BRIGHT tcet IT ENGINEERS

tcet

IDEATE.INNOVATE.INSPIRE

VOLUME 10 | OCTOBER 2018

EZINE LIBRARY

INDEX

DEPARTMENT OF INFORMATION TECHNOLOGY

ABOUT THE DEPARTMENT

The department of Information Technology, started its journey in the year 2002 and is committed to deliver the program with rigor and with active industry participation. The Department has 120 seats intake at first year and 24 seats as lateral entry at 2nd year for engineering diploma students. The department believes in student centric approach. Its dedicated team of faculty members inculcate relevant knowledge, skills and attitude in students to become successful professionals. The U.G. programme is accredited by National Board of Accreditation (NBA), New Delhi for three years w.e.f. 16.09.2011. UG Programme has been re-accredited for 3 years by NBA w.e.f 1st July 2016. Also the programme is permanently affiliated with UOM since AY 2015-16 onwards.

BRIGHT tcet IT ENGINEERS

VISION

"The department of IT will strive to be at the top position among the renowned providers of IT education"

MISSION

The IT department is committed to enrich students by rigorously implementing quality education with a focus to make them industry ready, while imbibing in them professional ethics and social values to become responsible citizens

PROGRAM OUTCOMES

PO 1: ENGINEERING KNOWLEDGE: *Apply Knowledge of Mathematics, Science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.*

PO 2: PROBLEM ANALYSIS: *Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.*

PO 3: DESIGN / DEVELOPMENT OF SOLUTIONS: *Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations.*

PO 4: CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS: *Using research based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions.*

PO 5: MODERN TOOL USAGE: *Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.*

PO 6: THE ENGINEER AND SOCIETY: *Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.*

PO 7: ENVIRONMENT AND SUSTAINABILITY: *Understand the impact of professional engineering solutions in societal and environmental context and demonstrate knowledge of and need for sustainable development.*

PO 8: ETHICS: *Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice*

PO 9: INDIVIDUAL AND TEAM WORK: *Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.*

PO 10: COMMUNICATION: *Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.*

PO 11: LIFE-LONG LEARNING: *Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.*

PO 12: PROJECT MANAGEMENT & FINANCE: ***Demonstrate knowledge** and under**stand**ing **of engineering and management principles and** apply these **to one's own work, as a** m**ember and** leader i**n a team**, **to manage** projects **in multidisciplinar**y envi**ronme**nts.*

PROGRAM SPECIFIC OUTCOMES

PSO1:

To develop the culture of augmenting existing technologies to create scalable IT solutions.

PSO2:

To combine various technologies like IoT,Cloud and Analytics to provide integrated solutions to real time problems of government or industries.

PSO3:

To master in moulding any problem into a web or internet based solutions.

FOREWORD

Dear Readers,

Engineers are one of the most important tools in shaping the development of society as a whole. Thus, here at TCET, we strive to provide students with all the knowledge that is needed and enable them with the required abilities so that they may become extraordinary engineers and diligent citizens of our country.

This time as the 10th edition of Ezine is being put forth, I would like to comment the contribution that the students, faculty, alumni and parents have made towards making the "Students' Magazine" possible. Like all editions before it, Ezine X serves as a platform for students and faculty to share and hone their knowledge and skills and for them to showcase their achievements in not just academia, but a wide spectrum of fields. Moreover, the magazine showcases the activities that the department and the institute conduct to ensure a versatile development among students. Thus, Ezine is not just about academics; it strives to serve as a beacon of inspiration for students to aim for greater heights.

We, at TCET believe that learning is a lifelong process - and that is exactly the principle that we, through Ezine, have tried our best to instil among students. Thus, Ezine is our way to make a little contribution toward the betterment of society.

Sincerely,

Dr. Kamal Shah

Dean, R&D Cell

"The function of education is to teach one to think intensively and to think critically. Intelligence plus character - that is the goal of true education."

-Martin Luther King, Jr.

Dear Readers,

The purpose of E-zine magazine is to imbibe the technical knowledge in the minds of the individuals. Knowledge in a classroom is only limited and requires additional boost from technical magazines like E-zine.

Not only that, there is an ever increasing gap between the industry and the academics. It is really difficult to match with the pace with which the industry grows technically. E-zine helps to bridge the gap of knowledge by imparting latest topics of technical innovations in the world of Information Technology. The best thing about E-zine is that it is a magazine of the students, developed by the students and for the students.

E-zine also provides a platform to the students and faculty members to showcase their knowledge and research by publishing their technical articles. The art of reading is diminishing day by day and E-zine is an effort to keep that art of reading and gaining knowledge.

Nelson Mandela once famously said, "Education is the most powerful weapon which you can use to change the world." Let us try to change the world for the betterment of humanity. E-zine is thus just a baby step to changing the perspective of an individual towards the society through knowledge.

On behalf of the editorial team I thank the management of Thakur College of Engineering and Technology for providing such a wonderful platform for the students and faculty members. Also many congratulations to the editorial team for putting efforts into the creation of E-zine.

Mr.Aaditya Desai
Faculty Incharge

Dear Readers,

It gives me immense pleasure to lead the department of IT. We started our journey in the year of 2001. In the over 1.5 decades we have grown our expertise & competence in the core IT curriculum & research. The department has a strong program in IT including B.E, M.E and Ph.D. Programs.

The department is striving hard towards the goal of providing innovative & quality education with high standard to achieve academic excellence. The primary focus of our curriculum is to impart technical know-how to student, promote their problem solving skills and innovation of few technologies. It offers many platforms to students including (ABL, PBL and TBL) for providing wide spectrum of options to students to pursue1 their interest. Our department maintains active research domain for carrying out collaborative and interdisciplinary research. The faculty members look forward to contribute in solving technological challenges of the society with active participation from all stakeholders. "Nothing can be achieved without genuine effort." The department boasts of experienced faculty who are all dedicated to teaching and research making a difference in the lives of our students. In nutshell, faculty members of the department are working in the direction of shaping up the students to make them global competitive technocrats and good Samaritans of our country. I congratulate team of faculty members and students for their hard work, dedication and original efforts.

Best wishes!!!

Dr.Rajesh Bansode
HOD, IT

EDITOR'S DESK

Dear Reader,

No one is a master from birth and none will ever be. The magazine you are seeing is a result of lots of trial and errors. This experience has given me and my team a great opportunity to explore various tools, solve problems in about hundreds of round about ways, matured us, increased our patience, improved our time management and the most important is that we learnt the importance of team work. These are some of the many soft-skills that one cannot get in the classroom itself. With these three months of hardships; I postulated that making a magazine is not an easy thing!

What I understood from this involvement is that, a magazine is an embodiment of studying, experience, hard work and time brought in the form of articles written by the authors and those who have put their effort in making it presentable. I hope that we have are successful in creating a magazine which is successful in imbibing these values in you. With this I would like to present you the 10th Edition of IT Department's Technical Magazine, EZINE X.

Sincerely,

DIVYAM CHOUDHARY,

EDITOR-IN-CHIEF

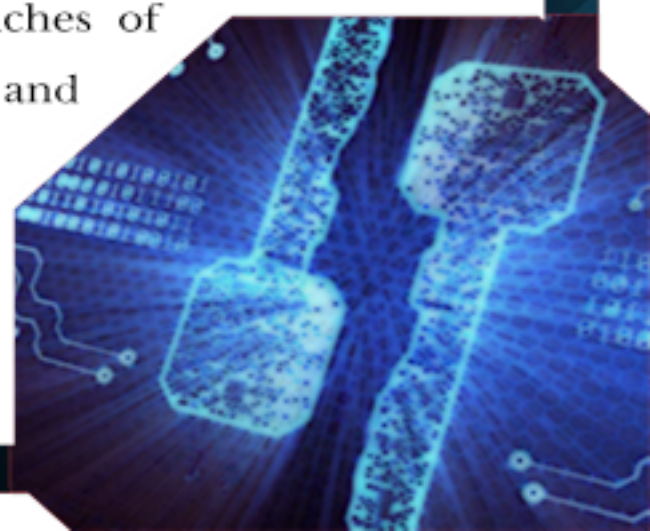
STUDENT'S TREATISE

QUANTUM CRYPTOGRAPHY

Quantum cryptography is an approach towards securing communications by applying phenomenon of quantum physics based on usage of light and their quantum properties for encryption. Quantum cryptography works on the physics of information, and also provides secure and protected communication, whose security is guaranteed directly by the laws of physics. Quantum cryptography first came into existence in the early seventies when Steven Wiesner wrote "Conjugate Coding". Quantum cryptography works on two important principles of quantum mechanics viz. (1) The Heisenberg uncertainty principle and (2) The Principle of photon polarization. The Heisenberg uncertainty principle states that, the quantum state of an object cannot be determined accurately. The principle of photon polarization states that, an agent cannot copy unknown qubits i.e. unknown quantum states, due to no-cloning Theorem.

Cryptography transmits information in such a way that its access is entirely restricted to any person other than the intended recipient, even if the transmission itself is received by any other. Cryptography operates with a sender encoding or encrypting the original message or text in a systematic way that conceals its meaning. The encrypted message or crypto-text is transmitted, and the receiver recovers the message by crumbling or decrypting the transmission. Existing cryptographic techniques are usually identified as "traditional" or "modern." Traditional techniques use operations of coding, transposition, and substitution (alteration of plaintext characters). Traditional techniques were designed to be simple, for encoding and decoding by hand. By contrast, modern techniques use computers, and rely on extremely long keys, convoluted algorithms, and intractable problems to achieve security assurances. There are two branches of modern cryptographic techniques viz. (1) Public Key encryption and (2) Secret Key encryption.

In Public Key Cryptography, messages are exchanged using an encryption method so complex that even full disclosure of the



encoded operation provides no useful information for its decryption. Each participant has a "public key" and a "private key"; the former is used by others to encrypt messages, and the latter is used by the participant to decrypt them. With Secret Key Cryptography, both communicating parties can use the same key to encrypt and decrypt the messages. Before any encrypted data can be sent over the network, both should have the key and must agree on the cryptographic algorithm that they will use for encryption and decryption. One of the major problems with Secret Key Cryptography is the logistical issue of how to get the key from one party to the other without allowing any unauthorized access by an attacker. If Party(A) and Party(B) are securing their data using Secret Key Cryptography, and if Party(C) gains access to their key, party(C) can understand any secret messages that he has intercepted between A and B. Not only can C decrypt A's and B's messages, but he can also pretend that he is A and send encrypted data to B, unbeknownst to B that the data is actually coming from C, not A.

In quantum computing, a qubit is a unit of quantum information - the quantum analogue of the classical bit .The state of a qubit can be in a 'superposition' of 0 and 1 simultaneously unlike any common bit which take only either values 0 or 1. Consider a qubit to be a single photon, and watch how it can be manipulated in the diagram below.

