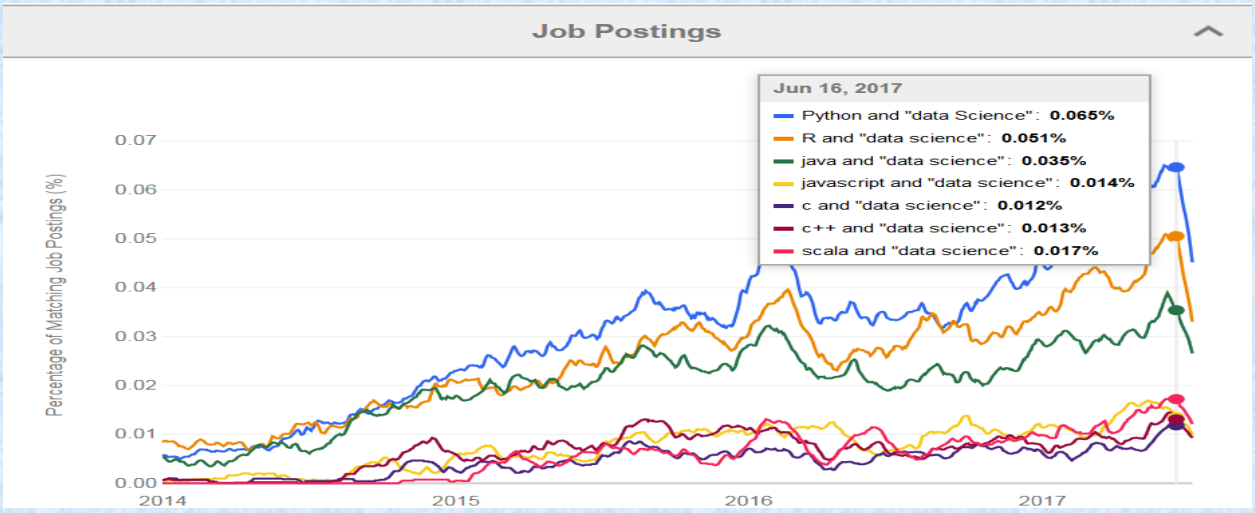
Data mining is thus a process which is used by data scientists and machine learning enthusiasts to convert large sets of data into something more usable.

Example: At Google, much of work on primary products like search, social, and ads relies on large-scale data mining. Like, Brand managers keen to see if their promotional TV ad campaigns result in echoed online activity searching for their brands (and possibly compared to their competitors) can do so with a few clicks.

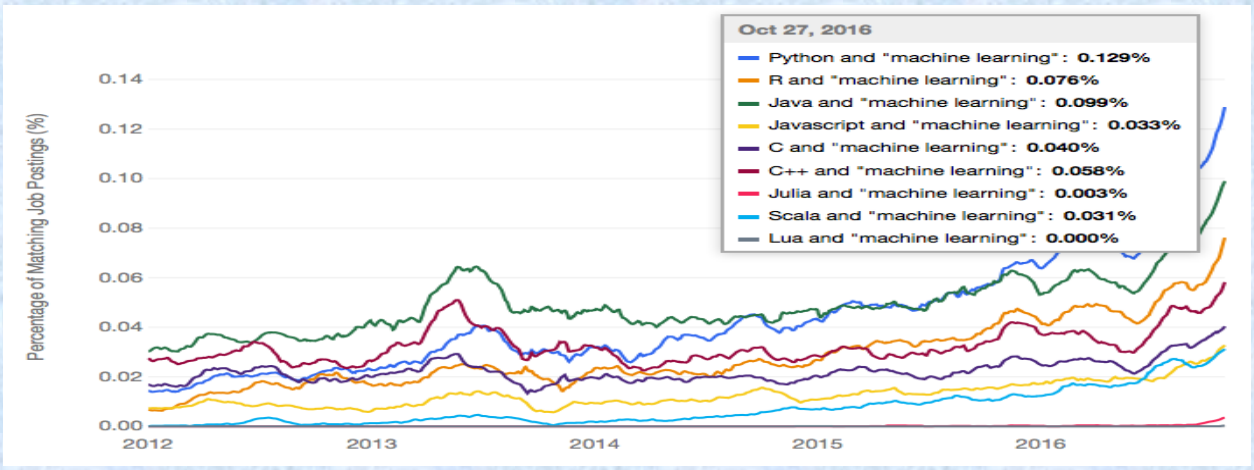
Difference between Data Science, Machine Learning and Data Mining

Data science focuses on the science of data, assess the impact of data in a specific product or organization. Machine learning completely focuses on algorithms and uses algorithms for gaining knowledge from data sets. Data mining is concerned with the process. It deals with the process of discovering newer patterns in big data sets. Unlike Machine learning, data mining combines algorithms as the part of a process. Popular Languages for Data Science, Data Mining, Machine Learning, Python, Java, R, C++, C, JavaScript, Scala, Julia

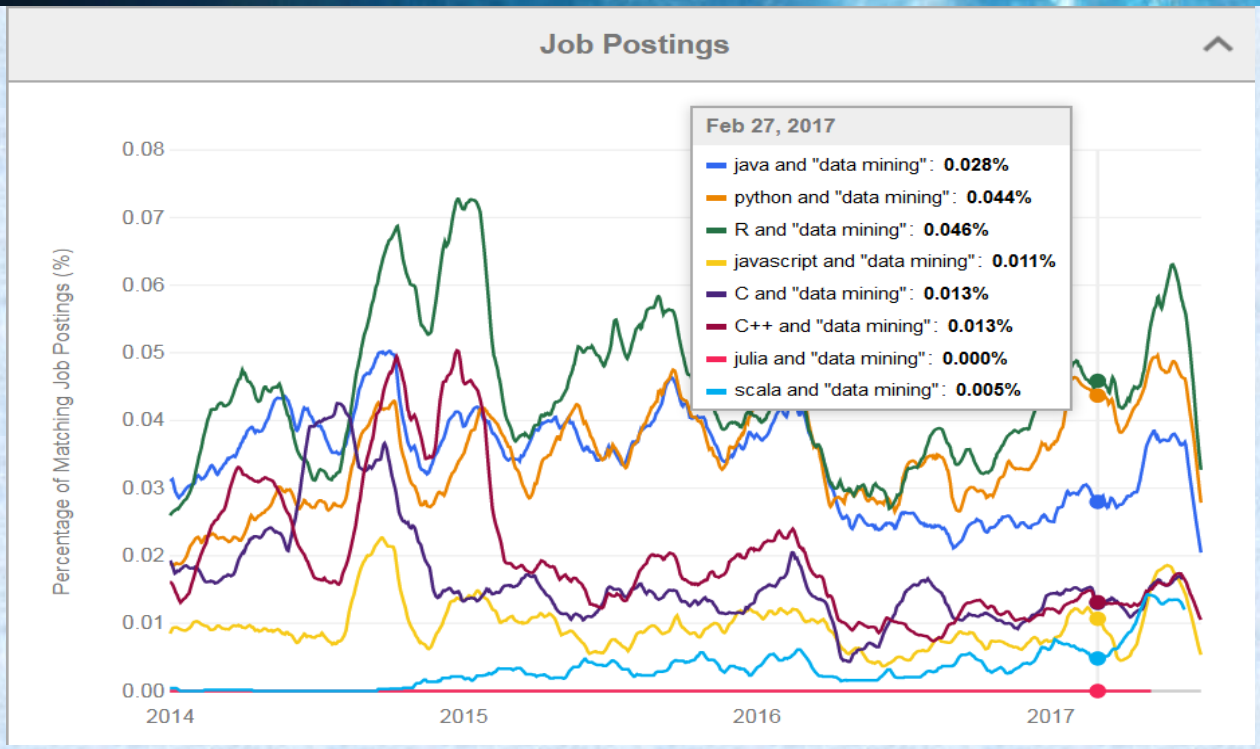
IBM's JeanFrancoisPuget trend search available on indeed.com shows the programming skills requirement in the area of Data Science, Data Mining and Machine Learning



Results obtained for the Query "Data Science"



Results obtained for the Query "Machine Learning"



Results obtained for the Query "Data Mining"

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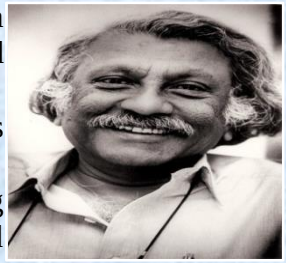
Famous Indian Scientists

Venkatraman Radhakrishnan



Venkatraman Radhakrishnan was born on May 18, 1929 in Tondaripet, a suburb of Chennai. Venkataraman was a globally renowned space scientist and a member of the Royal Swedish Academy of Sciences.

He was an internationally acclaimed Astrophysicist and also known for his design and fabrication of ultralight aircraft and sailboats.

His observations and theoretical insights helped the community in unraveling many mysteries surrounding pulsars, interstellar clouds, galaxy structures and various other celestial bodies. He died at the age of 81 in Bangalore.

A Learner App that Puts Learning Data into Students' Hands

Ms. Shallu Juneja
Assistant Professor (CSE)

Learning analytics tools have become increasingly valuable for college and university administrators looking to boost student success. But can data also inform decision-making on the part of students themselves. A project at Purdue University explores that possibility by taking advantage of the "quantified self" movement (made popular by health-tracking apps such as Fit bit) and putting the data into students' hands. The Quantified Self, also known as life logging, is a movement to incorporate technology into data acquisition on aspects of a person's daily life in terms of inputs (food consumed, quality of surrounding air), states (mood, arousal, blood oxygen levels), and performance, whether mental or physical. In short, quantified self is self-knowledge through self-tracking with technology. Other names for using self-tracking data to improve daily functioning are self-tracking, auto-analytics, body hacking, self-quantifying, self-surveillance, and personal informatics.

Pattern, a teaching and learning apps developed by Purdue Teaching and Learning Technologies , allows students to self-track their academic and extracurricular pursuits and rate how productive they are. The app also lets them compare their behaviours to other students to see which activities may yield the best results. "Pattern" can suggest when to study, recommend ways students can be more efficient with their time, and suggest how long students should be spending on tasks at Universities, few courses have a failure rate of 25 to 40 percent, depending on the semester. Many students struggle in these courses and then end up in failure or backlogs due to low grade point average. The engineering departments in these Universities had taken steps to try to improve success in the courses, including opening a tutorial center and offering supplemental instruction. These things have had some impact, but not as much as one would have liked to see. But apps like "Pattern", give students a very specific way to track their time and were able to mirror that back to them and have them be able to compare with others in their class. It would help them calibrate to a course and the expectations of what they should be doing. Students can log their study habits for a total of let's say three weeks during the semester (two mid semester exams and a final exam). Then their respective course teacher can compile the student data and combine it with test scores in the course. Demonstrations of result after conducting this experiment, in the form of PowerPoint slides in class depicting the study pattern of students who earned Good, Average and below Average will help other students to improve their study pattern. Through this experiment one can definitely see that there is a connection between hours studied and grades earned. And reflecting that back to the class would provide guidance and help change some behavior of students. Through this kind of quantified-self tool designed learner apps, engineering students in Universities can track their study behaviors, regulate and improve their habits.

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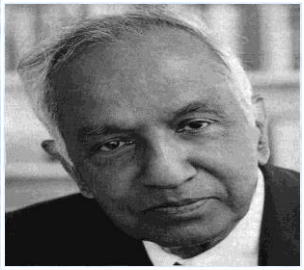
Famous Indian Scientists

S. Chandrasekhar



Born on October 19, 1910 in Lahore, British India, he was awarded the 1983 Nobel Prize for Physics for his mathematical theory of black holes. The Chandrasekhar limit is named after him. He was nephew of CV Raman. Chandra became a United States citizen in 1953.

His most celebrated work concerns the radiation of energy from stars, particularly white dwarf stars, which are the dying fragments of stars. He died on August 21, 1995, at the age of 82 in Chicago.