(a)

Diagram (a): A single photon is emitted from a light source and passes through a linear polarizer, which is placed horizontal in this case. Therefore, this process creates a qubit with horizontal polarization.

(b)

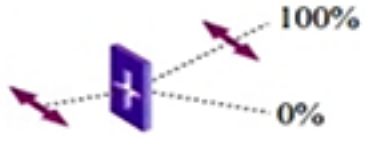


Diagram (b): When a horizontally-polarized photon passes through a horizontally- or vertically-oriented polarizing beam splitter, it always retains its horizontal polarization.t

(c)

Diagram (c): If a horizontally-polarized photon passes through a diagonally-oriented polarizing Beam splitter:

- The probability of finding the photon at one of the exits is 50%.
- The photon will be detected at one of the exits only.
- The polarization of the photon will change corresponding to diagonal polarization.

Applications of Quantum Cryptography:

- Ultra-secure voting.
- Secure Communications with Space.
- A Smarter Power Grid.
- Quantum Internet.

Mukesh Choudhary
SE A 13

POs attained: 1,2,3,4,5,8,10,11

BRAINGATE TECHNOLOGY

There are thousands of people suffering from a corporeal condition like paralysis, making them copiously dependent on others, even for a small chore. But thanks to the substantial boundaries of science and technology, the difficulties for a quadriplegic person can be eased using something called as BRAINGATE TECHNOLOGY. It is nothing but an interaction between humans and computers. It is ordinarily a brain implant system i.e. creating interfaces between neural systems and computer chips. It is a mind-to-movement system which helps a paralytic person to use his/her thoughts in order to control computers. A sensor is implanted into the brain of a paralytic person in order to monitor his/her brain activity which then converts their thoughts and intentions into computer commands. Braingate Technology helps those who have lost partial or complete control over any of the bodily functions such as to operate various devices such as switching on/off TV, lights, fans and operating the speed of the fan etc. Besides, we can use robot arms for our damaged arms which can be controlled by the computers/cursors on the screen to operate/meet our basic needs.

Braingate Technology was developed first by a biotech company named CYBER KINETICS in 2003 in conjunction with the Department of Neuroscience at Brown University and is in clinical trials.

Braingate Technology is a Brain-Computer Interface which consists of an Inter Neural Signal Sensor and External Processors. The sensor consists of tiny chips comprising hundreds of microscopic electrodes that detect each and every brain cell's electrical activities. The chip is implanted in the motor cortex area of the brain which control body movements. External processors convert neural signals into output signals which is then under the control of users. The external processors (computers) are connected to the sensors in a brain via cables due to which the computers translate the brain activity into useful communications using custom decoding software.

The basic principle of Braingate Technology is that the neural systems along with the brain function generate neural signals which are received by the computer chips implanted in the brain and the thoughts or data generated is sent to the computer system. There the user can view their generated controls and think accordingly in order to perform basic

tasks using a cursor on the screen, similar to how a computer mouse is used. There are basically two types of Brain-Computer Interface (BCI),

1. ***One Way BCI:*** It allows computers to either accept commands coming from the brain or to send signals to the brain.
2. ***Two Way BCI:*** It allows the brain and computers to exchange information in both directions.

- ***Advantages:***

1. The biggest advantage of Braingate Technology is that the paralyzed person can use it in order to decode their thoughts into useful communications due to which they can perform basic tasks such as operating gadgets, etc.
2. Another advantage is that it may be helpful to people who have lost their voice. Since the chips use electrical pulses generated by the brain, there is a possibility of talking again via a robotic voice or external processors can be used to translate the thought into text and display the same on the screen.
3. Also, the Braingate chip can be implanted into the brains of the Air Force pilots. It can help them to control their fighter aircrafts using their brain and can help take smart decisions in dire situations in lesser time.

- ***Disadvantages:***

1. One of the biggest disadvantages of Braingate Technology is that it requires Braingate chips to be inserted inside the patient's brain. This is a major disadvantage because if the surgery goes incorrectly, it may even lead to patient's immediate death.
2. Also, Braingate technology is not compatible yet, so whosoever has a Braingate chip implanted into their brain, will have to be connected to a chair via a cable which has a computer built into it. Whatever movements are being done till now is through robotic arms.
3. Also, the Braingate chip is not affordable to each and every person. Hence its use is limited.

So comprehensively, the concept of Braingate Technology is pretty extravagant and unthinkable and it can help a whole lot of people.

Neha Ashok Jha
SE A 36

Anjali Mishra
SE A 53

POs attained:11,2,3,4,5,7,8,10,11

NEED FOR AUTOMATION

Human beings are trying to make our life as easier as it can be. Automation is one of the keys which helps the development of a nation as well as improves the lifestyle of people there. U.S.A is the superpower as their systems are automated, advanced, updated.

Automation in IT

IT automation is the use of instructions to create a repeated process that replaces manual work of a person in data centers. Through automation, the desired output can be achieved with a minimum use of labour.

When we use the Internet, the computer system ensures whether the data is accessed by an authorized user by certain security checks, these security checks are put into the system by the administration, there are a series of steps that are checked by the computer before allowing access to the user. For e.g., if a person is calling another person who's already on a call, we hear an automated voice saying 'The user is busy.'

"The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency."

-Bill Gates

Pros and cons of automation

1. Through automation, the workload of an operation is put on the computer. The computer being quicker than humans increases the speed of the system. As more and more tasks can be executed in less amount of time, the efficiency of the automated system is more.
2. The automated system can't be changed as per requirement.
3.The jobs in the IT sector decrease as a result of the use of automated systems.
4. The automated systems can be dangerous too. E.g.In 2010, an automated system with a faulty algorithm leads to the crash of the stock market in U.S. which damaged the global trade.

Current technologies

Google home or amazon echo are some intelligent auto response systems which interact with the user and responds

according to the users' input.Anything on the internet or any command can be executed with the help of them. This minimizes the manual work of typing the grievance on the net, searching it. Thus automation saves time.

Future of Automation-

Automatic systems are expected to replace half of the workforce. Automated systems will strengthen the connectivity and reliability of humans on a computer system. Every information can be easily accessed and made available for human use. Robots for household chores could be a part of the future. The emerging superpower could be the one with the most efficient and advanced automated systems.

Vikas Maurya
SE A 51

POs attained:1,2,,3,4,5,8,10,11

BLOCKCHAIN TECHNOLOGY– HOW IT CAN CHANGE THE WORLD

Introduction : What is Blockchain ?

Blockchain, as the name suggests is a growing chain of records, called blocks, linked to one another using cryptography. It is the brainchild of a single person or a group of people who go by the pseudonym, Satoshi Nakamoto. Originally created for cryptocurrency bitcoin as a public transaction ledger, it is now finding it's used in various other technology fields. A blockchain, by design, is immutable, it's data, once recorded cannot be altered without modifying the subsequent blocks, which requires a consensus of the majority of the network. The information contained on a blockchain exists as a shared database. It is an open ledger that can record transactions between two different parties in a verifiably efficient manner. It is a decentralized network and managed on a peer-to-peer basis. With this technology, the problem of double spending is solved pretty conveniently as you do not need a third party, which might be a trusted authority or a central server. Blockchain's database not stored in any one location, it is hosted by millions of computers simultaneously, meaning it's recorded data is accessible to anyone on the planet.

Structure of Blockchain :

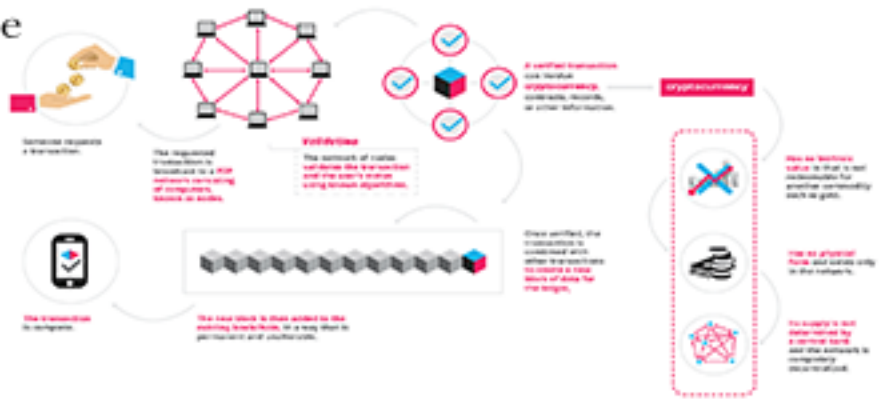
Many transactions may be made in and out of a single block of a blockchain, the blocks hold the batches of valid transactions. These are hashed and coded into a Merkle Tree. Each block is linked to another block by a cryptographic hash. Each block contains a cryptographic hash of the previous block. The integrity of the prior block is confirmed due to this iteration, leading down to the genesis block. Average time taken for the network to generate one extra block in the blockchain is called Block Time. For Ethereum, block time is 14 seconds while for bitcoin is 10 minutes. A rule change in the blockchain will mean that the blocks being produced by old rules will see the new blocks as invalid, this is called hard fork. An example of this is Ethereum, whose fork resulted in it's split into Ethereum and Ethereum Classic chains.

A network of so-called 'nodes' makes up the blockchain. A node is nothing but an administrator of blockchain who joins involuntarily(since the network is decentralized). Each node has got an incentive to join, the chance to win bitcoins. Nodes are said to "mine" bitcoins. Although "mine" is more of a misnomer, each node is competing to win bitcoins by solving computational puzzles.

Blockchain, since it is decentralized, anything that happens to it is a function of the network as a whole. It is not managed by a centralized authority, but by its own network.

Where can we use Blockchain?

Here are some uses where blockchain can be implemented :



Smart Contracts: Distributed ledgers can be used to code smart contracts which will execute by itself – without any human interaction or intervention – provided the specified conditions are met to the fullest. Ethereum is a blockchain created specifically for this purpose. It is open source. At the technology's current rate of development, smart contracts can be used to perform simple functions, such as, in a toll, once the project compensation money has been collected by the tax-payers, the toll will stop collecting any more money and will shut down.

Governance: By making the poll results fully transparent and accessible to the public, there will be total transparency during elections. Ethereum based smart contracts could expedite in the automation process. The organizational decision is also possible on blockchain with an app called Boardroom.

Banks: Many sections of the finance industry are looking forward to implementing blockchain for banking as it would ease and speed up bank office settlement systems. Many banks, UBS, for example, are opening new research labs that are dedicated to researching blockchain technology to explore how it can be used in financial services to reduce costs and increase efficiency.

File Storage: Distribution of data throughout the whole network will protect files from being hacked or corrupt. Therefore, decentralizing file storage on the internet clearly brings benefits. Internet comprising of decentralized websites would also increase the streaming and transfer time.

IoT: Internet of Things, meaning using internet network to control electronic devices. Smart contracts make automation of remote systems management possible.

Types of Blockchain:

Currently, there are three types of blockchains viz.

1) **Public Blockchain:** These are the blockchains which have absolutely none access restrictions. Literally, anyone with an internet connection can either conduct transactions or execute consensus protocol(validation). Examples are Bitcoin and Ethereum.

2) **Consortium Blockchain :** It is a semi-decentralized blockchain. It is permissioned, but a number of companies operate a single node each on the network. Administrators allow only certain trusted nodes to execute consensus protocol.

3) **Private Blockchain :** These are fully permissioned. Unless a network administrator invites, one cannot join this blockchain. Validator access is also restricted.

Shubham Maheshwari
SE A 12

POs attained:1,2,3,4,5,6,7,8,10,11,12

EVOLUTION OF SELF-DRIVING CARS

Self-Driving car industry is moving forward at a rapid pace right now with companies trying to make amazing self-driving cars. Other than that, there is a startup named 'DRIVE.AI' which has its own retrofit kits to make a normal car or a vehicle into an autonomous vehicle.

Talking about 'DRIVE.AI', it is a Silicon Valley startup which was founded in 2016 by several former lab mates of Stanford University's Artificial Intelligence lab. DRIVE.AI took into concern certain Statistics like the number of automobile related deaths caused due to human error and to solve problems like these they positioned themselves in the market with the best autonomous technology to create safer roads with smarter cars.

'DRIVE.AI' is a deep learning AI software company that aims to solve the self-driving challenge and creating a safer world with a more efficient transportation system. Talking about the retrofit kit, it uses camera based LIDAR (Light Detection and Ranging) to complement a self-driving software stack grounded in deep learning.

The only problem is that it is not a solution where you just put the kit and it's done. It will take a lot of time and that is the reason they are planning to offer their retrofit kits to other businesses as adding this kit to lots of cars together will cut down the cost. Also it will reach a wide market in less time rather than serving it to every single customer separately. The idea of turning a normal vehicle into an autonomous vehicle is financially preferable than buying a new Self-Driving vehicle.

It is actually going to take some time to reach to a bigger market with these technologies being very much expensive, but who would have thought of just sitting in a vehicle and the vehicle driving itself. Their biggest competitor right now is 'Waymo', which is another self-driving technology development company. And also 'Otto', a company which focuses on retrofitting semi-trucks with radars, cameras and laser sensors to make them autonomous.

Hetvi Shah
SE IT B 70

POs attained:1,2,3,4,5,6,7,8,9,10,11

MACHINE LEARNING IN NETWORK SECURITY AND INTRUSION DETECTION

In network intrusion detection research, one popular strategy for finding attacks is monitoring a network's activity for anomalies, that is, deviations from profiles of normality previously learned from benign traffic. This can be done using a number of tools or with the help of hardware equipment. Machine Learning can be primarily be classified into two categories i.e. supervised learning, where a training set is provided to a learning algorithm wherein a "right answer" is predefined, and unsupervised learning where a set of data is provided to a learning algorithm that finds patterns in the data and clusters it into groups based on their characteristics.

Traditionally, Network Intrusion Detection Systems (NIDS) can be categorized on the basis of their method by which they detect intrusions. Misuse Detection based systems monitor activities with predefined notions of malicious behaviours. This is where scalable supervised algorithms such as regularized logistic regression or SVMs (Support Vector Machines) can be implemented. The performance of any such sufficiently trained algorithm can provide a level of accuracy surpassing even the most sophisticated firewalls and NIDS that do not employ machine learning. The other method of intrusion detection is based on Anomaly Detection. Once again, the learning algorithms are provided with a notion of normal network behaviour and have been trained to mark up or isolate deviations from the profile. This can be done using MSD calculations where the mean squared difference between the observed value and predicted values is computed.

The task for classifying network anomalies using machine learning is significantly different from other implementations of classification algorithms. Anomaly detection approaches face a set of recognizable problems. Such systems tend to raise a larger number of false positives since it is trained on previous network traffic data and such data is rarely found to be attack free. Thus, a detector may declare a benign deviation as a threat. This very fact can be exploited by hackers by training a system on a "dirty" set where it teaches a system to accept malicious attacks as benign.

According to Sommer and Paxon [1] machine learning tools applied on other domains for anomaly detection are proven to work with great success where manual inspection is rendered

infeasible due to huge datasets. This discrepancy arises because NIDS exhibit particular characteristics that make effective deployment of learning algorithms fundamentally difficult. Typically, such algorithms are written for finding similarities while identifying mismatching data. Larger systems use collaborative filtering for clustering. If the system were to operate as an anomaly detector, it would cluster data that does not fit into a pattern and create a new class with a new label. As the number of network intrusion methods grows, so does the number of such classes, making it increasingly difficult to identify genuine intrusions.

In intrusion detection, the relative cost of any misclassification is extremely high compared to many other machine learning applications. A false positive requires spending expensive analyst time examining the reported incident only to eventually determine that it reflects benign underlying activity. As argued by Axelsson, even a very small rate of false positives can quickly render an NIDS unusable [2] . False negatives, on the other hand, have the potential to cause serious damage to an organization. Even a single compromised system can seriously undermine the integrity of the IT infrastructure.

There are ways to implement scalable machine learning in NIDS while ensuring system efficiency and reliability on the predictions of recommender systems. In a domain where the number of actions and consequent reactions are so diverse, it is always better to rely on insight along with numerical hypotheses. One way of doing so is gaining a deeper understanding of the threat model so as to develop an accurate recognition and response system. Most of the threats in network security are extremely specific and attackers choose to distort a particular part of a system. In such cases, it is always better to implement independent response systems using a modular approach, each with a narrow scope particular to a threat. Cost reduction using gradient descent optimization algorithms can greatly improve performance of any ML based NIDS since a higher cost can lead to a data misfit and cause false positives, or worse – false negatives.

So, to conclude machine learning has come a long way but still is facing a lot of challenges when it is to be implemented in NIDS. Thus, issues such as outlier detection, high classification costs, false results, semantic gaps and lack of “clean” training examples need to be solved before a scalable ML based NIDS system can be fully functional at a global level.

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[1] R. Sommer and V. Paxson, "Outside the Closed World: On Using Machine Learning for Network Intrusion Detection," 2010 IEEE Symposium on Security and Privacy, Berkeley/Oakland, CA, 2010, pp. 305-316.

[2] S. Axelsson, “The Base-Rate Fallacy and Its Implications for the Difficulty of Intrusion Detection,” in Proc. ACM Conference on Computer and Communications Security, 1999.

Advait Maduskar
TE A 52

POs attained:1,2,3,4,5,7,8,9,10,12

SCOPE OF BIG DATA

Let There Be Numbers

The oldest system of accounting is the Tally mark system that came into being about 20000 years ago. Back then, the average human beings were remarkably different, still coming to the terms with all the changes that evolution had brought upon them. However, despite the modification to our bodies and minds there has been one thing that has stayed with us even today - the urge to collect data. The art of collecting and counting has evolved from being a way of keeping track of your cattle to being the primary source of the information for areas of study ranging from marketing to astrophysics.

Big data- a misnomer

When the term Big Data was first used, a moniker given to every sort of data, ranging from food to help, to sales, to data that government possesses, acquired through decades of paperwork involving passport and driving licenses. Over the years, it has evolved gradually to encompass all the schemes that proposed, and eventually use Big Data as their source of information.

Imagine if you will that big data is the Digital equivalent of The Beatles. Now, musicians influence the world over, and consequently allow themselves a different kind of freedom of expression. But to a person who was only regular aware of their existence, the best way to show them the Beatles Legacy would be to inform them of the most popular musician to have been strongly motivated to do what they do because of them.

Just like the man who didn't have more than a vague idea of The Beatles, most people don't know what Big Data is, and the only way to even partly understand this global phenomenon and its staggering order of magnitude is to try to understand its more popular sub -parts. The most common term bandied by tech company executives on forums on the Internet are Smart Data, Identity Data and People Data.

Smart Data

Let's look at the most popular of the three to begin with- Smart Data. Smart Data is essentially the subset of Big Data that can immediately be put into use. Previously stated big data comprise of 3 V's. Typically, Big Data problem consists of primarily Volume and Velocity, with Variety taking a backseat. However, in the real world, a large part of any information collected using algorithms

is just metadata having no immediate practical purpose. Smart data, on the other hand is more purposeful in it problem solving skills, focusing on the third V to sort out valuable, actionable information.

The sorting of big data traditionally calls for professionals having high level of knowledge regarding data collection and interpretation, and takes a lot of time and effort to pre-process, clean and accurately segment before it becomes valuable to a particular company.

Identity data

The postmodern understanding of the human identity, paraphrase, that every human being is a product of the intersection of all of his/her social interactions. This has several philosophical implications. It essentially means that every step that an individual takes and every decision he/she makes can be predicted- if there is sufficient amount of information available to analyze. This is the essence of Identity Data.

It is also the part of Big Data that is most vital to security. Websites such as Wired and Slate also use identity data to predict what kinds of articles the subscriber is likely to enjoy, and to try and improve on how they bring them the news of their preferences and suggestions of stuff related to it.

People data

People Data is the internet equivalent of a call-center. This is because it is the type of data that is used by companies to track the customers like they are a real human being. People data is generally collected through the social interaction of a customer including what social media sites they prefer, where they got the recommendation to first stumble upon the website of a particular said company, if they stayed on the website or close it immediately, and so on.

However, it is essential to take people data into account, especially concerning its more reliable brethren, and that is evident from a cursory glance at the banking sector

With increasingly sophisticated techniques that help us make sense of incredible amount of data, it is inevitable that the three will not only intersect, but may completely overlap, at times, as well. We are going to encounter these terms much more frequently as time passes, as they will be the cornerstones of most customer-based industries, scientific endeavors, and basic Internet-based human interaction..

Amish Punmiya
TE B 12

POs attained:1,3,4,6,7,8,10,11,12

CLOUD COMPUTING
A BOON TO THE PHARMACEUTICAL INDUSTRY

The pharmaceutical industry's primary motive is to discover, develop and produce pharmaceutical drugs for medication. These industries are subjected to a variety of laws and regulations that govern the patenting and testing of these drugs. Productivity of this industry faces a dismal future since organizations' discoveries and developments in new products remain more or less the same, innovation has declined and the market conditions are getting harsher with each passing day. Altering the discovery and development processes will be vital in shaping the pharmaceutical sector and in addressing some of its key challenges.

CLOUD COMPUTING AND ITS ROLE

Cloud computing is the delivery of computing services—servers, storage, databases, networking, analytics, software and more, over the Internet, also known as the cloud. Companies offering these computing services are called cloud providers and typically charge for cloud computing services based on usage by the customers. Cloud computing facilitates rapid innovation and scope for development and productivity. There are several aspects of the drug discovery process that can be streamlined using cloud-based solutions. However, there is a customary hurdle that companies encounter when it comes to migrating towards the cloud. This hurdle is termed customizability. Pharmaceutical organizations that have a lot of legacy on-premise software find it very expensive and tedious to upgrade since they have created unique systems for specific tasks. Upgrading and recreating these niche implementations across all systems can be challenging. Although, now organizations are becoming increasingly comfortable with cloud technology which enable them to addressing their software needs from a more holistic approach.