Artificial Intelligence Aids Materials Fabrication

Sushant Verma
Roll No. - 03596402716

In previous years, researches such as the Materials Genome Initiative and the Materials Project have produced a wealth of tools used in computational world for the design of new materials useful for a wide range of applications, from energy and electronics to aeronautics and civil engineering.

But development process of production of these materials still depends on a combination of experience, intuition, and literature reviews.

A research team at MIT, the University of Massachusetts at Amherst, and the University of California at Berkeley are working to fill up that materials-science automation gap, with a new artificial-intelligence system that would deduce "recipes" for production of particular materials.

"Computational materials scientists have made a lot of progress in the 'what' to make — what material to design based on desired properties," says Elsa Olivetti, the Atlantic Richfield (Assistant Professor of Energy Studies in MIT's Department of Materials Science and Engineering (DMSE)). "But because of that success, the major problem has shifted to, 'Okay, now how do I make it?'"

The researchers have designed a database that contains materials recipes extracted from millions of papers. Scientists and engineers could enter the name of a target material and any other criteria — precursor materials, reaction conditions, fabrication processes — and find out the suggested recipes.

As a step toward realizing that vision, a machine-learning system has been developed by Olivetti and her colleagues that can analyze a research paper, deduce which of its paragraphs contain materials recipes, and classify the words in those paragraphs according to their roles within the recipes: names of target materials, numeric quantities, names of pieces of equipment, operating conditions, descriptive adjectives, and the so on.

In a paper appearing in the latest issue of the journal Chemistry of Materials, they also demonstrate that a machine-learning system can analyze that extracted data to deduce general characteristics of material classes — such as the different temperature ranges that their synthesis requires — or particular characteristics of individual materials — such as the various physical forms they will acquire when their fabrication conditions vary.

The senior author on the paper is Olivetti, and she's joined by Edward Kim, an MIT graduate student in DMSE; Kevin Huang, a DMSE postdoc; Adam Saunders and Andrew McCallum, computer scientists at UMass Amherst; and Gerbrand Ceder, a Chancellor's Professor in the Department of Materials Science and Engineering at Berkeley.

Reference: *http://energy.mit.edu/news/artificial-intelligence-aids-materials-fabrication*

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STUDENTS CORNER

Projects

WHO'S WATCHING YOU?

CYBER SECURITY

Vansh Mittal: 04596402715
Pratyaksh Mittal: 61314802715

Why is Security important? It is important because government, military, corporate and financial, collect, process, and store unprecedented amounts of data on computers and other devices. Not only these, but general public also store some of those data that needs to be protected. But what if Someone is watching you? Cyber security, as the name suggests protects networks, devices, programs, and data from attacks and unauthorized access. These are technologies, practices that supports the protection process. A significant portion of the data can be sensitive information, whether that be financial data, personal information, or other types of data for which unauthorized access or exposure could have adverse consequences. So we need to have stringent protection for them. Various Organizations transmit sensitive data across networks and to other devices in the course of doing businesses, and cyber security describes the discipline dedicated to protecting that information and the systems used to process or store it. As the volume and sophistication of cyber-attacks grow, companies and organizations, especially those that are tasked with safeguarding information relating to national security, health, or financial records, need to take steps to protect their sensitive business and personnel information.

Atlanta Works to Break Ransomware Hold
March 30, 2018

Nearly a week after it became the target of one of the largest ransomware attacks to date, the City of Atlanta has made progress toward recovery, but it is still far from business as usual. Hackers encrypted many of the city government's vital data and computer systems. Mayor Keisha Lance Bottoms characterized the ransomware attack as "a hostage situation."

US Charges 9 Iranians in Massive Academic Research Theft
March 27, 2018

The DoJ has charged nine Iranian nationals for engaging in a massive phishing campaign on behalf of the Iranian Revolutionary Guard. The allegations include the theft of $3.4 billion in research and intellectual property from 320 colleges and universities in the U.S. and abroad, as well as from 47 foreign and domestic companies, plus several federal agencies, state governments, and the UN.

Chaos Threatens Tech Takeover
March 26, 2018

The tech world experienced more insanity last week. We finally got confirmation from AMD that the CTS Labs security report was a tempest in a teapot, but the big question remained unanswered. A self-driving Uber vehicle killed a pedestrian, but we didn't ask the right questions. Facebook admitted that it gave our information to a bad actor, and we forgot what really would wake up Zuckerberg.

Researcher Cracks 'Hacker-Proof' Crypto Wallet
March 22, 2018

A virtual currency hardware wallet with millions of users has been compromised. Saleem Rashid explained how he cracked the firmware on the wallet produced by Ledger using what's known as a "supply chain" attack. That means a targeted device is compromised before any users get their hands on it. The attack on Ledger's $100 Nano S wallet creates a backdoor on the device.

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Block chain

Radhika Bansal
Roll No. - 60514802716

Block chain technology is silently revolutionizing the world around us and forward thinking organizations are integrating the technology into their daily operations. The system was originally created to bring forward a network of digital property free from centralized control that accurately kept track of ownership.

A Digital Ledger

The creation of Bitcoin in 2009 also saw the popularization of block chain technology when the mysterious Satoshi Nakamoto devised a decentralized digital ledger that accurately kept track of every transaction made, and contained a guarantee of integrity throughout the entire network.

Nakamoto outlined a consensus network that would enable the new form of digital money to work with a decentralized peer-to-peer payment network being powered by its users. The system essentially works by getting computers to spend energy proving that they are trustworthy, and stamping that trust on the "blocks" of recorded transactions. Trying to falsify or alter any unit of information on the block chain would require an enormous amount of computing power to try and override the entire network.By allowing digital information to be distributed but not copied, block chain technology created the foundation of a new type of internet that the world's tech community are now finding other potential uses.As Don & Alex Tapscott, authors of Block chain Revolution stated, "The block chain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value."

Smart Contracts

Block chain technology has already evolved into something new in that there are many block chains, as companies operate with different needs and require specific solutions. Ethereum has stepped forward to provide a versatile platform that offers a new range of solutions.

Created by Vitalik Buterin in 2013, the Ethereum network allows users to create "smart contracts" that can be executed by any computer running the Ethereum software in exchange for the network's own currency, ether. The Ethereum network has the ability to realize the potential of block chains on a world-changing scale with smart contracts opening up a range of possibilities in sectors including the world of law, the music industry, and the real estate business.

The opportunities for development are endless with the following sectors all-moving towards integrating block chains:

Crowdfunding
File Storage
Identity Management
Intellectual Property Protection
Sports Betting
Online Gaming

Reference:- *https://coincodex.com/article/1014/what-is-blockchain-technology-and-where-is-it-used-right- now/*

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UPI: Payment Technology

Dipendra Chandra Jha
Roll No. - 01496402716

Gone are the days when we needed long bank account number and clumsy IFSC code to transfer funds!! Yeahh, all you need now is the VPA (Virtual Payment Address) :)
India has come a long way in online payments in a very short period of time. With the launch of NEFT and IMPS, cash transfers between accounts has been made electronic, paperless and instant. NPCI (National Payments Corporation of India) has recently launched **UPI** (Unified Payments Interface) as a new way to transfer money in India.
UPI (Unified Payments Interface) is the latest payment technology that is disrupting the industry. UPI can be thought of like an **Email ID for your money.** It will be a unique identifier that your bank uses to transfer money and make payments using the IMPS (Immediate Payments Service). IMPS is faster than NEFT and lets you transfer money immediately and unlike NEFT, it works 24×7. This means that the online payments will become much easier without requiring a digital wallet or credit or debit card.
Virtual Payment Address (VPA)/ UPI Id:
It's a unique address that is mapped to your linked bank account, also called as UPI Id.
While creating the UPI Id, it must to have the mobile number registered with the bank in one of the SIM of the smartphone, thereby making it highly secure.
Now, one can use virtual/disposable accounts to do transactions generated right from the bank app. Through this, the merchant or the payee will not know your details and even if his system is hacked, you needn't worry about losing money.

#Core Features

Unified Payment Interface provide the following core features via a single payment API and a set of supporting APIs.

1. Ability to use personal mobile as the primary device for all payments including person to person, person to entity, and entity to person.
2. Ability to use personal mobile to "pay" someone (push) as well as "collect" from someone (pull).
3. Ability to use Aadhaar number, mobile number, card number, and account number in a unified way. In addition, ability to pay and collect using "virtual payment addresses" that are "aliases" to accounts that may be payee/amount/time limited providing further security features.
4. Make payments only by providing an address with others without having ever provide account details or credentials on 3rd party applications or websites.
5. Ability for sending collect requests to others (person to person or entity to person) with "pay by" date to allow payment requests to be "snoozed" and paid later before expiry date without having to block the money in the account until customer is ready to pay.
6. Ability to pre-authorize multiple recurring payments similar to ECS (utilities, school fees, subscriptions, etc.) with a one-time secure authentication and rule based access.
7. Ability for all payment system players to use a standard set of APIs for any-to-any push and pull payments.
8. Ability to have PSP provided mobile applications that allow paying from any account using any number of virtual addresses using credentials such as passwords, PINs, or biometrics (on phone)

Currently, BHIM and PhonePe are the leading UPI Apps. But there are many other of different banks. Seeing the huge rise in UPI transactions, Now, Tez of Google Inc. has recently jumped into this industry in India.
Surely, the UPI technology is going to prove a master stroke in achieving the aim of Digital India.

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Bitcoin

Nidhi Anne Sebastian
Roll No. - 20396402716

A 21st century version of gold, only without the storage issues?
"Bitcoins have acquired value. They are being used for settling varieties of economic transactions. People are using them as investment also. And a store of value. So currency is being eliminated."

THE BITCOIN EVOLUTION

Bitcoin has been around since late 2008 but it started making the news in early 2013. It is a crypto currency and a payment system; its main advantage being that transactions are anonymous and peer-to-peer.

Bitcoin's unique architecture is set-up in such a way that their "mining" gets progressively more resource-intensive and total production will be limited to 21 million Bitcoins.

CURRENT BITCOIN VALUE

1 Bitcoin equals 438842.40 Indian Rupee

WHAT DO ECONOMISTS SAY

Paul Krugman --> "What's really happening is a determined march to the days when money meant stuff you could jingle in your purse. In tropics and tundra alike, we are for some reason digging our way back to the 17th century."

Robert Schiller --> "It is a bubble, there is no question about it. ... It's just an amazing example of a bubble."

What do the investors say?

Marc Andreessen (Netscape ++) --> "The Internet of Money"

Warren Buffett --> "Stay away from it. It's a mirage basically, it's a method of transmitting money, it's a very effective way of transmitting money and you can do it anonymously and all that… a check is a way of transmitting money, too. Are checks worth a whole lot of money?"

Paul Singer --> "There is no more reason to believe that bitcoin, a computer- generated, algorithm-driven currency of supposed limited supply, will stand the test of time than that governments will protect the value of government-created fiat money. One difference: Bitcoin is newer and we always look at babies with hope."

PROS AND CONS

Payment Freedom
Paying through bitcoins provide us utmost freedom. Bitcoins can be sent to any person in any part of the world. No intermediaries in between. No bank holidays/strikes. No boundaries or borders. No payment limit.

Low/Minimal Fees
Paying through Bitcoin has very low and sometimes no transaction fees at all. It all depends on the priority of the person. If a person wishes that his/her transaction gets processed fast, he has to pay a transaction fees which is still very low as compared to any financial intermediary or digital wallets.

It's fast
Bitcoin transactions are very fast if compared to banking channels. A bitcoin transaction is as fast an e-mail and can be processed within 10 minutes. Also it can be instantly processed if they are "zero-confirmation" transactions, meaning that the merchant takes on the risk of accepting a transaction that hasn't yet been confirmed by the bitcoin. Bitcoin has very low transaction fees even for being super-fast in terms of processing.