Companies are working with cloud vendors to create solutions that address multiple pain points in the drug discovery process, rather than a solution with a singular function. This holistic approach adds value as the swiftness of software deployment in the cloud provides organizations with a strategic edge, increasing efficiency and enhancing a company's overall offering and time to market

FUTURE OF THE PHARMACEUTICAL INDUSTRY

Cutting costs, boosting efficiency and speeding up drug discovery are the primary targets of pharmaceutical organizations and to achieve these objectives, companies have established collaboration with Contract Research Organizations (CROs). Cloud computing can counter the security and data integrity concerns associated with the pharmaceutical sector. Advanced cloud products are enabling pharmaceutical organizations to discover unexplored resources. Adopting cloud-based solutions can also bypass working with obsolete technology and remove the barriers associated with frequent upgrades. Cloud computing grants companies the ability to swiftly adopt the most efficient and relevant technology for their research instead of creating the traditional unnecessary, tedious and time-consuming methods.

Cloud-based solutions have proved to be a boon for the pharmaceutical industry. If institutions and organizations alter their business models to reflect these technological advances, stagnant productivity can be completely eradicated and innovative drugs would be produced recurrently. The cloud-based technologies provide organizations with technological enhancements today, to facilitate the discoveries of tomorrow.

Shweta Sharma
TE B 27

POs attained:1,2,3,4,5,6,7,8,9

SENTIMENTAL ANALYSIS USING MACHINE LEARNING

Sentiment Analysis is the process of determining whether a piece of writing is positive, negative or neutral. It's also known as opinion mining. Sentiment Analysis is used by many companies to find people's opinion about any product or a social issue. In today's world of Big Data Analytics, Sentiment Analysis plays an integral role in the growth of a company. Sentiment Analysis is also used to predict the outcome of a real life problem. This article focuses on Sentiment Analysis using social media and how we can achieve sentiment analysis using Machine Learning Algorithms.

Machine Learning is a science which allows computers to learn and act like people, and also to improve their learning over time autonomously, providing them with data and information in the form of observations and actual interactions.

Steps for Sentiment Analysis using Machine Learning:

1. Data Collection
2. Data cleaning
3. Data Shaping
4. Choosing an Algorithm
5. Training Machine Learning Algorithm
6. Validation to find accuracy
7. Try on new input

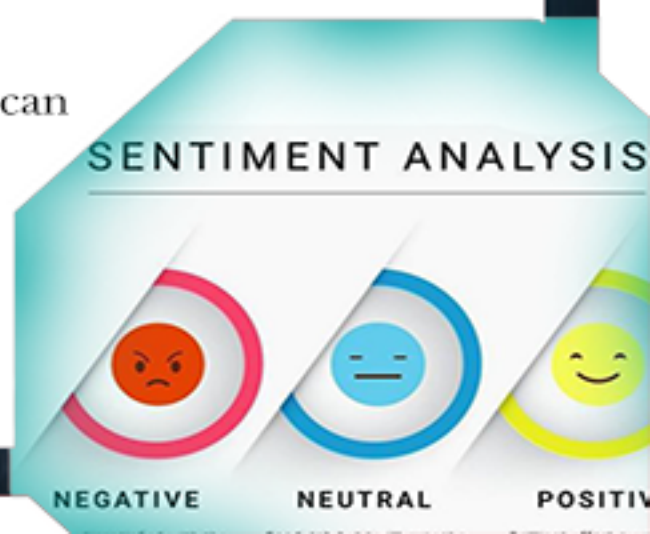
1. Data Collection

This is one of the most important steps in sentiment Analysis. As the Algorithm depends on input data, the data collected should be relevant and should not be too less. Twitter also provides an official API to collect tweets. Also, there are many other open source libraries to collect tweets.

2. Data Cleaning

After data is collected, it should be cleaned to generate data that can be used ahead. Data Cleaning involves:

1. Escaping HTML Characters
2. Decoding of Data
3. Apostrophe lookup



4. Removal of Stop Words
5. Look-up for slangs
6. Standardizing words
7. Removal of URLs
8. Replace Emoticon with words

3. Data Shaping

After Data is cleaned, data needs to be shaped to appropriate format. NumPy, Pandas and Skikit-learn library are used to convert cleaned data to required data format. As data is in text, we need to convert it into a format which is understood by the algorithm. We use a bag of words model to convert it into vector which is understood by algorithm.

4. Choosing Algorithm

There are many Algorithms available for Text Classification. Refer below diagram:

Lexicon-based Approach:

Rules are written in scripting language to identify the polarity and subjectivity of text.

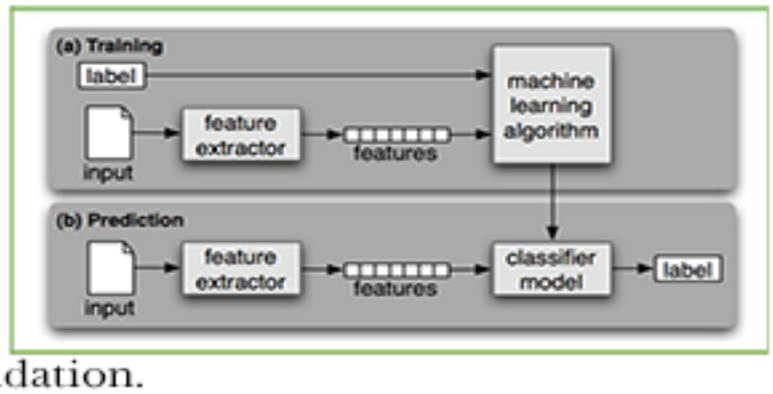
Supervised Learning:

Supervised Learning is a learning in which we teach or train the machine in using data which is well labeled, meaning some data is already tagged with the correct answer. After that, the machine is provided with a new set of examples (data) so that the supervised learning algorithm analyses the training data (a set of training examples) and then produces a correct outcome from the labeled data.

e.g.: Naïve Bayes, Support Vector Machine, Decision Trees and Neural Networks

5. Training Algorithm

Skikit-learn library provides for implementation of machine learning algorithms.



6. Validation

Training Data is split into 2 parts: Training and Validation.

After training the algorithm, it is given valid data as input and the output is compared with a validated label to check for accuracy. Depending on the accuracy, the machine learning model is modified.

7. Try on new input

Now, the trained algorithm is used to predict output of unlabeled data. Analysis is generated after getting the output for the inputted data.

Applications:

1. **Product Reviews:**

In recent times, people have been sharing their opinions and ideas through social media. Organizations invariably want to know about the opinion of their products and services. Individual consumers also want feedback from existing users before buying a product. Since there are many opinions to cope with, Sentiment Analysis comes to the rescue, not only

saving time but also improving accuracy. e.g.: Sentiment analysis for a product 'xyz'

2. Customer Feedback:

Customer Feedback plays a very important role in improving businesses. Sentiment Analysis can help to classify feedback into its respective domain and then further classify them as positive, negative or neutral. For example, for a hotel, customer feedback can be classified into different domains such as:

1. Room Service 2. Food 3. Cleanliness 4. Staff etc.

3. Brand-Watching:

Companies can analyze how people react to their marketing campaigns on social networking platforms, such as YouTube, Facebook, Twitter and Instagram. This gives them objective information about which content is working, and, accordingly, allows them to refine their marketing strategy.

Amey Tendulkar
TE B

POs attained:1,2,3,4,5,7,8,9,10

BLOCK CHAIN TECHNOLOGY AND BITCOIN

Agna Parikh and Aakash Paliwal

Abstract–Block chain is a decentralized transaction and information retrieval technology started mainly for crypto currencies mainly BITCOIN. Block chain technology growth can change my aspects of life. block chain technology provides high protection for transactions, authenticity for our data and data integrity makes it a better approach for safer transactions , personal information stored in this will transformed into a numeric value(hash) which is difficult to identify . BITCOIN and such crypto currencies can serve a huge market for currency exchange at global market thus leading more interlinking of world economy. Crypto currency can be sub divided into currency security and commodity. Creating and managing such vast and decentralized database is a big challenge in itself with its own flaws. Our main objective is to study about roots of block chain technology and Bitcoin, development through years and its future.

Keywords: Blockchain, crypto currency, bitcoin, mining

I. INTRODUCTION

Unlike World Wide Web which is centralized block chain technology is decentralized and accessible to all. Many people can write entries into record. It is a not product owned by any single user. Currency transactions in traditional ways are centralized and managed by third party organizations. Decentralized and open sourced nature allows people to trust each other and exchange money avoiding involvement of any intermediaries. This brings safe exchanges. It is often confused that Bitcoin is equivalent to block chain technology but Block chain is just a technology behind bitcoin. Bitcoin is just an e-currency. Bitcoin created a digital environment where commodities can be exchanged with digital currency. They are the concept of confidence and anonymity. The country should able to sustain these two elements forever, it will impair its status if either one of this will get affected. The main objective is the block chain technology is becoming day by day more revolutionary whereas block chain might be concerned which is very risky as stated by the Finance industry.

What makes block chain more secure?
Data entered is stored in blocks. Each block consists of three parts: Data, Hash and Hash of Exchanges. Hash ofprevious block. Hash is always unique just like a fingerprint. Once a block is created its hash is calculated. Hash of previous block links one block to other creating nodes. Thus, information about all exchanges are shared to every node thereby making system more transparent compared to traditional ways. Thus, due to this reason crypto currencies are based on block chain development technology.

It seems that digital currency is solution to traditional flaws in money exchange ways but it still has many difficulties and constraints that need to be studied.

The bitcoins price is determined by supply and demand of coins. There are only a few bitcoins in circulation and new ones are created at predictable rate just like fiat currency, this helps to keep price stable. Being relatively new and having a small market, the currency is still volatile.

II. REVIEW OF PAPER

HISTORY: Every new technology that grows to become tomorrow's future has its roots unknown like internet and block chain.. Bitcoin was created to wake the financial crisis to operate of outside governments, banks and other financial institutions .other digital and virtual currencies also called crypto currencies appeared soon afterwards.

Blockchain first came into knowledge at around 2009 when Satoshi Nakamoto published the paper named "BITCOIN: A PEER TO PEER ELECTRONIC CASH SYSTEM" and software of BITCOIN to public. The increase in popularity of Bitcoin lead crypto currency emerged. Among first to emerge was Namecoin and Litecoin. [5]

Invention of block chain technology and bitcoin has created ripples in world financial transactions and economy.