Non-Inflationary
Perhaps, this is the reason why Bitcoin is called the *Future of Money*. Generally, the central government can get fiat currencies printed as much as they want. When the economy is slowing down it is not able to pay off its national debt, the government orders to print more currency and inject it into the economy. This causes the value of currency to decrease as more people have more currency.
On the other hand, this is not the case in Bitcoins. Only 21 million Bitcoins will ever be created and this is known to everyone. This means that after all the Bitcoins have matured, more number of bitcoins cannot grow and thus inflation won't be a problem.

You can create your own money
As central government can print its own money, similarly any person can also produce bitcoins by himself. This can be done my mining bitcoins through computers. It is not any kind of physical mining. Bitcoin mining
is simply a case of leaving the computer switched on, and keep the bitcoin mining software running? Read more about mining here.

Degree of acceptance
Many people are still unaware of Bitcoin. Every day, more businesses accept bitcoins because they want the advantages of doing so, but the list remains small and still needs to grow in order to benefit from network effects.

Volatility
A Bitcoin price is very volatile and increases/decreases at a very high pace. Speculators wish to take advantage of it but genuine investors think of it as too risky and therefore all the investors do not invest in Bitcoins.

Ongoing development
Bitcoin software is still in beta with many incomplete features in active development. New tools, features, and services are being developed to make Bitcoin more secure and accessible to the masses. Some of these are still not ready for everyone. Most Bitcoin businesses are new and still offer no insurance.

Money Laundering/Black Market

Initially bitcoins were used for money laundering and people operating in black markets, which did not want to reveal their personal information and get payment secured. In money laundering middleman/intermediaries would collect money from one source and transfer it to another source through Bitcoins.

So what's next for Bitcoin?

It has many advantages and for this reason it will remain relevant as a currency. The vast majority of its transactions by volume are made in China.

We see the biggest risk to Bitcoin being its substitution and/or parallel use by other crypto currencies. Bitcoin die-hard fans claim that this is never going to be an issue since Bitcoin was the pioneer. This argument is probably flawed because although the BTC is used for payments, this is only a relatively small % of all Bitcoins. One of its primary uses is being a store of value and for this reason other crypto currencies can always step in and enjoy similar status if aggregate demand requires it. Is it just a short-lived popular fad that may soon evolve into something quite different? Only time will tell. The only certainty is that its price will remain very volatile in the future.

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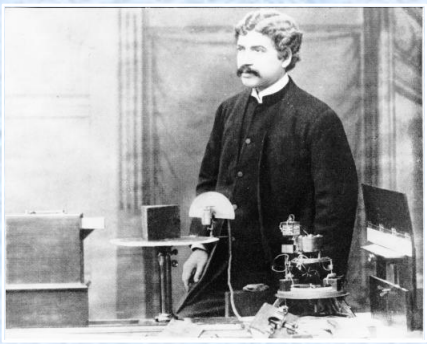
Famous Indian Scientists

Jagadish Chandra Bose



Acharya J.C. Bose was a man of many talents. Born on 30 November, 1858 in Bikrampur, West Bengal, he was a polymath, physicist, biologist, botanist and archaeologist. He pioneered the study of radio and microwave optics, made important contributions to the study of plants and laid the foundation of experimental science in the Indian sub-continent. He was the first person to use semiconductor junctions to detect radio signals, thus demonstrating wireless communication for the first time. What's more, he is also probably the father of open technology, as he made his inventions and work freely available for others to further develop. His reluctance for patenting his work is legendary.

Another of his well-known inventions is the Cresco graph, through which he measured plant response to various stimuli and hypothesized that plants can feel pain, understand affection etc.

While most of us are aware of his scientific prowess, we might not be aware of his talent as an early writer of science fiction! He is in fact considered the father of Bengali science fiction.

Visvesvaraya

Born on 15 September 1860, Sir Mokshagundam Visvesvaraya was a notable Indian engineer, scholar, statesman and the Diwan of Mysore during 1912 to 1918. He was a recipient of the Indian Republic's highest honour, the Bharat Ratna. Sir M V suggested that India try to be at par with industrialized nations as he believed that India can become developed through industries. He has the credit of inventing 'automatic sluice gates' and 'block irrigation system' which are still considered to be marvels in engineering. Each year, his birthday 15 September is celebrated as Engineer's Day in India. Since river beds were costly, he came up with an efficient way of filtering water through 'Collector Wells' in 1895 which was rarely seen anywhere in the world.

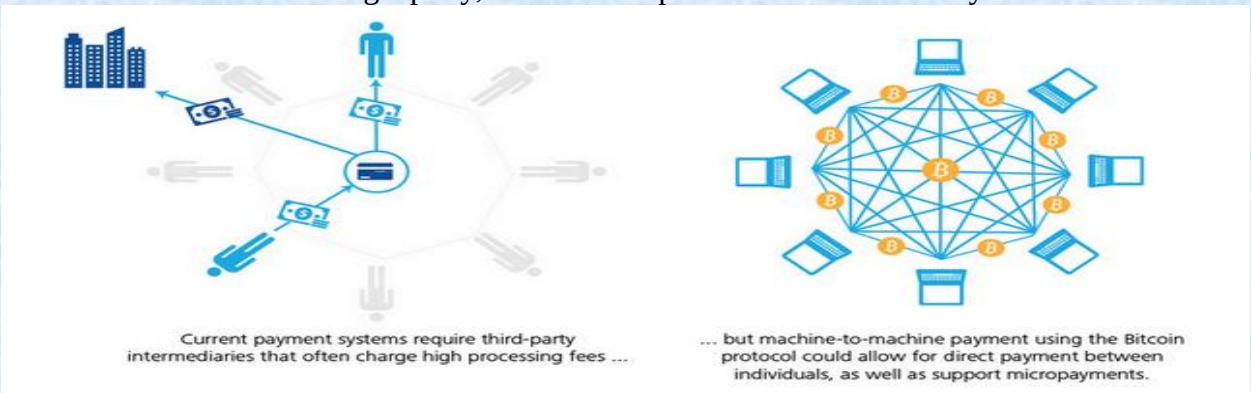
Programming your money with Bitcoin and Block chain

Vasudev Awatramani
Roll No: - 36714802716

Block chain, the technology behind Bitcoin, seems to be the driving technology behind the next generation Internet, also referred to the Decentralized Web, or the Web3. Block chain is a novel solution to the age-old human problem of trust as it provides architecture for so called trustless trust. It allows a participant to trust the outputs of the system without trusting other individual participants within it.

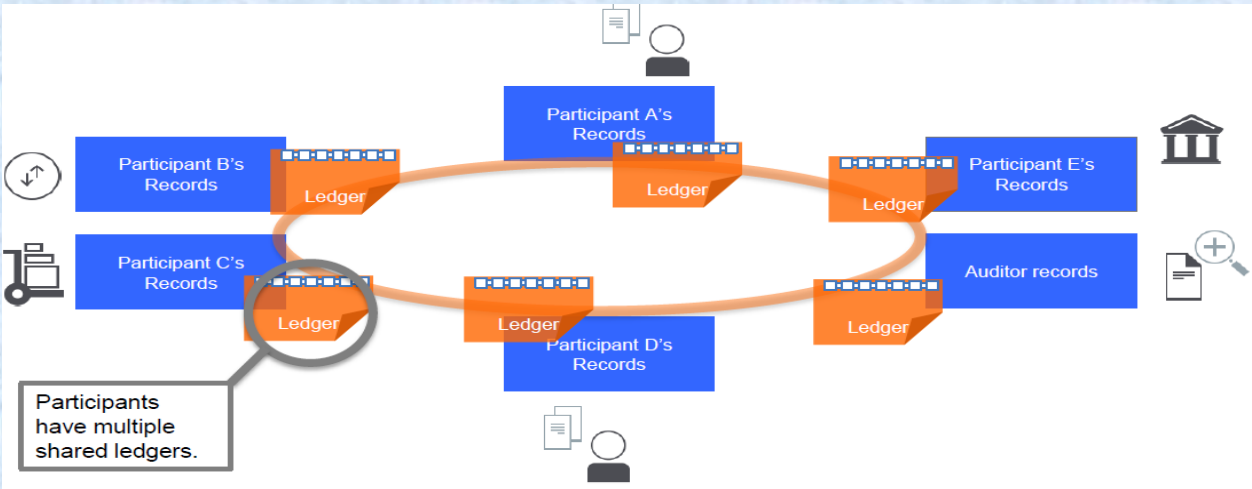
Block chain is essentially a shared, trusted public ledger of transactions, where every participant of the network can inspect but no single user controls. It is a decentralized database that maintains a continuously growing list of transaction data records, cryptographically secured from tempering and security from unethical elements. The public ledger is built using a linked list like data structure that is necessarily a list or chain of blocks, where each block is about information of number of transactions that were validated by the network in a given timeframe, hence the name of this technological concept, Block chain.

As block chain allows a database to be directly shared without a central administrator than some centralized application logic and its transactions have their own proof of validity and authorization to ensure the constraints, this directly results in disintermediation of third-party organization (which may or may not be trusted in present scenario). For instance, we wish to make an economic transaction from India to Japan, without the crypto currency support, we would have to rely upon trusted third -party organization such as Banks to affect the transaction for us. Currently both, we and our receiver in Japan have different bookkeeping methods and ledgers which are isolated and private. First of all, in this process, there is somewhat involvement of a middleman that will obviously result in some sort of fee for the transaction, secondly there is time delay, the transaction may take a few days to be completed and lastly there is a presence of a single authority which is validating this transaction which may resort to unethical behavior for concerned motives. Whereas, block chain enables us to conduct the entire transaction in digital currency such as bitcoin without the above stated limitations with much more security and validation. Hence, the block chain technology enables a network of computers to maintain a collective bookkeeping, which neither closed nor in control of a single party, rather this is public and available fully across the network.



Since the early stages of currency system, the society has always attempted to eradicate uncertainties in our economic transactions, whether it be the middle ages' barter system or modern government issued currency or for that matter notary certified assets, a major issue is always addressed to trust and the value of currency. But, with the birth of the block chain, the issue of trust over a currency is revolutionized, as each node in a given network of participants of economic transactions; all transactions are logged including information on the time, date, participants and amount of transaction by every node in their private ledger. Therefore, each node in the network owns a full copy the block chain, where these transactions are verified by bitcoin miners and via complex mathematical principles these nodes automatically continuously agree about the ledger and all the

transactions within it .So, if one attempts to corrupt a transaction ,the nodes will not arrive at consensus and refuse to incorporate the transaction in the block chain .Thus, every transaction is public and thousands of nodes unanimously agree over the transactions , this is almost like having a notary present for every transaction. Hence, everyone has access to a shared, single source of truth; this is why we can always trust block chain.



As mentioned earlier bitcoin miners are essential to validate a particular transaction, for instance certain nodes in the given network of participants are special and as referred as miners, these miners firstly, validate a transactions in terms of accountability of the involved parties, say if the concerned payee is or not able to conduct the transaction and secondly establish a key that is associated with the \transaction (this task requires considerable computation and cryptographic processing) which is used to add this transaction entry to his/her local block chain repository. After validation and token-generation, the miner broadcasts that the given transaction is validated, allowing other miners and participants to sync or update their block chain repositories with the new developments via the key or token as established earlier. For their services, the miners are rewarded financially, of course in bitcoins. So, one can relate the block chain as global open-source VCS repository which is maintained and contributed by miners.

But the best thing about the block chain is that it does not exclusively support the bitcoin, rather the ledger does not care whether the given bitcoin represents a certain amount of dollars, euros, or any other asset like property, a user can decide himself what the bitcoin represents. As a bitcoin is a divisible in a hundred million units, where each unit is uniquely identifiable and programmable, hence, users can assign value to each unit, for e.g.- a user can program each unit to represent certain amount of dollars, euros, shares of a company or even a kilo-watts of energy or digital certificate of ownership. So, a bitcoin is much more than money and payments, as it can be used to represent any asset of value.

Moreover, bitcoin allows us to make our currency smarter and automate our cash flow, imagine a health care allowance that can only be used to pay for health care at certified parties, in this case one can avoid the verification in bureaucratic process regarding the spending of allowance, as you can simply program these rules into the money ensuring compliancy upfront, it can also be programmed to automatically return to provider if the user does not use it after certain amount of time, ensuring allowances are not hoarded. Similarly, a company can control its spending in the same way by programming budget for salaries, machineries, and materials so that the respective money is specified and cannot be spend on other things. Also, automating such matters leads to considerable decrease in bureaucracy which saves the organization incredible amount of time and money.

Even advancements such as IOTs have already adopted the block chain technology, think of a vending machine or delivery-system drone, these machines are unfamiliar with concept of trust but bitcoin is not, so a drone can be absolutely certain that it will deliver the package to the right recipient and know for sure that has been paid for, and vending machines that is programmed to automatically keep track of its supplies or order new supplies and pay for them automatically via the block chain network.

Block chain being an internet technology is disruptive and breaks the status quo, opening markets, filling trust gaps and eliminating need of middlemen. Bitcoin and crypto currencies have caused a paradigm shift and its time to explore this new technology constructively and critically, discussing openly its potential application.

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Cricket Match Prediction using Machine Learning

SHIVAM ARORA
SUDHANSHU CHOPRA
SHUBHAM AGGARWAL
Mentor: - Dr. POOJA GUPTA (Assistant Professor)

The aim of our project is to predict the outcome of ODI cricket match using machine learning algorithms and model like KNN, SVM, Random forest, etc. and many more. Our data set is based on howstats.com website and we use statistical analysis like Gaussian formula, averages etc. to make our model. We have uses many python libraries such as Numpy, Scikit-learn, Pandas etc. Our data set has following parameters like venue of match, opposition teams, toss status, averages of matches etc. and much more. Till now we have acquired accuracy upto ~70%. The future scope of the project includes dealing with more types of matches like test match, T20s, etc.

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Famous Indian Scientists

Homi J Bhabha

Born on October 30, 1909 in Bombay, Homi Jehangir Bhabha played an important role in the Quantum Theory.

He was the first person to become the Chairman of the Atomic Energy Commission of India. Having started his scientific career in nuclear physics from Great Britain, Bhabha returned to India and played a key role in convincing the Congress Party's senior leaders, most notably Jawaharlal Nehru, to start the ambitious nuclear programme.

Bhabha is generally acknowledged as the father of Indian nuclear power. But few people know that he was absolutely against India manufacturing atomic bombs, even if the country had enough resources to do so. Instead he suggested that the production of an atomic reactor should be used to lessen India's misery and poverty.

He died when Air India Flight 101 crashed near Mont Blanc on 24 January 1966. Many possible theories of the crash came up including a conspiracy theory in which the Central Intelligence Agency (CIA) is involved in order to paralyze India's nuclear program.

E^2R^2: ENERGY-EFFICIENT AND RELIABLE ROUTING FOR WIRELESS SENSOR NETWORKS

Aishwarya Dhembla
Ashwarya Singh
Mentor: -Mr. Ashish Sharma (Assistant Professor, CSE)

1. Energy Efficient Clustering Algorithm for Wireless Sensor Network Using Type-2 Fuzzy Logic
Lifetime enhancement has always been a crucial issue as most of the wireless sensor networks (WSNs) operate in unattended environment where human access and monitoring are practically infeasible. Clustering is one of the most powerful techniques that can arrange the system operation in associated manner to attend the network scalability, minimize energy consumption, and achieve prolonged network lifetime. To conquer this issue, current researchers have triggered the proposition of many numerous clustering algorithms. However, most of the proposed algorithms overburden the cluster head (CH) during cluster formation. To overcome this problem, many researchers have come up with the idea of fuzzy logic (FL), which is applied in WSN for decision making. These algorithms focus on the efficiency of CH, which could be adoptive, flexible, and intelligent enough to distribute the load among the sensor nodes that can enhance the network lifetime. But unfortunately, most of the algorithms use type-1 FL (T1FL) model. In this project, we propose a clustering algorithm on the basis of interval type-2 FL model, expecting to handle uncertain level decision better than T1FL model.

2. Comparison of Localization Free Routing Protocols in Underwater Wireless Sensor Networks
Underwater Wireless Sensor Network (UWSN) is newly developed branch of Wireless Sensor network (WSN). UWSN is used for exploration of underwater resources, oceanographic data collection, flood or disaster prevention, tactical surveillance system and unmanned underwater vehicles. UWSN uses sensors of small size with a limited energy, memory and allows limited range for communication. Due to multiple differences from terrestrial sensor network, radio waves cannot be used over here. Acoustic channel is used for communication in deep water, which has many limitations like low bandwidth, high end to end delay and path loss. With the above limitations while using acoustic waves, it is very important to develop energy efficient and reliable protocols. Energy efficient communication in underwater networks has become uttermost need of UWSN technology. The main aim nowadays is to operate sensor with smaller battery for a longer time. In this project we analyze various routing protocols in the area of UWSN through simulation. We analyze Depth Based Routing (DBR), Energy Efficient Depth Based Routing (EEDBR) and Hop by Hop Dynamic Addressing Based (H2-DAB) protocol through simulation. This comparison is carried out on the basis of total consumed energy, end to end delay, path loss and data delivery ratio.

3. Energy Efficient Routing Protocol for Mobile Wireless Sensor Network
In wireless sensor network, nodes are usually powered by batteries with limited amount of energy. In this project we use an Ad Hoc on Demand Multipath Routing Protocol for finding multiple paths to transfer the data from source node to destination node. The proposed work performed the energy efficient routing, when the sink node (base station) is in static state and all other neighboring nodes are in mobile state. Here gateway node acts as a relay for transmitting data from one group of node to another group. The performance of Ad hoc on Demand Multipath Routing Protocol is compared with Ad Hoc on Demand Distance Vector Routing Protocol. The simulation result shows that the proposed energy efficient routing algorithm consumes low energy and gives high throughput.

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Guide on Tourism Bot (G.O.T.Bot)

Shubham Bansal
Chahat Malhotra
Reva Chadha
Mentor:-Dr. Pooja Gupta (Assistant Professor, CSE)

The travel industry is well-known for the quick assimilation of technology. The connected travelers today log into websites and click their way through hundreds of tourist destination and they are able to get information about these destinations. They are informed about local cuisine, hospitality options and other important information about that destination.

Truly, today's travelers are spoiled (in a good way). But they can be spoiled further by using Natural Language Interaction to alter the way travelers engage technology. This is where the creation of this project becomes important. The aim of the project is to create a Chat Bot that can provide information regarding different travel destinations to the travelers who want to travel to these destinations. The Chat Bot is able to process query that may or may not be in natural language using Natural Language Processing (NLP) and provide response to the user in a natural language. The Chat Bot will improve the process of interaction between human and technology by making this experience similar to the interaction between two humans where they can communicate in their natural languages instead of relying on the GUI of different technologies that they interact with.

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ENHANCED THRESHOLD SENSITIVE STABLE ELECTION PROTOCOL USING FUZZY LOGIC FOR WIRELESS SENSOR NETWORKS

Aishwarya Dhembla
Ashwarya Singh
Mentor: -Mr. Ashish Sharma (Assistant Professor, CSE)

Wireless sensor networks (WSN) consists of several routing protocols that have been proposed for different field of applications. WSN have a dynamic environment, limited power and memory so to build a simple, scalable and efficient routing protocol become one of the most challenging tasks. Various applications of sensor networks are tracking, monitoring of habitat, battlefield surveillance, home automation and many others. WSNs have limited energy as they are battery operated; recharge of the battery is not supported. Thus the development of techniques for extending the battery lifetime is essential. Several routing protocols have been proposed for different field of applications so as to achieve energy-efficiency and enhanced network lifetime. An efficient solution to prolong the network lifetime is clustering of sensor nodes. It offers several advantages such as load balancing, scalability, reduction in collisions during intra-cluster communication. There are two categories of cluster head selection schemes. In the homogeneous schemes, all the sensor nodes of the network are equipped with the same amount of energy such as LEACH, HEED, and CHEF. However, the performance of homogeneous schemes is poor for heterogeneous networks as the nodes with low energy level could have a high probability of election than the nodes with high energy level. In the heterogeneous schemes, all sensor nodes have a different amount of energy as each node is assigned with various task such as SEP, DEEC. We propose and analyze a novel cluster head selection scheme based on Fuzzy Inference System (FIS) for heterogeneous wireless sensor networks (HWSNs) which is named as ETSSEPFL. In ETSSEPFL, the node's qualification for being a CH is evaluated as per the residual energy of a node and distance to a base station (BS). Based on these factors, each node applies the fuzzy rules to determine whether to become a cluster head in each round. The nodes that have high residual energy and are closer to base station have the high probability of being a cluster head.

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Mood Analysis for music recommendation

Amogh Jain
Shubham Jha
Sarthak Bhatnagar
Project guide: Mrs. Garima Gupta (Assistant Professor, CSE)

Mood Analysis is used to select a song based on the input provided by the user in response to various set of images representing different emotions. Once an emotion is determined using the system, a song from the database mapped to that emotion is selected randomly and played for the user.

The accuracy of a mood analysis system is, in principle, how well it agrees with human judgments. This is usually measured by variant measures based on precision and recall over the two target categories of negative and positive texts. However, according to research human raters typically only agree about 80% of the time. Thus, a program which achieves 70% accuracy in classifying sentiment is doing nearly as well as humans, even though such accuracy may not sound impressive. If a program were "right" 100% of the time, humans would still disagree with it about 20% of the time, since they disagree that much about any answer. On the other hand, computer systems will make very different errors than human assessors, and thus the figures are not entirely comparable. For instance, a computer system will have trouble with negations, exaggerations, jokes, or sarcasm, which typically are easy to handle for a human reader: some errors a computer system makes will seem overly naive to a human.

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EXCELRATION' ANDROID APP

Shadual Sinha
Sonali Manhas
Rohit Handa
Project guide: Mrs. Ruchi Goel (Assistant Professor, CSE)

Forgot to add necessary items in your grocery list? You will have to go all the way back to the grocery store just because of that one item that was missed? This app will never let it happen again! *Excel Ration* is an easy to use app which not only lets you make a grocery list but also reminds you when a particular item is about to get finished. In an era where everyone at home is working and busy in their lives, we often forget which item is about to get over. Automatic reminders ensure that no item is missed while preparing the grocery list. Old grocery lists are also stored in the app and help in recollecting all the essentials that can be added to the list. The receipts of purchase and coupons are often lost and remain unused. And getting a defective item exchanged or returned at the grocery store without a bill is no less than a battle. This app stores all bills and coupons. Never again miss the opportunity of getting that extra discount... and why not? You deserve it! The list was made on your phone while someone else is going to the grocery store? No worries, the list can be uploaded on the Google Drive or shared on WhatsApp along with details like the quantity and brand. You may or may not like advices in life, but you will surely like to get suggestions to add items in your grocery list. This feature is another check to ensure that you don't forget even a single grocery item You come back tired from the office and feel the need to make a grocery list. But you are too tired to type each and every grocery item in that small on screen keyboard of your mobile phone. Just sit back on that couch, close your eyes and dictate the grocery list to your phone. The app will do the needful of typing the entire list of items.

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PICTURE PUZZLE

Chiranjeev

As a part of Summer Training, I had made a Core Java Project (Desktop Application/Game) titled "**PICTURE PUZZLE**". The goal of this project was to get some knowledge about Swing class which is used to develop desktop applications.

A Picture Puzzle or Sliding Tile Puzzle is a combination puzzle that challenges a player to slide (frequently flat) pieces along certain routes (usually on a board) to establish a certain end-configuration. The pieces to be moved may consist of simple shapes, or they may be imprinted with colors, patterns, sections of a larger picture (like a jigsaw puzzle), numbers, or letters.