BITCOIN REGULATION AND LAWFRAMING:

1. UNITED STATES OF AMERICA

USA serves convenient ways for Bitcoin investments. There are many ATMs exchanging

crypto currencies. Most of Bitcoin companies are headquartered in The United States. Law framing is complex in USA mainly due to its federal system. Crypto currencies are considered a property, assets or stock shares. Transactions with bitcoin and alike crypto currencies are taxable just like property. Law regulation and framing has been left to state governments and no common law is yet made by central government. Few states are have rules and laws which are bitcoin friendly i.e. they have either no money transfer law or have law which provide people and few other states don't promote bitcoin investments.

2. INDIA

Many Indians believe that they will be using crypto currency. It is a fantasy, a hidden fantasy but by government it is not approved though it is not official illegal yet

In the Union Budget 2018, the finance minister mentioned "there is no clear data or evidence that virtual currencies have risen to such an extent where they need to be banned. "and they are predicting that it is a real and heightened risky bubble of the type seen in "Ponzi" scheme which can result in sudden and prolonged crashed exposing investor especially retailed consumer losing their hard earned money, the government has also cleared that such virtual currency do not have any regulatory permission or protection in India so the investor and other participant deal with this virtual currency at their own risk and should be best avoided. RBI has introduced they didn't given any license to trade in crypto currency as well as CENTRAL BANK has issued that it is very risky . Indian government cautioned investors against investing. Investors are been asked to deposit twenty percent of advance tax on profits gained by Bitcoin and other crypto currency exchanges. Some of the bank like SBI are not allowing to withdraw the money from their wallet as Zebpay wallet. Since it is peer to peer connection without involving any intermediate the black money can be converted to white money and there will be loss to CENTRAL BANK as compared to bitcoin which is borderless transaction so people will be more valued to bitcoin so there will be less trading and though the budget of entire system will be changed which will adversely affect the poor people and the various types of loans will seems to be accomplished as people will start investing their money on bitcoin .thus the market value will keep changing as the value of the bitcoin will change. On December 2018 there will be final declaration that bitcoin is a legal tender or not on what will be the restriction on it.[1].

3. GREAT BRITAIN

It is main platform for crypto currency exchange. It is one of the most favorable and supportive for bitcoin businesses and startups. Several government agencies working on it plans to regulate bitcoin transactions in order to avoid use for frauds and other illegal activities. "The UK's leading crypto currency companies have joined together to launch a self-regulatory trade body—Crypto—to improve industry standards

4. G20 SUMMIT

A letter issued by France and Germany issued a letter requesting discussion for regulation on bitcoin and like crypto currencies. Countries fear growth of bitcoin may put their citizens at risk.

5. CHINA

The People's Bank of China (PBOC) which is central authority that regulates financial institutions issued a statement "it would block access to all domestic and foreign currency exchanges and ICO websites with a ban of all foreign exchange". Which has been a considered a 6% decline in bitcoin prices this is due to the risk of the monetary system due to the unlawful issuance of crypto currencies, multi-level marketing and Ponzi schemes .in January 2018 Bobby Lee, CEO and co-founder of BTCC (which closed its China operations), expressed hope that "It's only a matter of time before China lifts the crypto exchange ban." Lee said the resilient nature of crypto currencies will enable them to spring back following more regulations... [2]

6. JAPAN

Last year Japan and its payment services act to legally define virtual currencies as a means of a financial settlement requiring virtual currency exchanges to register with the government and submit annual report .as of mid-January 16 registered crypto currency exchanges, making the nation a major player in the field. The recent theft of roughly ¥58 billion worth of crypto currency holdings from a Tokyo-based virtual currency exchange — the largest-ever heist of its kind — makes the case for more steps to tighten oversight of such exchanges. Regulations on virtual currencies should be considered in a balanced manner that

addresses the problems that have been exposed while weighing the impact on their future potential to radically change financial services. [3]

7. RUSSIA

For security purpose the bill legalizes the term "Digital financial assets" as a security in electronic form, which is verified by making a digital record in the register of the digital transaction named as blockchain. The bill states that crypto currencies are not an authorized means of payment in Russia. Therefore, crypto currency based on this draft is not money. Crypto currency is widely spreading all over the world.it allows the individuals.

And investor to speculate as they do with the stock. The finance ministry proposed to legalize crypto currencies but was opposed by the central bank due to "a loss of control over the money flows from abroad." whereas as we concern about bitcoin and the crime which is spreading all over the world the prime minister of Russia

"Vladimir Putin "has officially announced that crypto currencies will officially regulated in Russia and stated that aside from utilizing the blockchain technology ,the system is in no way connected to bitcoin , which is just another digital token. The block chain technology is a platform that can facilitate wide variety of transfer – potentially including new Russian state crypto

currency backed by gold. Both the central government and the finance ministry were working separately on a draft law to regulate crypto currencies which was postpone due to lack of agreement in their judgment among their regulators and then after some conversation with the prime minister of Russia "Vladimir Putin" they stated that the finance ministry and the central bank will work together so they both commonly prepared one common Draft law in which their main motive was , Deputy Finance Minister Alexei Moiseev indicated on Wednesday that there may be some restrictions.

"Russia's Finance Ministry supports the idea to limit the amount crypto currency that can be purchased by individuals, and they declared that they will issue its own crypto currency "CRYPTORUBLE", according to them the state issued a cryptocurrency that cannot be mined and will be issued and controlled and maintained only by the authorities. The crypto rubles can be exchanged for regular rubles at any time, though if the holder is unable to explain where the crypto rubles came from, a 13 percent tax will be levied.. tThe same tax will be applied to any earned difference between the price of the purchase of the then and the price of the sale [4].

ADVANTAGES OF BITCOIN

Bitcoin has a capacity to create an innovation in present economic model in various countries across the globe.

Faster payment compared to traditional banks. Also cost to accept bitcoins is lower than other payment methods like credit cards

Main and most important impact of more investments in bitcoins is during inflations and hyperinflations. A fiat currency can be made into circulation as many as wanted and decided by government. More circulation of currency means there is drastic downfall in currency value at global market. Unlike bitcoin which has fixed number after they have been mined, no more bitcoins can be created. Thus bitcoins protects against situations like inflation.

WITH BITCOIN DIFFICULTIES WITH BITCOIN

1. By using decentralized and open-sourced blockchain technology, illegal transactions are easy to make without leaking any information about individuals and motives. Thus more ease for cybercrimes to take place
2. It consumes huge amount of electric power as a huge data base is to be maintained at global scale and involving huge number of people.
3. Buying and selling bitcoin is not that simple. They cannot be easily bought or sold via credit cards. It is done via various exchanges which offer such services.
4. Nobody owns bitcoin. Every bitcoin owner has equal stake. Unlike stocks and fiat currency no world organization is involved. Thus bitcoin exchanges puts a big question on investors, if it's safe to invest or not.

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MAKING BITCOIN A BETTER CURRENCY

1. A combined initiative can be taken at global level. To enforce few monetary laws and regulations at global level. Growth of more crypto currencies can protect underdeveloped countries like Uganda and Zimbabwe against inflation and hyperinflations
2. More investments and exchanges by people at global platform might lead to country's own economic stability.
3. Better monetary laws and friendly acceptance by various countries can help bitcoin replace US Dollar as a medium of international market and exchanges. This can prove a better option as no particular country is involved.
4. This can only by various summits and mainly by unbiased involvement of World organizations like World Bank
5. Bitcoins can also replace gold reserves.

BEFORE BLOCKCHAIN

1. What you we will do if your identity has been hacked? Which is linked to all your personal information like your passport, mobile number, bank account.
2. Once in a every week we use to hear about crime occurring in stock exchange and money transfer.
3. Major food scandal Uttar Pradesh. Food was transported across the border of India.
4. Your voting was not authenticate and secure. Is this type of voting giving you security?

AFTER BLOCKCHAIN

1. If it is linked with the block chain there will be multiple nodes in it which is very difficult for a hacker to hack it.
2. Block chain makes a good alternate for a money transfer across the world and keeping the transparency on both the sides.
3. Use of block chain will diminish the control of third party. Where the consumer will get their product information just in a second.
4. Using block chain it will become very easy to detect my vote whether my vote is going to the right person or not.

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Agna Parikh
SE IT B

Aakash Paliwal
SE IT B

POs attained : 1,2,3,4,5,7,8,10

SOFTWARE DEFINED NETWORKING – A NEW ERA OF NETWORKING

We all know what Internet of Things (IoT) is. Basically IoT gives us a map of all the virtual devices connected to the internet. IOT has four main different components like Sensors/devices, Connectivity, Data processing and Data processing. But then as there increase in number of devices there is tremendous load on the cloud due to which the maintenance cost and other cost make it very expensive to handle. It is facing issues such as Scalability, Heterogeneity, Availability, Low computational resources, Small memory resources, Generation of big data etc. To overcome these issues new networking architecture is being introduced named as Software Defined Networking (SDN).

Software Defined Networking (SDN) is an emerging technology that has new design and management approach for networking. Previously routers were the smart devices used for the connectivity of different networks which consist of both data plane (to forward the packet towards destination) and control plane (to decide the path of the packet to be sent). In SDN both these planes are separated for smooth delivery of packets. In SDN gateways are utilized as dumb switches only as forwarders.

SDN has a controller which behaves as the heart of SDN. Control plane resides in this controller and is responsible for assigning the path to the packets. Data plane resides on the router devices and is responsible for forwarding these packets. Packets routes can be determined in two ways, they are

1. Statically: Routes are pre-determined and cannot be changed during transmission.
2. Dynamically: Routes can be changed at the time of transmission.

Above two features can be embedded in SDN controller at the expense of decreased network efficiency because of the additional communication caused by the control traffic between SDNC and IOT nodes.

As the SDN controller is known as the heart of SDN it becomes our primary task to keep it away from every attack. One such attack is Distributed Denial of Service attack (DDoS). This attack can majorly hamper the working of the SDNC and it may lead to the halt of all the services provided by the controller to all the other host machines. DDoS is a malicious attempt to block all the resources so that the host machines are not able to access any of it. Currently a study is being going on about how this problem can be tackled. Solution for this is various Machine Learning Algorithms which can be used to detect the fraud request which is being sent to SDNC again and again. In a study, algorithms such as Naïve Bayes classifier, Support Vector Machine (SVM) and Neural Networks (NN) were used to understand the

the behaviour of the system through these classifiers. Each classifier stands out differently on the basis of different parameters such as Accuracy, Precision and Recall. These three parameters were used to determine the best algorithm which can be implemented so as to protect SDNC from DDoS attack. Below tables gives us the overall scenario regarding the machine learning algorithms with respect to three parameters, they are: Accuracy, Precision and Recall.

	A	B	C	D
1		Accuracy	Precision	Recall
2	Naive Bayes(%)	70	75	60
3	Support Vector Machine(%)	80	80	80
4	Neural Networks(%)	80	100	60

Fig: Comparison Table of three Machine Learning Algorithms.

We can conclude from the table that the Support Vector Machine (SVM) performs consistently while evaluating all three parameters. Further studies are going on using newly emerging Machine Learning Algorithms so as to minimize the impact of DDoS attack on SDNC.