The main objective of this game is to arrange all the pieces of the puzzle (which are initially jumbled) in correct order to get the desired image.

The project helped me to enhance my knowledge about Swing class and its components. I would like to thank my mentor Mr. Suraj Saini or the same.

ABOUT THE GAME

The game has 3 puzzles – Nature, Beach and House. It has 3 difficulty levels:

Easy: In this difficulty level the user gets 2 minutes 30 seconds to solve the puzzle.

Medium: In this difficulty level the user gets 2 minutes to solve the puzzle.

Hard: In this difficulty level the user gets 1 minute 30 seconds to solve the puzzle.

When the game is started, the user is asked to select a puzzle and a difficulty level. After clicking on 'select' button, the user is taken to the puzzle screen and the timer starts. The aim of the game is to correctly arrange the pieces in the given time.

In addition, the user also has an option to restart the game or choose another puzzle in the middle of a game.

A dialog box appears if a user solves a puzzle or if the time gets up. In the dialog box, the user has an option to restart the level, go to the home screen to choose another level or exit the game.

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Famous Indian Scientists

Srinivasa Ramanujan

Born on December 22, 1887 in Tamil Nadu, Ramanujan was an Indian mathematician and autodidact who, with almost no formal training in pure mathematics, made extraordinary contributions to mathematical analysis, number theory, infinite series, and continued fractions.

By age 11, he had exhausted the mathematical knowledge of two college students who were lodgers at his home. He was later lent a book on advanced trigonometry written by S. L. Loney. He completely mastered this book by the age of 13 and discovered sophisticated theorems on his own.

We hadn't known before that he faced a lot of health problems while living in England due to scarcity of vegetarian food. He returned to India and died at a young age of 32.

Ramanujan's home state of Tamil Nadu celebrates 22 December (Ramanujan's birthday) as 'State IT Day', memorializing both the man and his achievements.

Internships

Alert Messaging Interface

Sagar
Roll No: - 11014802714

Alert Messaging Interface project was made with an objective of alerting its client(s) whenever a source is used by the operator at the server side. This project shows the angles of source in such a way that it becomes easier for the operator at client side to locate the position of the source which was used by the operator at server side. An operator at server side can send message by manually inputting the data or by using predefined sources at the server side. This project was implemented using both UDP and TCP sockets. So, an operator can broadcast the message to a group of client by unreliable (UDP) method or can send the message to a client using reliable (TCP) method.

The code was written completely in C++ & compiled using Qt Creator - the cross-platform IDE that makes application and UI development a breeze. Since time-to-market is key, this IDE includes productivity tools that speed up our development time. The system has been tested in real time environment. Network, Core and GUI Libraries of Qt were used in this project.

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LOCATION TRANSMISSION USING USER INTERFACE

Siddharth Mittal
Roll No:-11114802714

Location Transmission using User Interface is a project based on Socket Programming in which a source can send the message to a particular receiver. The user of source can send the message by setting angles azimuth and elevation and firing predefined push buttons. The message which is sent from the user is encoded in byte format with last byte containing the error byte which is then decoded at the receiver end and results are displayed. When client side receives the message, it decodes it and displays it in a graphical format. This project shows messages in a message box whenever an action is performed.

This project has two interfaces: one for server side and one for client side. The server side can also act as client side whenever there is need of diagnosing the server side on local host or there is need of receiving the message from other servers. The software is made to help the defense forces to get in contact with their troops over some network connection so that they can share the location for their next task and also to save the time and efforts of the forces. Location Transmission using User Interface can be used to send messages in Hex values to a particular receiver.

We can send message by using predefined sources of message. This interface sends information about the sender of the message, source of the message and the angles (azimuth and elevation) at which an object is used by the sender of the message. Transmission Interface alerts its receivers that a source object is used by the sender at particular angles so that the receivers of the message can take required actions.

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REAL TIME OPERATING SYSTEM

Aishwarya Dhembla
Roll No: - 11914802714

INTRODUCTION:
The project implements the basic functionality of a Real Time Operating System for PIC18f2550 Microcontroller.
OBJECTIVES:
1)-Interrupt Handling
2)-Context Switching
3)-USART to facilitate communication through a computer's serial port using the RS-232C protocol.
TECHNOLOGY USED:
Language: C
Tools: MPLAB X IDE, Termite
Hardware: PIC18f2550, MAX232
FUNCTIONALITY:
Interrupt handling: An interrupt is a hardware mechanism used to inform the microcontroller that an event has occurred. When it recognizes an interrupt, it saves its context and jumps to a subroutine known as Interrupt Service routine (ISR). Upon completion of the ISR the program returns to the place where it was interrupted.
Context Switching: Real Time Operating System is built around a multi-tasking kernel which controls the allocation of time slices to tasks. A time slice is a period of time a given task has for execution before it is stopped and replaced by another task. This process is known as context switching and it occurs repeatedly.
USART: A USART (Universal Synchronous/Asynchronous Receiver/Transmitter) is a microchip that facilitates communication through a computer's serial port using the RS-232C protocol.
In our project we have developed two user applications:
1) UA1- It used to blink led at Port Pin B6.
2) UA2 - It used to blink led at Port Pin B7.
When an application is running and the user requests to run another application an interrupt is generated and the currently running application is stopped and the execution of new application begins and the RTOS keeps switching between the two applications until the user requests to end an application.
Also Termite which is a simple RS232 terminal has been used to transmit and receive data from microcontroller.
The following commands have been developed for the user:
1) - LS – to list all commands
2) - UA1 – to run user application 1
3) - UA2 – to run user application 2
4) - ED1 – to end user application 1
5)-ED2 – to end user application 2
These commands can be written by the user on the terminal for execution.
CONCLUSION: The Real Time Operating System which implements the above said functionality has been developed successfully and it proves to be very useful as almost all microcontrollers-based system work in real time. A real time system is a time responsive system that can respond to its environment in the shortest possible time.

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OBJECT DETECTION

This project, on Object Detection, is written using OpenCV, Python and Numpy. In this project, different operations such as scaling, rotation, etc. are performed on different images which are important in the field of computer vision. This project also explains the method of detecting a circle in an image.

Even though this project is limited to image processing, videos can also be processed using same packages but using different functions of those packages.

In video processing, each video which is to be processed is first divided into frames and then each frame can be analyzed/ processed separately. These frames can, however, be recombined to make a video with visible changes.

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METRO EFFICIENCY ANALYSIS

-Somaya

The 'Metro Efficiency Analysis' is a cloud based Project. It is built with the vision to improve the efficiency of Metro train arrival times so as to provide an undisturbed and comfortable journey to its commuters. Here we make use of LAMP technology to analyses the efficiency of Metros. The user types the expected arrival time and the actual time of arrival. This data is collected over a long period of time for all the trips made by each train every day. This data when cumulated into a single analysis scheme, gives us an exact picture of the efficiency of the trains.

The DMRC burns the midnight oil to provide its commuters a memorable experience. It makes sure that the trains run on time. But sometimes due to technical fault, natural calamity or human err, the trains get delayed. Hence a true analysis from time to time, motivates the staff to work towards it with more grit and determination. The Project collects data and plots various graphs to show the analysis of data. I made use of Think Speak to achieve the same. Thing Speak is an IoT analytics platform service that allows you to aggregate, visualize and analyses live data streams in the cloud. Thing Speak provides instant visualizations of data posted by your devices to Thing Speak. With the ability to execute MATLAB code in Thing Speak you can perform online analysis and processing of the data as it comes in. Some of the key capabilities of Thing Speak include the ability to:

- Easily configure devices to send data to Thing Speak using popular IoT protocols.
- Visualize your sensor data in real-time.
- Aggregate data on-demand from third-party sources.
- Use the power of MATLAB to make sense of your IoT data.
- Run your IoT analytics automatically based on schedules or events.
- Prototype and build IoT systems without setting up servers or developing web software.
- Automatically act on your data and communicate using third-party services like Twilio or Twitter.

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ALUMNI CORNER

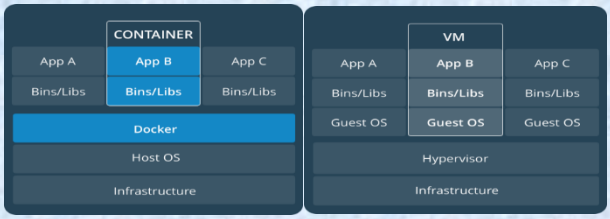
Articles

Docker your new buddy!

Rohit Gupta
(Batch 2011-15)

Choosing between Linux and windows is the dilemma we face time to time as soon as we enter the world of computer science engineering because on one hand we have to work on applications specific for windows and on the other hand all the cool open source software's works good on Linux. To fight such mess, we install virtual box on our windows operating system and some brave ones dual boot the system (I was the brave one during my engineering days!). There is obviously a third way to solve this problem which is known Dockerization of your application. Before going into further we should first understand the concept of Container.

Containers are an abstraction at the app layer that packages code and dependencies together, which means all the dependencies which your software needs from an operating system will be packaged along with your application in a single entity. Confused? Don't be let me explain you with an example: Whenever you need to install java sdk in your system you always go to oracle website and download the package according to your operating system, you might be thinking byte code remain the same as java is platform independent but to run the particular byte code we specifically need java runtime which is dependent on the OS on which we are executing our code. Container here will packaged all the dependencies which java runtime needs along with the java sdk, which basically concludes that you can make different containers : Linux, Unix and window for different or same versions of java and can run all these containers simultaneously on your system. In short you can run java 1.7 and 1.8 at the same time without configuring those environment variables.



Seeing the above figures you might be getting the gist of differences between Docker container and virtual machine but let me explain the key difference between the two.

Docker VS Virtual Machines In Virtual Machines there is hypervisor, which has two key jobs. First, it maps resources like CPU and memory from virtual host to physical host. Secondly, it acts as a control layer, allowing us to manipulate the virtual machines themselves. The problem with hypervisor is it needs to set aside resources to do its job. This takes away CPU, I/O, and memory that could be used elsewhere. The more hosts the hypervisor manages; the more resources it needs which will ultimately become constraint on your machine.

In Docker ecosystem, Containers share the resources (CPU, I/O, and memory) of the host machine unlike VM, basically they act as a process instead of an isolated system so it is lightweight and easy to deploy. Docker daemon manages the kernel resources for containers so that they can work simultaneously and obviously happily. So, Docker should be the ultimate choice whenever we are more concentrated on running a software swift, easy and fast. You can reach him on my email id rohitgupta.mait@gmail.com where he can share you some resources on Docker to get it running.

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Routing Algorithms Based On Routing Information Update Mechanism

Aarushi Goyal
BTA, ZS Associates

PROACTIVE OR TABLE-DRIVEN ROUTING PROTOCOL

Table-Driven Routing Protocols are also called as Proactive Protocols since they maintain the routing information even before it is needed. In these protocols, each node in a network maintains one or more routing tables which are updated regularly. It maintains the routing table using the routing information learnt from neighbours on periodic basis. Each node sends a broadcast message to the entire network if there is a change in the network topology. However, it incurs additional overhead cost due to maintaining up-to-date information and as a result; throughput of the network may be affected but it provides the actual information to the availability of the network. The proactive protocols are not suitable for larger networks, as they need to maintain node entries for each and every node in the routing table of every node. This causes more overhead in the routing table leading to consumption of more bandwidth.

Main characteristics of these protocols are distributed, shortest-path protocols, maintains routes between every host pair at all times, based on periodic updates of routing table, high routing overhead, Consumes more bandwidth, etc.

The Destination Sequenced Distance-Vector routing protocol (DSDV), Cluster-head Gateway Switch Routing protocol (CGSR), Optimized Link State Routing protocol (OLSR), Wireless Routing Protocol (WRP) are examples of table-driven or proactive routing protocols.