Software Defined Networking is a domain where we get exposed to various technologies and fields such as Internet of Things (IoT), Machine Learning Algorithms, Networking rules , concepts and many more. This one topic allows us to explore many more topics within. Learning SDN means exploring future as this technology is still emerging and firms like Google and Microsoft are working on it.

Kiran Yadav
BE B 53

POs: attained 1,2,3,4,5,6,7,8,10,11

FACULTY EXPOSITION

WIRELESS SENSOR NETWORK SIMULATOR FOR SMART CITY DESIGN

'Internet of Things' is one of the technologies in which many applications and research work has been going on lately. Internet of Things is all about exchanging of data among devices (things) which are communicating with each other via a network known as Machine to Machine (M2M) communication. Each device is associated with a software, sensors, controllers and network connectivity.

IoT based applications are one of many emerging trends. Many smart-city IoT based applications are currently under development. Also recently, Government of India is focusing in the development of what is called a 'Smart City'. IoT and wireless sensor networks are going to play a vital role in this buildout.

Applications such as smart car parking, smart electrical meters, natural event detection and control system, smart applications or system for agriculture and many more have to be developed and tested for an appropriate result. Prototype of such an application can be created but for an actual implementation, a massive number of controllers and sensors are required and to check for output of such a system before implementation is very necessary. For developers and researchers, it is one of many challenging tasks to study the behavior of the system/application on a monumental scale before carrying out an actual implementation.

To overcome this challenge, a developer can use a simulator like CupCarbon. This simulator helps to create a virtual environment for the development of wireless sensor networks. CupCarbon comprises of actual maps, sensor nodes, natural events and routes, markers to create a route, mobile objects and base station. In-build codes for transmitter and receiver, natural event generates for the simulation of events like heat, gas, humidity, temperature etc. Networks can be designed and prototyped through an ergonomic and easy-to-use interface using the OpenStreetMap (OSM) framework which deploys sensors directly on the map. It includes a script called SenScript, which allows to program and configure each sensor node individually. Also, through this script, it is possible to generate codes for hardware platforms such as Arduino/XBee. This part is not fully implemented in CupCarbon, it only allows generation of code for simple networks and algorithms.

CupCarbon simulation is based on application layer of the nodes. This makes it a real complement towards existing simulators. It does not simulate all the protocol layers due to complex nature of urban networks

that need to incorporate other complex and resource consuming information such as mobility, signals, buildings, roads etc.

CupCarbon offers the possibility for simulation of algorithms and scenarios in several steps. For example, there could be a step for determining the nodes of interest, followed by a step alluding to the nature of the communication between these nodes to perform a given task such as the detection of an event, and finally, a step describing the nature of routing to the base station in case an event is detected. Senscript is used to write code for the simulation. Sensor nodes can be made intelligent through scripting. Basic logic, arithmetic operations and branch statements can be used while coding. Many other commands are there in Senscript such as dreadsensor, areadsensor to read data for digital and analogue sensors respectively. Commands can be categorised as Sensor command, Radio Module command, Embedded Card command, Message data and Mobile Visualization.

Students as well as researchers can use this simulator for developing projects or conducting research. IoT based applications will help in understanding the behavior of a system before performing an actual implementation. It also minimizes the cost of testing the system and ultimately, the cost of the whole project.

Compsed By
Rahul Neve
Assistant Professor
IT Department

POs attained : 1,2,3,4,5,6,7,8,9,11

"AUGMENTED REALITY IS NOT JUST WEARING GLASSES!"

Augmented Reality (AR) uses a personal display, up close to the user to show him/her information, text, drawings, 3D objects generated by a computer, either locally or remote. The overlay information is registered to the scene by a forward-looking camera and display the skeletal structure of a building, or the location of a store, can translate newspapers, manuals, etc.

In the very near future we will all be wearing AR glasses, just as we wear corrective and sun glasses today. The AR glasses of the future will be lightweight, they won't be unbearable or attract attention to themselves, and they will be capable of providing us with a wealth of related information, as well as being a logging device of our lives. The AR glasses of the future will always be connected, providing you with information and sending information about you (with your approvals and to your private storage locker). AR glasses will also be honest witnesses in any insurance claims, or disputes with service personal.

However, the benefits of AR are not limited to the future or just glasses. A smart-phone or tablet can today deliver AR capabilities too. Basically any device that has a forward facing camera and back facing screen could be an AR device. Theoretically a digital camera with a Wi-Fi or Bluetooth capability could be an AR device. So could your car if it has forward facing cameras as are being proposed for autonomous driving. And if a car can, so can a boat, truck, bus, or a train.

AR is not just a solitary experience either. With the help of camera and Wi-Fi or any other mobile phone connection, a technician or a first responder can show the situation to an expert at a remote location and get guidance.

In addition to AR glasses- also known as “smart glasses” - tablets, and phones, there are AR helmets. AR helmets are for motorcycle riders, and for factory workers. These are helmets with Heads-Up Displays (HUDs), which are a logical and practical implementation of an AR system, and the helmet offers more storage space for electronics and batteries.

Composed By
Nishtha Mathur
Assistant Professor
IT Department

POs attained : 1,2,3,4,5,7,8,10,11,12

ALUMNI'S PIECE

Intelligent Systems : Artificial Intelligence & Machine Learning

Technology around the world is changing rapidly. To fulfil the demands of customers, Artificial Intelligence(AI) and Machine Learning(ML) play a vital role.

AI and ML include : Virtual Reality (VR) ,Augmented Reality (AR) ,Mixed Reality(MR) , Computer Vision etc.

Virtual Reality

The major aim of VR is to develop an avatar-based 3D virtual environment that simulates professional interpreting practice in these settings and to populate this environment with relevant pedagogic content such as an appropriately spoken source text for interpreting practices in several languages.

The overall aim of the project was subdivided into a number of specific objectives, namely - to create an adaptive 3D the virtual environment that meets the need to develop a range of interpreting scenarios (e.g. a business meeting room, a court room, a tourist office or a community center) that can be run in different modes ('exploration', 'live' ,and 'interpreting practice'); to develop multilingual content for use in interpreting scenarios of the virtual environment.

Areas of VR :

Military : VR simulation helps in testing the soldiers in many different stressful situations to check their reaction and performance without the risk of being hurt physically or mentally.

Real estate.

Automotive.

Healthcare.

Gaming.

Education and learning new skills.

Tourism.

Augmented Reality

When we look forward to understand how anything works, we must have its objectives in mind. The objective of Augmented Reality is to bring computer-generated virtual objects into the real world by accurate simulation and allow interactions in real-time.

Areas of AR

Pharmaceutical

Advertising & Branding. performance

Maintenance & Repair

Real estate

Automotive

Gaming

Mixed Reality

Combining AR and VR to make both work in tandem. Example HoloLens

Tools& SDK to develop AI and ML :

Tools : Unity 3D Engine, Unreal Engine , Android Studio, XCode

3D Designing & Modeling: 3Ds Max, 3Ds Maya, Blender, Photoshop etc.

SDKs: ARCore ,Vuforia SDK

Composed By
Mr.Rajnish Vishwakarma
BE IT – Alumni (2012 Batch)
Sr.Software Developer at Siemens India (Siemens Ltd)

POs attained : 1,2,3,4,5,7,8,9,11,12

PARENT'S FEATURE

The Evolution of Computing and IT Industry

The IT Industry is divided in two parts:-1>Software 2>Hardware

First let's see how the software industry has evolved in the past decade

.

The most basic example of an automated system might be a train ticketing system. There is software that has indexed all the places that you can visit and accordingly plan your journey and get tickets. This system has been deployed for many years now by IRCTC. Many such software solutions have become an integral part of our daily routine. Such systems are follow an algorithm and do not deviate from it. This as you might know can be procedure based or object based depending on the type of problem you want to solve. The problem may be divided into modules and then solved one by one. This is finding a 'computerized' solution to our problem.

But the meaning of 'computing' has changed over the years. Any innovation has a first part where you find a problem and the next part where you find its solution. Earlier the problem identifiers were humans and the solvers were the machines. But computing today even includes the first part. There are Machine Learning algorithms that can be fed on huge repositories of data and programmed to improve it and give a conclusive pattern of data. We have headed towards a world where the computers can even predict the future. Humans have felt the need to make computers think like them for the same. Examples of Machine Learning algorithms are infinite. Some of them are G-locomotive, Soil fertility using Image Recognition, Weather forecast, etc. In Business accounting, SAP BusinessObject BI is a Business Intelligence platform that can provide data discovery, insight analytic derivation, etc.

An AI/ML software is more accurate if there is more reference data to learn from. To process more data, a robust and secure hardware is required. This is where the hardware industry comes in.

Most developers are now making applications with more core usage, using the parallel processing architecture as there a limitation on number of cores available on the CPU. So the new way is to use the GPU cores for computing processes. With this new architecture there can be 1000x increase in the no. of available core. The GPU might have been developed as a image processor but now, using CUDA/Tensor cores, we can have GPU perform most of the tasks that a CPU does.

The maximum cores that are available in a CPU right now is 72 in the latest Intel Xeon Phi Processor, where we can integrate maximum 4 processors in one server makig a 288 core data server. While if we compare it with the leading GPU for data centre, NVidia Tesla V100, the no. of core increases 1000 times. This GPU supercomputer can replace 54 CPU server nodes. CPU is important for OS handling, so if we dedicate a GPU for other robust process and keep the CPU free, we can achieve optimization

.

Using the NVswitch tool, 16 such GPUs can be integrated in one server which can then provide 81,920 cores which was only 72 in CPU. While comparing computing speed, the speed of Tesla V100 can go over 100 Teraflops. Using GPU cores is also advantageous when it comes to power management. A GPU with 8 cards i.e 40960 cores uses only 3500 watts of power while if we create a CPU data server of similar capacity, it will use approximately 200 kilowatts of power.

From a point of limitation to infinite possibilities in data computing, hardware and software have advanced parallelly.

Composed by
Alok Choudhary
Senior Business Manager,
Rashi Periphrals
Father of Divyam Choudhary
POs attained:1,2,3,4,5,8,11

OUTHOUSE ARTICLES

WEAR: Smart Women Safety Wearable

Bhavya Jain
Member
Young Engineers Club
Mumbai, India
jainbhavya832@gmail.com

Saniya Parekh
Member
Young Engineers Club
Mumbai, India
man.parekh@gmail.com

Abstract

Nowadays, the prime thought in every girl's mind is about her own safety. Although women have acquired top positions in all sectors, according to the reports of NCRB-social-government organization 35% women all over the world face a lot unethical physical harassment, sexual assault, kidnapping and many more crimes even in the public areas like railway station, bus stop, etc. The authors felt a need for an advanced women security system which would make them feel safe when travelling alone. The system is equipped with pulse rate sensor, camera, switch, GPS, GSM, buzzer and a microcontroller.