REACTIVE OR ON-DEMAND ROUTING PROTOCOL

On-demand routing protocols were designed to reduce the overheads in proactive protocols by maintaining information for active routes only. This means that these protocols finds path by exchanging the routing information only when a node requires a path to communicate with the destination. These protocols are also called reactive protocols since they don't maintain routing information or routing activity at the network nodes if there is no communication. If a node wants to send a packet to another node, then this protocol searches for the route in an on-demand manner and establishes the connection in order to transmit and receive the packet. The route discovery usually occurs by flooding the route request packets throughout the network. When a node with a route to the destination (or the destination itself) is reached a route reply is sent back to the source node using link reversal if the route request has travelled through bidirectional links or by piggy-backing the route in a route reply packet via flooding.

Reactive protocols can be classified into two categories: source routing and hop-by-hop routing. In source routed on-demand protocols, each data packets carry the complete source to destination address. Therefore, each intermediate node forwards these packets according to the information kept in the header of each packet. This means that the intermediate nodes do not need to maintain up-to-date routing information for each active route in order to forward the packet towards the destination. Furthermore, nodes do not need to maintain Neighbour connectivity through periodic beaconing messages. The major drawback with source routing protocols is that in large networks they do not perform well. This is due to two main reasons; firstly, as the number of intermediate nodes in each route grows, then so does the probability of route failure. The advantage of this strategy is that routes are adaptable to the dynamically changing environment of MANETs, since each node can update its routing table when they receiver fresher topology information and hence forward the data packets over fresher and better routes.

The Dynamic Source Routing Protocol (DSR), Ad-hoc On-Demand Distance Vector routing protocol (AODV) and Temporally-Ordered routing protocol (TORA are the examples of on-demand or reactive routing protocols.

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HYBRID ROUTING PROTOCOL

The Hybrid routing protocols combine features of both proactive and reactive ones. Usually, the topology is divided into specified regions or zones. Data distribution within a region is table-driven (proactive) and when communication between nodes of different regions needs to take place, it is accomplished through on-demand (reactive) routing protocol.

The Hybrid routing protocol is based on maintaining the network topology information within the zone of the node, i.e. up to m hops. The source node and the destination node must fall in the zone. In the zone of given node, it uses table-driven routing protocol, and out of the zone of given node it uses on-demand routing protocol. Therefore, HRP is a protocol that is based on the concept of zones; each zone can contain multiple nodes. Each node deploys a relocation method to find its physical location and determines its zone ID by mapping its physical location to the zone map. Equipped with this zone ID, the node can start the intrazone (level of node) clustering and then the interzone (level of getaway) clustering procedures to build its routing tables. Each asynchronously broadcasts a link request. Nodes within its communication range in turn reply with link responses node ID, zone ID. After all link responses are received, the node generates its node LSP that contains the node ID of its neighbours of the same zone and the zone ID of its neighbours of different zones. Nodes may receive link responses from the nodes of their neighboring zones. After LSP receipt, cluster head communicates with the getaway that is sending a scope on the table containing the nodes belonging to the area. Their getaways change the tables received by the cluster head and update their routing table. For cluster-head and getaways are devices performances at the scope and power.

Thus HRP features are requires less memory and processing power than LSRP, integrates reactive and proactive routing advantages, serves activated nodes via reactive flooding, etc.

The Zone Routing protocol (ZRP), Zone-Based Hierarchical Link State Routing Protocol (ZHLS) is the example of hybrid routing protocol.

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Famous Indian Scientists

APJ Abdul Kalam

Avul Pakir Jainulabdeen Abdul Kalam, born on October 15, 1931 is an Indian scientist who worked as an Aerospace engineer with Defence Research and Development Organisation (DRDO) and Indian Space Research Organisation (ISRO).

Kalam started his career by designing a small helicopter for the Indian Army. Kalam was also part of the INCOSPAR committee working under Vikram Sarabhai, the renowned space scientist. In 1969, Kalam was transferred to the Indian Space Research Organization (ISRO) where he was the project director of India's first indigenous Satellite Launch Vehicle (SLV-III) which successfully deployed the Rohini satellite in near earth's orbit in July 1980.

He also served as the 11th President of India from 2002 to 2007. Kalam advocated plans to develop India into a developed nation by 2020 in his book India 2020. He has received several prestigious awards, including the Bharat Ratna, India's highest civilian honour. Known for his love for children. Kalam had set a goal of meeting 100,000 students in the 2 years after his resignation from the role of scientific adviser in 1999.

INDUSTRY EXPERT'S CORNER

TECHNICAL ARTICLES

Emerging Technologies that will Boost- up business Scenario in 2018

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In 2018, emerging technologies like artificial intelligence, natural language processing, and computer vision are maturing, going from game-changing ideas to foundational tools for business. This year, we'll see these and other technologies drive how business gets done and what new products will launch in the near future. With the increasing acceptance of Robotics, block chain and Artificial Intelligence (AI), the operating model and business delivery mechanism of several industry segments is drastically changing. These technologies are heavily influencing how people run business and are opening up new opportunities and business models that were not possible before. Robotics and Process automation (RPA) has become one of the leading technologies that is fueling the growth in the IT sector and services industry. Robotics Process Automation or 'Software Robotics' is a pervasive technology that work across technology platforms and mimics human like behavior while processing repetitive, rule based transactions that deals with electronic data and high volume. The conventional IT solutions such BPM, system integration typically takes much longer compared to an RPA implementation and hence RPA is increasing becoming a preferred solution amongst leading industry players. It is estimated that 35 % of world's job will be replaced by RPA and AI by 2025. Considering this trend, demand of RPA and AI related skills is one of the emerging trends we are seeing in the market place. There is a global shortage for high quality RPA and AI skills in the market and leading organizations like Big 4 consulting majors and IT majors like Accenture and IBM are seriously considering establishing RPA academy in their respective organization to meet this demand. Artificial intelligence as technology which till off late was limited to research and development labs is now been seen in the market place with some practical use cases. e.g. there is an increasing demand in the services industry like Banking and telecoms for Chat Bots. Chat Bots primarily work on Natural language processing have emerged as cost effective alternative to costly human agents and can provide 24 X 7 service at a far better level of accuracy and effectiveness. Trend based predictive analytics and Image recognition to facilitate decision making in business scenarios is also increasingly becoming common place. Block chain is a concept of distributed ledger processing over a trusted network. As a concept it is appears relatively easy to understand but in its implementation it is quite complex. Certain industry processes such as trade finance in banking, medicine verification and tracking in pharma, crypto currency in secondary market are typical use cases that are fast emerging as success stories of block chain. Developing skills in these emerging will require good understanding of programming basics, agile method of development, smart algorithm writing and object oriented programing. It also entails good ability to re-model business processes, envisage a new way of working and articulating a business case /cost-benefit of doing this automation. Developing RPA and AI capabilities is natural extension of computer science and IT graduates and this is the domain where leading IT companies are investing a lot. It is imperative that new graduates are exposed to this technology during their academic life so that they can become relevant to the current demand in the market place. While developing technical skills in the above mentioned technologies is a good starting point, it will be safe to say that technical skills alone will not suffice. Ability to understand the business process, perform design

thinking, articulating business case and ability to develop credible use cases which will provide tangible business outcome are also important skills to acquire.

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The Block chain a revolutionary decentralized trust System

By SACHIN KUMAR
TECHNICAL MANAGER (IBM INDIA LTD)

Blockchain–the technology behind the bitcoin digital currency–is a decentralized public ledger of transactions that no one person or company owns or controls. Instead, every user can access the entire block chain, and every transfer of funds from one account to another is recorded In a secure and verifiable form by using mathematical techniques borrowed from cryptography. With copies of the blockchain scattered all over the planet, it is considered to be effectively tamper-proof. The challenges that bitcoin poses to law enforcement and International currency controls have been widely discussed. But the blockchain ledger has uses far beyond simple monetary transactions. Like the Internet, the blockchain is an open, global infrastructure upon which other technologies and applications can be built. And like the Internet, it allows people to bypass traditional intermediaries in their dealings with each other, thereby lowering or even eliminating transaction costs. By using the blockchain, individuals can exchange money or purchase insurance securely without a bank account, Even across national borders—a feature that could be transformative for the two billion people in the world currently underserved by financial institutions. Blockchain technology lets stranger's record simple, enforceable contracts without a lawyer. It makes it possible to sell real estate, event tickets, stocks, and almost any other kind of property or right without a broker. The long-term consequences for professional intermediaries, such as banks, attorneys and brokers, could be profound— and not necessarily in negative ways, because these industries themselves pay huge amounts of transaction fees as a cost of doing business. Analysts at Santander Inventors, for example, have estimated that by 2022, blockchain technology could save banks more $20 billion Annually in costs. Some 50 big-name banks have announced blockchain Initiatives. Investors have poured more than $1 billion in the past year into start-ups formed to exploit the blockchain for a wide range of businesses. Tech giants such as Microsoft, IBM and Google all have blockchain projects underway. Many of these companies are attracted by the potential to use the blockchain to address the privacy and security problems that continue to plague Internet commerce. Because blockchain transactions are recorded using public and private keys—long strings of characters that are unreadable by humans—people can choose to remain anonymous while enabling third parties to verify that they shook, digitally, on an agreement. And not just people: an institution can use the blockchain to store public records And binding promises. Researchers at the University of Cambridge in the U.K., for example, have shown how drug companies could be required to add detailed descriptions of their upcoming clinical drug trials to the blockchain. In London, mayoral candidate George Galloway has proposed putting the city's annual budget on the blockchain ledger to foster collective auditing by citizens. Perhaps the most encouraging benefit of blockchain technology is the incentive it creates for participants to work honestly where rules apply equally to all. Bitcoin did lead to some famous abuses in trading of contraband, and some nefarious applications of blockchain technology are probably inevitable. The technology doesn't make theft impossible, just harder. But as an infrastructure that improves society's public records repository and reinforces representative and participatory legal and governance systems, blockchain technology has the potential to enhance privacy, security and freedom of conveyance of data—which surely ranks up there with life, liberty and the pursuit of happiness.

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RESEARCHERS CORNER

FACULTY PUBLICATIONS

Taxonomy of GUM and Usability Prediction Using GUM Multistage Fuzzy Expert System

-Deepak Gupta, Anil Ahlawat

The evaluation of quality of software is an important aspect for controlling, managing so that we can be able to enhance the improvement in a software process. For such evaluation, many factors have been identified by a number of researchers. The quality of software is further dependent on many other factors. Usability of software is one of the most significant aspect on which quality of software is dependent. Many researchers proposed a number of software usability models, each model considering a set of usability factors but these models do not include all the usability aspects and it is hard to integrate these models into current software engineering practices. As far as real world is concerned, we are facing many obstacles in implementing any of these proposed models as there is a lack in its precise definition and the concept of globally accepted usability. This paper aims to define the term 'usability' using the GUM. Generalized Usability Model (GUM) is proposed with detailed taxonomy for specifying and identifying the quality components, which brings together factors, attributes and characteristics defined in various HCI and Software Models. This paper also shows how to predict the usability of a software application using a fuzzy based expert system which has been implemented using multistage fuzzy logic toolbox.

Publication/Acceptance:

"Taxonomy of GUM and Usability Prediction using GUM Multistage Fuzzy Expert System", International Arab Journal of Information Technology, SCIE (IF - 0.72). Accepted [In-Press]

Usability feature selection via MBBAT: A novel approach

Deepak Gupta, Anil Ahlawat

In this paper, a metaheuristic algorithm has been introduced for software usability feature selection and evaluation. Usability is becoming one of the most significant aspects of quality of software. The term 'usability' has already been defined by the authors in their previous work in a reference to the hierarchical software usability model. This model combines various usability factors and features in a hierarchical manner. Here, we introduced MBBAT (Modified Binary Bat Algorithm) for usability feature selection to
get an optimal solution for the search of useful usability features out of a given set of usability features. MBBAT is an extension of Binary Bat Algorithm (BBA) which is based on the bat's behavior and to the best of our knowledge; this algorithm is introduced for the first time in software engineering practices. The selected number of features and accuracy of proposed MBBAT algorithm is compared with the original BBA and the proposed metaheuristic algorithm outperforms the original BBA as it generates a fewer number of selected features and having low accuracy.