I. INTRODUCTION

We don't need to look at statistics to confront the horrid truth. Everyday new stories flash in news channels and newspapers about women being molested, raped, etc. and we all are well aware about it. The increase in the number of such events is an alarm for people to wake up and take efforts for making India a safer place for women. To make women feel safe we have designed an open source low cost safety jacket for women. The jacket would be activated when the pulse rate of the user increases than average in a panic situation. Then when a button is pressed the current location of the incident is sent to personal contacts and police control room. A loud sound is emitted from the buzzer to make local people aware about the incident and to flee the attackers and assaulters. Then a camera switches which would record the situation and could be used as a proof and to identify the attacker afterwards.

Some of the incidents are: being stalked while walking; attempted physical or sexual assault; unsafe neighbours; domestic violence

II. PROBLEMS IN FOCUS

1 Sexual harassment: Women across India □ from executives in corporate towers to those toiling on roads, farms, etc. □ face the same problem of being sexually harassed.

2 Stalking: Being followed on your path to home when alone is the major threat to women in India. Most of these stalking incidents happen at night in less crowded areas. This is where we need a solution.

3 Unreported cases: The major problem in India is that most of the cases go unreported as it is considered an act that puts one to shame, only 20% of the registered cases for sexual harassment reach actual conviction. This is because there is no proof about the identity of the criminal.

III. EXISTING SOLUTIONS

There are many existing solutions for the problem. But in the existing system there is no monitoring system for girls, it should create many problems for them as they need to press some SOS buttons manually which might not be possible in in an emergency situation. Some are purely based on Android application which means everyone needs to have a mobile phone and a stable internet connection at all times. There is no hidden camera for the proof of the incident and the identity of the criminal.

IV. PROPOSED SOLUTION

Violence against women (VAW) is, collectively, violent acts that are primarily or exclusively committed against women. To make them feel safe and avoid such cases the solution proposed is a women safety jacket. The security system is based on 2 modes:

A. Hardware Device mode

All the hardware is hidden in the jacket so that no one comes to know about it. It consists of a pulse rate sensor which would continuously keep a track on the pulse rate of the women. If at any point of time the pulse rate becomes higher than average. That means the user is in a panic situation or scared from someone. Then the system is switched on and if the women presses the button present on the sleeves of the jacket, a message will be sent to 3 saved contacts and the police control room with the live location of

the victim. Also it will give a call and become silent after the user sees it like an alarm.

B. Software mode

In this mode the victim can open the ( ) android app press a SOS button which would activate the system without checking the pulse rate. It would then inform the saved contacts about the event.

Whenever the system is activated the camera switches on and starts recording the incident and saves it in a SD card for a proof of the incident and to identify the criminal. A buzzer is also switched on to produce a loud noise to make other pedestrians aware about it.

V. METHODOLOGY

The system consists of many electronic sensors, audio-video devices and a microcontroller. Figure 1 shows the data flow in our security system.

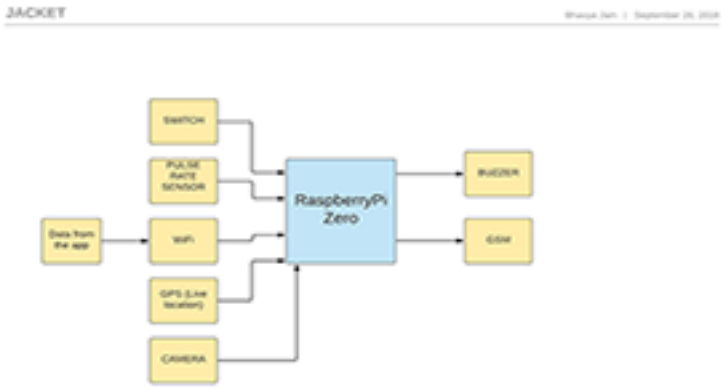

Fig 1: Block Diagram

Microcontroller a microcontroller consists of the main processing and controlling unit of the system. All the input and output devices used in the system are interfaced to the Input / Output (I/O) pins of the microcontroller and the program for execution is stored in the memory of the microcontroller. The microcontroller used in the project is Raspberry Pi Zero W. Raspberry Pi Zero W (Wireless) the ultra-small and ultra-slim Raspberry Pi Zero W (Wireless) is the smallest form factor Raspberry Pi on the market incorporating Wi-Fi and Bluetooth connectivity on board.

Fig 2: Raspberry Pi Zero

Pulse rate sensor □ Pulse rate sensor is a plug and play sensor to check the heart rate. When we place the finger on the pulse sensor, the light reflected will change based on the volume of blood inside the capillary blood vessels. During a heartbeat, the volume of capillary blood vessels will be high. This affects the reflection of light and the light reflected at the time of a heartbeat will be less compared to that of the time during which there is no heartbeat.

Fig 3: Pulse Rate sensor

Switches □ Multiple Push Switches are used to detect user input to the system. Switches are digital input devices sending logic □1□ or logic □0□ to the microcontroller depending on whether the switch is pressed or not.

Fig 4: Switch

GPS - The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites placed into orbit. By using the GPS sensor, you can get current information from the GPS receiver, such as latitude and longitude coordinates, bearing, and speed.

Fig 5: GPS (Global Positioning System)

The Global System of Mobile Communication (GSM). The GSM sensor used in this project is SIM 800l. It is a small, portable breakout board used for sending/receiving messages and calls.

Fig 6: GSM (Global System of Mobile Communication)

Camera Camera serves as an input device for capturing photo of the user for verification and transaction records handling purposes. The camera is easily interfaced using raspberry pi and Arduino

Fig 7: PiCamera

Buzzer □ Piezo buzzer are most commonly used to produce sound. When a dc current is passed through it, the piezo plates in it expands and contracts resulting in generating sound.

Fig 8: Buzzer

VI. IMPLEMENTATION

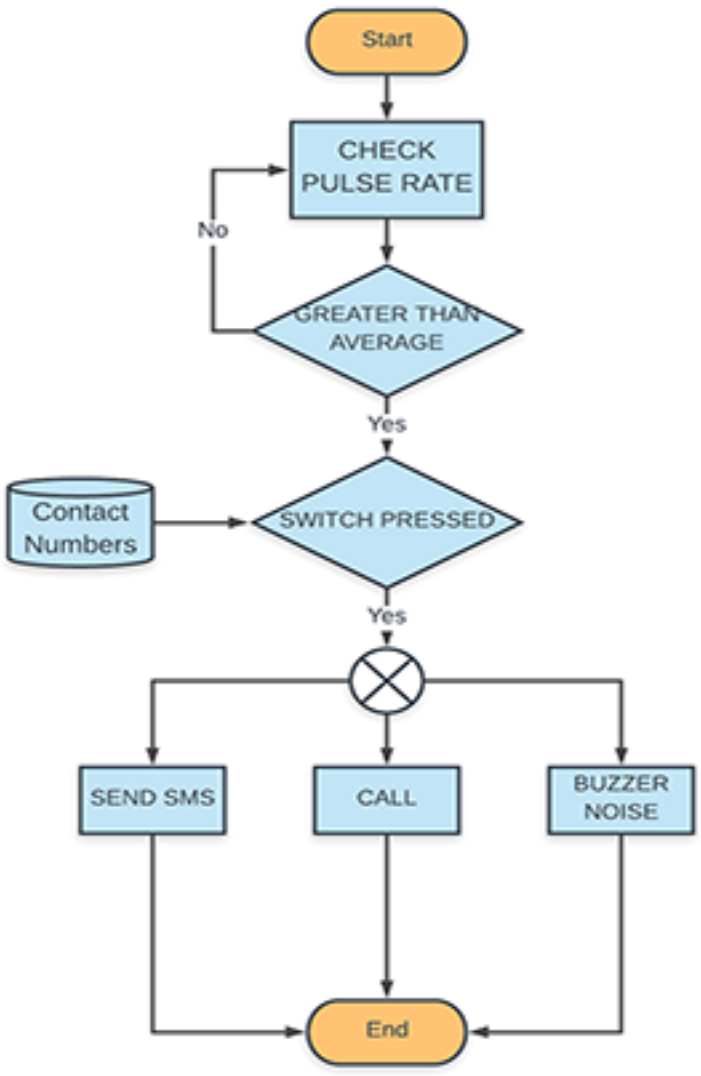

Fig 9: Flowchart

The figure above shows the flow of data in our safety jacket. First it will check for pulse rate continuously until it goes out of the average range. If it rises or decreases too much the system will be activated. Then if the user presses the button present on the wrist, the system will gather the live location of the victim and send messages to the family members and a call to police control room. It will turn on the camera and the buzzer.

We have implemented our idea into a jacket. We incorporated all the electronics and tried to use very few wires to make it comfortable to wear and use. All the electronics was stored in the cap. Figure 10 shows the jacket with the electronics.

Fig 10: Jacket with hardware

VII. RESULTS

In this electronic jacket for women safety we used GSM sensor to send message and location to the family members. Therefore, this system is used for protection and to control other activities which are happening today's scenario. Buzzer is used to make loud noise to call for help and to flee away the attacker. All These sensors and actuators are connected to the Raspberry Pi Zero. Finally, the video recording of the incident and an image of the assaulter is also stored in the system which can be viewed later.

Figure 11 shows the message received by the family members when the user is wearing the safety jacket and is in danger.

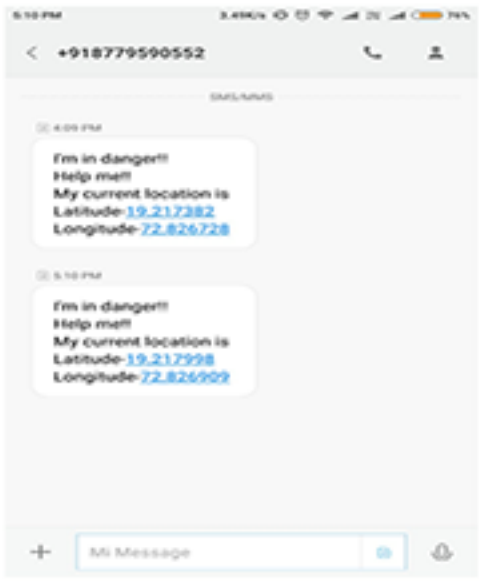

Fig 11: Message received

VIII. FUTURE ENHANCEMENTS

- Wearable devices like jewelry or watches can be more suitable to use in every occasion. Hence this system can be integrated and made smaller into a form of a pendant or a watch.
- Immediate action is needed to be taken when the molester is attacking the girl. To solve that we can use a stun gun circuit to disable the attacker for few minutes and the girl can safely run away or ask for help.