Publication/Acceptance:

"Usability Feature Selection via MBBAT: A Novel Approach", Journal of Computational Sciences, SCIE (IF - 1.74) 2017, Available online.

Usability Prediction & Ranking of SDLC Models Using Fuzzy Hierarchical Usability Model

Deepak Gupta, Anil Ahlawat, Kalpna Sagar

Evaluation of software quality is an important aspect for controlling and managing the software. By such evaluation, improvements in software process can be made. The software quality is significantly dependent on software usability. Many researchers have proposed numbers of usability models. Each model considers a set of usability factors but do not cover all the usability aspects. Practical implementation of these models is still missing, as there is a lack of precise definition of usability. Also, it is very difficult to integrate these models into current software engineering practices. In order to overcome these challenges, this paper aims to define the term 'usability' using the proposed hierarchical usability model with its detailed taxonomy. The taxonomy considers generic evaluation criteria for identifying the quality components, which brings together factors, attributes and characteristics defined in various HCI and software models. For the first time, the usability model is also implemented to predict more accurate usability values. The proposed system is named as fuzzy hierarchical usability model that can be easily integrated into the current software engineering practices. In order to validate the work, a dataset of six software development life cycle models is created and employed. These models are ranked according to their predicted usability values. This research also focuses on the detailed comparison of proposed model with the existing usability models.

Publication/Acceptance:

"Usability Prediction and Ranking of SDLC models using Fuzzy Hierarchical Usability Model", Open Engineering (Central European Journal of Engineering), ESCI, SCOPUS. Volume 7, No. 1, 2017, Available online.

Usability Prediction of 'Live Auction' Using Multistage Fuzzy System

Deepak Gupta, Anil Ahlawat

In the recent decade, usability prediction has become a relevant research field. It is also helpful in enhancing the software quality. We have extended our work in this paper and predicting the total usability of a web application using multistage fuzzy system. The usability factors in the fuzzy system are grouped as multistage, so as to reduce the fuzzy rules. In our work, we implemented three tasks as (1) we have created a dataset for 'Live Auction' web application and made the dataset publicly available; (2) the usability of the web application has been predicted using the fuzzy system; (3) Ranking of players using sowia-moora method.

Publication/Acceptance:

"Usability Prediction of Live Auction using Multistage Fuzzy System", Journal of Engineering and Applied Sciences, SCOPUS. [Accepted] [In-Press]

Survey of Mutual Exclusion and its variants in Distributed Systems and MANET's.

Ashish Khanna

Abstract: In present world most of the applications developed are of distributed nature. These applications are implemented in distributed environment or systems. Whereas, distributed system can be considered as a system where multiple entities are working in parallel. In distributed system resource allocation is considered as one of the most challenging problem. The resource sharing is prime motivation behind the evolution of distributed computing systems. Hence, a number of processors may compete to have mutually exclusive access to shared resources. The above discussed problem is considered as mutual exclusion. In the presented paper a survey of Mutual exclusion and its variants detailed discussion is presented.

Publication/Acceptance:

Introduction to variations of MANETs: VANETs and FANETs, International Journal of Advanced Research Trends in Engineering and Technology (IJARTET) (UGC approved), ISSN 2394-3785, pp. 55-65, 2017

Software usability datasets

Deepak Gupta, Ashish Khanna

Abstract: Usability of software systems have recently become a very significant quality factor for enhancing the quality of software and is usually associated with easiness in use and learn. A various usability models and ISO/IEEE standards have\ been proposed in literature with their own set of features and attributes. The proposed models are validated using a number of qualitative usability evaluation techniques. However, there is a lack of a commonly used, standard dataset for usability evaluation. In this work, two new datasets i.e. software development lifecycle (SDLC) and Live Auction are created and made publicly available. Moreover, in this paper, we have also done a critical analysis of usability evaluation techniques and use questionnaire evaluation technique to create the new datasets.

Publication/Acceptance:
Deepak Gupta, Ashish Khanna, "Software usability datasets", International Journal of Pure and Applied Mathematics, Scopus, Dec 2017, Vol 117, No. 15, 1001-1014, Available online.

A Survey: Gender Classification Based on Fingerprint

Ashish Mishra, Ashish Khanna, Reetu Sahu

Abstract: Fingerprint recognition system design may be used for authentication of right person in real time situation however at RFID based authentication is a not reliable because it may be used by anyone. As ladies have a tendency to have a fundamentally higher edge thickness (scaled down focuses) than men however it may be separated just when unique mark is in model frame (great) not in inert shape (not great). confinement of accessible work is to discover amend individual when inert prints (obscure unique mark) typically accessible technique is has less acknowledgment rate & less edge thickness, for idle figure prints likewise time for acknowledgment is additionally high henceforth it is likewise requiring to decrease time for acknowledgment & enhance edge thickness. Objective for this paper is to develop an algorithm which may efficiently latent fingerprint into exemplar fingerprint with high recognition rate & high throughput.

Publication/Acceptance:
Ashish Mishra, Ashish Khanna, Reetu Sahu, "A Survey: Gender Classification Based on Fingerprints", International Journal of Pure and Applied Mathematics, SCOPUS. Volume 117 No. 20, pp. 985-992, 2017.

Introduction to variations of MANETs: VANETs and FANETs

Ashish Khanna

Abstract: Mobile Ad-Hoc Networks are self-ruling and decentralized remote frameworks. In Mobile Ad-hoc Networks (MANET), every dynamic node goes about as a host and also like a router. The nodes impart to each other by communication of hop-to hop. The dynamic nature of MANET permits nodes to join and leave the system at any time. Nodes are the frameworks or devices i.e. cell phone, tablet, personal digital assistance, and PC that are partaking in the system and are portable. MANET which using wireless is especially helpless because of its principal qualities, for example, open medium, dynamic topology, appropriated collaboration and obliged ability. Thus, security in MANET is a mind-boggling issue.

Publication/Acceptance:
Ashish Khanna, Introduction to variations of MANETs: VANETs and FANETs, International Journal of Advanced Research Trends in Engineering and Technology (IJARTET) (UGC approved), ISSN 2394-3785, pp. 55-65, 2017.

IMAGE SEGMENTATION AND EDGE DETECTION NEURO-FUZZY LOGIC SYSTEM

Ashish Khanna, Deepak Gupta

Abstract- Image Segmentation is the process of disintegrating a digital image into many segments (sets of modules, also known as super-pixels). The goal of segmentation is to clarify and change the presentation of an image into something that is comparatively more meaningful and easier to understand. Image segmentation is generally used to pinpoint objects and boundaries (lines, curves, etc.) in images. [5] More precisely, image segmentation nowadays used to process of selecting module to every pixel in an image such that pixels with the same module share defined characteristics. In other words, Image Segmentation is the technique of distinguishing an image into meaningful parts, or objects. [6] It also results in a highly segmented image, where each object or entity is labeled in a different way that simplify the description or process of the original image and it can be interpreted by the system that handles the image. In general, the classification of an image's pixels as belonging to one of the "objects" (i.e., classes) composing the image is generally based upon some similar feature(s), to some pattern. In order to find features which can lead to a successful type, assumptions about the image are usually required. This is however due to the fact that the best results are generated by segmentation algorithms "tailored" for defined applications however, generally they operate poorly upon applications other than assigned. The maximum of total segmentation algorithms assumes generally 2 levels, or "object and background" related segmentations. Whereas such a result is considerate for some of the 'classical' image processing [11]. The neural Networks is an area of Artificial Intelligence (AI) which find data structures and algorithms for the learning and the codification of data. Many of the chores that humans generally perform naturally fast are the realization of a familiar face, proves to be a very difficult task for a computer when typical programming methods are used generally.

Publication/Acceptance:

Ashish Khanna, Deepak Gupta, Image Segmentation and Edge Detection NEURO-FUZZY LOGIC SYSTEM, International Journal of Advanced Research Trends in Engineering and Technology (IJARTET) (UGC approved), ISSN 2394-3785, pp. 47-54, 2017.

Detection and Elimination of Search Engine Spam Using Various Techniques

Moolchand Sharma, Ashish Khanna, and Prerna Sharma

Abstract Current web search engines are built to serve all users independent of the special needs of any individual user. With the exponential growth of the available information on the World Wide Web, a traditional search engine, even if based on sophisticated document indexing algorithms, has difficulty meeting efficiency and effectiveness performance demanded by users searching for relevant information Web surfers trust search engines. They expect only the most relevant responses will be listed in the top ranking positions. But due to search engine spamming it won't happen. Without taking action, results from search engines will be greatly harmed. We have analyzed various solutions proposed by various authors and explore in detail the effective solutions to some search engine spam techniques, such as link stuffing and Cloaking. We have proposed completely different scheme for automatic elimination of spam through entry level spam check.

Publication/Acceptance:

Moolchand Sharma, Ashish Khanna, and Prerna Sharma "Detection and Elimination of Search Engine Spam Using Various Techniques", International Journal of Pure and Applied Mathematics, SCOPUS. Volume 117 No. 20, 993-997, 2017.

Feature Selection for Usability Evaluation using MMFO: A novel approach

Deepak Gupta, Anil Ahlawat, Arun Sharma

Nature-inspired metaheuristic algorithm can be based on swarm intelligence, biological systems, physical and chemical systems, hence these are also known as swarm-intelligence based, bio-inspired, physical-based and chemistry-based, depends on the sources of inspiration. But these algorithms unable to compute reduced set of features with maximum accuracy for a usability model. To avoid this limitation, a nature-inspired optimized algorithm has been introduced in this paper for feature selection and software usability evaluation. Usability is becoming one of the most significant aspects of quality of software. The term 'usability' has already been defined by the authors in their previous work in a reference to the hierarchical software usability model. This model combines various usability factors and features in a hierarchical manner. Here, we introduced MMFO (Modified Moth-flame optimization algorithm) for usability feature selection to get an optimal solution for the search of useful usability features out of a given set of usability features. MMFO is an extension of Moth-flame optimization algorithm (MFO), which is based on the navigation method of moths called transverse orientation and to the best of our knowledge; this algorithm is introduced for the first time in software engineering practices. The selected number of features and accuracy of proposed MMFO algorithm is compared with the original MFO and the proposed nature-inspired optimization algorithm outperforms the original MFO as it generates a fewer number of selected features and having low accuracy.

Publication/Acceptance:

Deepak Gupta, Anil Ahlawat, Arun Sharma, "Feature Selection for Usability Evaluation using MMFO: A novel approach", Future Generation Computer Systems, SCIE (IF - 3.99). Accepted [In-Press]

h-Group Local Mutual Exclusion algorithm in MANETs

Ashish Khanna, Awadhesh Kumar Singh, Abhishek Swaroop

Mutual exclusion is one of the fundamental problems in distributed computing systems. The solutions to mutual exclusion problem ensure exclusive access to a shared resource(s). Attaiya-Kogan-Welch [22] presented a variant of mutual exclusion problem, called Local mutual exclusion (*LME*) problem applicable to mobile ad hoc networks. In *LME* problem, the non-neighboring nodes may enter *CS* simultaneously. Later we presented group local mutual exclusion *GLME* a generalization of *LME* where unlike Local mutual exclusion problem, the processes requesting same group (resource) may be in a critical section (*CS*) simultaneously. In the present exposition, an extension of *GLME* problem, named *h*-Group Local Mutual Exclusion (*h*-GLME), has been proposed. The *h*-GLME, where the number of active groups can be *h* (*h* >=1) and the processes requesting any of *h* groups may be in their respective *CS* simultaneously. It is applicable to mobile ad hoc networks (MANETs). In MANETs, the neighborhood can be defined on the basis of the location of the node or the communication range of shared resource(s); however, we have used the communication range of shared resource to define the neighborhood. The solution is token-based and satisfies correctness requirements. We have performed an extensive simulation to estimate communication overhead, latency, and concurrency. Also, we present a method to handle token loss problem. To the best of our knowledge, we are first to present the wireless extension of the *h-GME* problem.

Publication/Acceptance:

Ashish Khanna, Awadhesh Kumar Singh, and Abhishek Swaroop, *h*-Group local mutual exclusion algorithm in MANETs, CSI Transaction on the ICT (Springer), ISSN 2277-9078, pp. 227-234, 2016.

Botnet Detection by Network Behavior Analysis

Mr. Yogesh Sharma, Nipun Agrawal

One of the most possible vulnerabilities to data available over network can be a botnet attack which can cause significant amount of data loss. A botnet attack is a type of malicious attack that utilizes a series of connected computers to attack or take down a network, network device, website or an IT environment. The attack can slow down the network/server, making it busy enough that other legitimate users are unable to access it or temporarily freeze the server. Distributed denial of service (DDOS) is common example of a botnet attack that utilizes a number of botnet devices to send a large number of simultaneous requests/packets to the targeted system. Thus in this paper we collected data sets (i.e. packets travelling in a network) from various sources and merged it to obtain a larger set comprising of benign and malicious traffic. The packets are then analyzed to obtain TCP/UDP based flows. Features are then computed for all the flows identified and listed in a feature vector table. We further tried to parallelize the feature computation work using Hadoop map reduce framework. The feature vector table can be further used to train the classifier for segregating the malicious traffic from the benign traffic.

Publication/Acceptance:

Keywords- Bot, Bot-master, Botnet, P2P, Flows, Feature Vector,GRD Journals- Global Research and Development Journal for Engineering, Volume 2, Issue 11, October 2017, ISSN: 2455-570

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Famous Indian Scientists

Satyendra Nath Bose

Born on January 1, 1894 in Calcutta, SN Bose was an Indian physicist specialising in quantum mechanics. He is of course most remembered for his role played in the class of particles 'bosons ', which were named after him by Paul Dirac to commemorate his work in the field.

Bose adapted a lecture at the University of Dhaka on the theory of radiation and the ultraviolet catastrophe into a short article called "Planck's Law and the Hypothesis of Light Quanta" and sent it to Albert Einstein. Einstein agreed with him, translated Bose's paper "Planck's Law and Hypothesis of Light Quanta" into German, and had it published in Zeitschrift für Physik under Bose's name, in 1924. This formed the basis of the Bose-Einstein Statistics. In 1937, Rabindranath Tagore dedicated his only book on science, Visva–Parichay, to Satyendra Nath Bose. The Government of India awarded him India's second highest civilian award, the Padma Vibhushan in 1954.

STUDENT'S PUBLICATIONS

Comparison of Face Recognition Algorithms Using Opencv for Attendance System

SudhaNarang[1], Kriti Jain[2], MeghaSaxena[2], AashnaArora[2]
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Abstract-In this paper; we have proposed a real-time Face Recognition System for monitoring attendance of students in class rather than relying on methods that are time-consuming. The proposed implementation comprised of using the Viola-Jones algorithm for detecting the human faces from a web camera and then the detected face is resized to the required size; this resized face is further processed by using a simple Local Binary Patterns Histograms algorithm. Once recognition is done, automatically attendance will be updated in a SQLite database with the required attributes. The paper also shares the rationale for preferring OpenCVimplementation over MATLAB. The database is automatically updated by the developed system so that a remote authenticated user can access the attendance. The implementation also ensures that the attendance results are accessing to a remote authenticated user through the application GUI of attendance system.

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Neural Network for Image Classification

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ABSTRACT
As observed machine learning, computer vision techniques and other computer science algorithms cannot compete the human level of intelligence in pattern recognition such as hand written digits and traffic signs. But here we have reviewed a biologically plausible deep neural network architecture which can make it possible using a fully parameterizable GPU implementation deep neural network independent of the pre-wired feature extractors designing, which are rather learned in a supervised way. In this method tiny fields of winner neurons gives sparsely connected neural layers which leads to huge network depth as found in human like species between retina and visual cortex. The winning neurons are trained on many columns of deep neurons to attain expertise on pre-processed inputs in many different ways after which their predictions are averaged. Also GPU used, enables the models to be trained faster than usual. Upon testing the proposed method over MNIST handwriting data it achieves a near-human performance. Upon considering traffic sign recognition, our architecture has an upper hand by a factor of two. We also tried to improve the state-of-threat on a huge amount of common image classification benchmarks.
Keywords: Neural network, Machine learning, Computer vision

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TECHNOLOGY NEWS CORNER

Drones capable of reading human heart rate developed

(MARCH,2018) :

Australian researchers have developed a drone capable of measuring a person's breathing and heart rate from 60 meters away, an advance that may help during humanitarian crises.

The researchers led by Javaan Chahl from the University of South Australia (UniSA), showed that the drone was able to measure a subject's heart beat by using a camera to sense the top a person's head pulsing by approximately one millimeter with each beat, reports Xinhua news agency.

"Basically in a disaster, unfortunately you have to prioritise who's living, who's dead and perhaps who's dying, and this might allow a drone to map a scene and establish the general condition of people," Chahl told the Australian Broadcasting Corporation (ABC).

"The same software could do facial recognition, measure their heart rate after climbing up some stairs in the subway, and you could do that for 100,000 people a day," Chahl said.

The drones were created in conjunction with the Australian Defense Force (ADF) to be deployed during humanitarian crises.

However, Chahl said that the device could also be used for bad things like spying or weaponisation.

For Blind Gamers, Equal Access to Racing Video Games

(MARCH,2018):

Brian Smith, a computer science student in Columbia Engineering, the engineering and applied science school of Columbia University, has created a new system to help the visually impaired play racing video games. The audio-based interface, called racing auditory display (RAD), uses novel signification techniques to help players with turning and understanding a car's speed. Together, these approaches enable players to understand enough aspects about the race to form a plan of action. Smith worked with 15 participants recruited through Helen Keller Services for the Blind and volunteers at Columbia to integrate the RAD into a prototype for a racing game he built in Unity, a popular game engine. He will present his paper at the ACM CHI 2018 Conference on Human Factors in Computing Systems, April 21–26 in Montreal, Canada.

Computer Model Describes the 'Architecture of Life'

(FEBURARY,2018):

Researchers at Harvard University's Wyss Institute say they have used a new holistic multiscale modeling technique to demonstrate the application of tensegrity ("tensional integrity") principles across various levels of size and structural complexity within living cells. Tensegrity principles are used in nature to stabilize the shapes of living cells and determine their response to mechanical forces. The modeling method considers each model as a series of mathematical operations that can dynamically change in response to different inputs, enabling data from different size scales and formats to be combined within a single multiscale model built from the bottom-up and top-down concurrently. "This is the first study, to our knowledge, that demonstrates the mechanical continuity, strain transfer, and conformational changes that result from chemical energy release from the atomic scale up through the whole-cell level, as well as how tensegrity guides those changes to drive cellular movement," says Harvard professor Donald Ingber.

New AI system can decode your mind

(OCT, 2017):

WASHINGTON: Scientists have developed a new artificial intelligence system that can decode the human mind, and interpret what a person is seeing by analyzing brain scans. The advance could aid efforts to improve artificial intelligence (AI) and lead to new insights into brain function. Critical to the research is a type of algorithm called a convolutional neural network, which has been instrumental in enabling computers and smartphones to recognize faces and objects. "That type of network has made an enormous impact in the field of computer vision in recent years," said Zhongming Liu, an Assistant Professor at Purdue University in the US. "Our technique uses the neural network to understand what you are seeing," Liu said. Convolution neural networks, a form of "deep-learning" algorithm, have been used to study how the brain processes static images and other visual stimuli. "This is the first time such an approach has been used to see how the brain processes movies of natural scenes - a step toward decoding the brain while people are trying to make sense of complex and dynamic visual surroundings," said Haiguang Wen, a doctoral student at Purdue University. The researchers acquired 11.5 hours of Functional magnetic resonance imaging (fMRI) data from each of three women subjects watching 972 video clips, including those showing people or animals in action and nature scenes. The model was then used to decode fMRI data from the subjects to reconstruct the videos, even ones the model had never watched before.

High-tech ring detects explosives and more

(OCT, 2017):

When it comes to functional jewellery, we've already seen everything from fitness tracking earrings to bracelets that thwart attackers. Joseph Wang and colleagues at the University of California, San Diego, however, have created something that's a little different yet. They've made a ring that detects chemical and biological threats in the wearer's environment. The ring consists of two main parts. There's an electrochemical sensor cap for detecting specific compounds, beneath which is a circuit board that processes data and transmits it wirelessly to a Smartphone or laptop. Performing both voltammetric and chronoamperometric measurements, the ring is reportedly able to detect a wide range of threats. In its current prototype form, however, it's optimized to detect explosives and organophosphate nerve agents – in both vapor and liquid phases. "We have demonstrated for the first time a fully integrated wireless ring-based multiplexed chemical sensor platform for simultaneous monitoring of several (explosive and nerve-agent) security threats," the researchers state. "The present work addressed also the growing needs for merging the strengths of fashion and wearable fields to create wearable lifestyle accessories toward a widespread acceptance of wearable sensor technology."

AI system used to improve dialysis

(OCT, 2017):

LONDON: Scientists have used an artificial intelligence (AI) system to design a device that may ultimately improve dialysis for patients by optimizing blood flow in veins.Researchers, including those from Imperial College London in the UK, used computer modeling techniques - normally employed to simulate how unsteady air pockets flow over a plane - to model how unsteady currents in blood flows in the veins of patients undergoing dialysis.When the kidneys stop working properly, dialysis can be used to remove waste products and excess fluid from the blood by diverting it to a machine to be cleaned. To connect this machine to the patient a special junction must be formed between an artery and a vein in the patient's wrist or upper arm. This junction is called arterio-venous fistulae (AVF).

Now a smart watch that tracks your every move (SEPT, 2017):

LONDON: Scientists have created a new algorithm that enables smart watches to not only record your exercise session but also detect when you are brushing your teeth or cooking, an advance that will provide a richer and more accurate picture of your daily life.

Current smart watches can recognize a limited number of particular activities, including yoga and running, but these are programmed in advance.

The new method, developed by researchers from University of Sussex in the UK, enables the technology to discover activities as they happen, not just simply when exercising, but also when brushing your teeth or cutting vegetables.

Traditional models "cluster" together bursts of activity to estimate what a person has been doing, and for how long, researchers said.

For example, a series of continuous steps may be clustered into a walk. Where they falter is that they do not account for pauses or interruptions in the activity, and, so, a walk interrupted with two short stops would be clustered into three separate walks.

New system can reconstruct faces using your DNA:

WASHINGTON: Scientists have reconstructed faces from people's DNA, an advance that challenges the idea that genetic databases can be anonymous.

Research institutions regularly collect thousands of human genomes to understand diseases. Most promise volunteers that their identity will be protected.

However, the study published in the journal Proceedings of the National Academy of Sciences shows that in the long run, such anonymity may not be possible.

By training an algorithm to link genetic information with facial features and voices, researchers were able to identify people from their genomes.

"The genome contains all the information that determines your identity. It is used in criminal courts around the world to identify people," said Craig Venter, from the US-based company Human Longevity Inc.

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Famous Indian Scientists

Meghnad Saha

Born on October 6, 1893 in Dhaka, Bangladesh, Meghnad Saha's best-known work concerned the thermal ionisation of elements, and it led him to formulate what is known as the Saha Equation. This equation is one of the basic tools for interpretation of the spectra of stars in astrophysics. By studying the spectra of various stars, one can find their temperature and from that, using Saha's equation, determine the ionisation state of the various elements making up the star. He also invented an instrument to measure the weight and pressure of solar rays. He was also the chief architect of river planning in India. He prepared the original plan for the Damodar Valley Project.

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