IX. CONCLUSION

Sexual harassment: Among the worst countries in crime, India has an abhorrent track record in all forms of sexual exploitation. In homes, on streets, in public transports, at offices, even on vacations. No place is safe. And the most terrible fall out of this is the lack of self-worth and feeling of degradation following the emotional and physical trauma that constant harassment creates. Hence, the system proposed above is a good step forward to help women be safe at all times when they feel they are in danger or being harassed. 20% of such cases go unreported; hence the device sends the information of the incident immediately to the police so that the attacker is caught as soon as possible. We hope for a safer world for women.

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The authors would like to special thanks to the team of Science Kidz Educare Pvt. Ltd. For supporting them at all times.

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Bhavya Jain Saniya Parekh

Winners of Technical Paper Presentation conducted by ACM in Zephyr.

POs attained : 1,2,3,4,5,6,8,9,11

STIMULATED REALITY

WHAT IF WE DON'T ACTUALLY EXIST? OUR WORLD CAN BE A STIMULATED REALITY ACCORDING TO SCIENCE

Imagine you were a fish, born inside an ocean. Your aquatic species happens to be the most advanced species that has ever existed in the ocean. You have the knowledge of all different kinds of fishes and living beings that live inside the ocean. For you, this ocean is what you call "The Universe". There is perhaps nothing that exists beyond this reality, that you believe is true.

One fine day, you get trapped inside a net (fish trap) and a few seconds later, you find yourself surrounded by giant floating bodies (Boats/Ships) and some monsters (Human beings in this case). You have come to realize that there is another world beyond your own world, the one you used to call "The Universe". You had no idea about this world before. You also realize that you are not able to breathe in this environment but you were lucky enough to escape through the net and get back inside the ocean. You now have an entirely different perspective of what you thought a "reality" is. You no longer believe that the universe is just an ocean but for now, you believe that there is another world out there, you have seen, different and scary too.

Chances are that you are not willing to go in that world again though. But as a fish, you still have no idea about cosmos, space, stars, solar system, galaxies etc. And most probably you won't know about them either. We as human beings are thankful enough to know about all those things related to the cosmos that animals inside oceans don't know about.

But what makes us think that we know everything? What if this is true of us humans too, similar to those fishes?

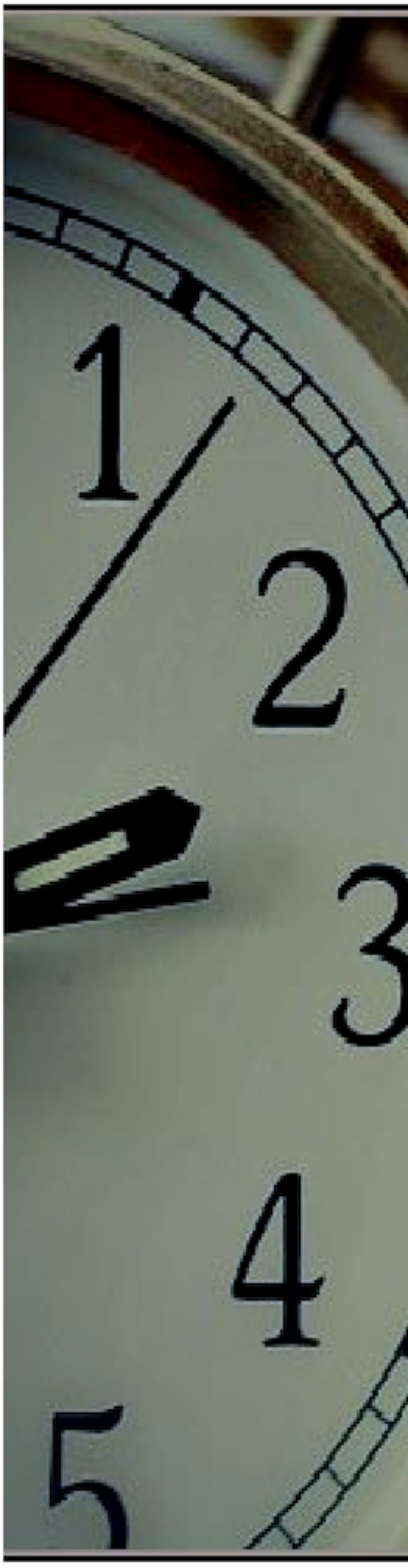
There is a good chance that our version of the universe is far from the truth. And there is no guarantee that we would ever be able to sense the "reality" either.

Take snakes, for example, they don't have the ability to hear, so even if snakes had brain power just like us humans, they won't ever be able to know what it feels like to hear a "sound", because they can't sense sound waves.

What if there is something out there that is completely out of our reach? That's quite an interesting question, don't you think?

Maybe there are some superior beings out there, who know about us, each and every detail. But we don't know about them, just like a fish who has lived his/her life deep inside an ocean, has no clue about human beings. But we know about that fish's species and a lot more than that fish knows about himself/herself. And these superior beings may don't care about us humans in the same way as well.

Quite scary isn't it? But what if the actual "reality" is far scarier/surprising than this too?



What if we don't actually exist?

Chances are quite fair that the world we live in is just a mirage, a simulated reality made up by some Superior beings/Advanced Civilization. This may seem to be unrealistic at first glance but according to the leading scientists, this might actually be true.

"THERE IS ONLY ONE CHANCE IS A BILLION THAT OUR REALITY IS NOT A SIMULATION " - Elon Musk

Elon Musk is one of the greatest entrepreneurs in the entire human history and the greatest of the 21st century. When you hear such a thing from someone like Elon Musk, serious doubts regarding the nature of our reality begin to arise. Not just him, but legends like Bill Gates and Stephen Hawking have a similar opinion.

There is a very likely possibility that the world that we live in today is just a merge stimulation that has been programmed by some advanced species. If you have watched the movie 'The Matrix', you already have a good idea of what I am talking about.

The ZUZE Z1

We might be inside something similar to a computer programme and everything that we see today is, in fact, fake and does not actually exist. It's just us who are made to think that these things around us exist. The world's first programmable computer, the ZUZE Z1 was able to perform two flowing operations per second. Modern computers do this 27 trillion times faster! And this is being achieved in a mere 79 years. According to the scientists, the power of computers will grow several times more in the next hundred years.

It's hard to even begin to imagine what kind of world our children and grandchildren will live in. Already virtual worlds like the one for example in Grand Theft Auto 5, shock us with their detail. It's easy to imagine that it will become indistinguishable to from reality in next 50-100 years.

GTA V

In fact, it is possible that we will be able to create virtual universes in which the characters really think and have minds similar to ours. But they won't know that they live inside a simulation. This is really frightening on many levels. What if we are such characters already?

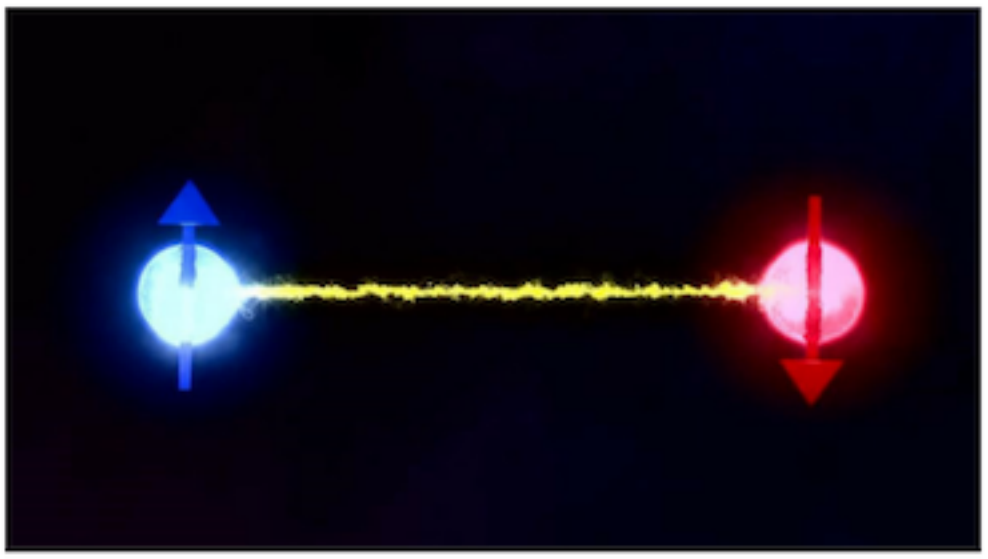
Philosopher Nick Boston first introduced the general public to this hypothesis regarding the virtuality of our world back in 2003. Its essence was that if my technological civilisation exists in our universe, then it is likely that they can create simulations, similar to those where you and your kids play sitting at your computers, only millions of times larger and more realistic. This means that you or I could be in a world of NPC, Non-Player Characters in some alien Sandbox right at this moment. One of the most serious proofs that we live inside a stimulation is a phenomenon known as Quantum Entanglement.

Quantum Entanglement

So, what is this "Quantum Entanglement" exactly?

It is a physical phenomenon which occurs when pairs or groups of particles are generated in such a way that the quantum state (read further to understand what "quantum state" really is) of each particle cannot be described independently from the state of the other particle(s). And that's true even if the particles are separated by a large distance from each other. Therefore, a quantum state of one particle is enough to determine the quantum state of the whole system, even if the other particle is far away.

A photon flying through space can be considered to be rotating i.e. it has something called "spin". In fact, photons don't really rotate but this is just a simplified model. The quantum state that I mentioned in the last paragraph is "spin" for this case.



An experiment was proposed by Albert Einstein, which was to test the Copenhagen Interpretation. Some very interesting results were obtained from this experiment. It goes like this, if an atom for example Caesium emits two photons in different directions then because of the Law of Conservation of Momentum, their state will be interconnected. If one of them rotates from the bottom then the other will rotate from the top down, always! They will always have a spin in opposite directions, this is call quantum entanglement, in a more simpler explanation. Remember, the photons don't know which way to spin before they are observed. So in this case, if the fact of the observation made one photon choose one of the options, it's tangled partner must then immediately have a spin in the opposite direction. That is, by the very fact if our observation of one photon, we affect the spin of the other photon. Even though we did not observe the second photon. And the second photon is required to not only find the spin but to do so immediately, even if the photons are at a great distance from each other. That means that if the entangled photons were somehow are set even to the different ends of our universe. This information about which way it's spinning should somehow fly or jump across the universe to its partner at several quadrillion times faster than the speed of light. So that it basically instantly gets its spin.

This is incredible, it violates the very laws of physics as we know them because nothing can move faster than photons in a vacuum. However, the second photon still somehow manages to get this information in almost zero time.

But the question is, How?

How does an entangled photon send this information to its partner faster than the speed of light (it's quadrillions of times faster than the speed of light!)

Einstein was convinced that such an instantaneous connection was impossible and he assumed that when entangled photons emerge from the atom, they already comprised information about the past and know which direction to rotate if or when they are observed. That means that the observer doesn't change things but only recognizes the spin of the particle.

Here is the interesting part, after 17 years of Einstein's death. It turned out that this single unparalleled genius was mistaken in this case. That's right, Einstein was wrong.

To prove the presence or absence of information about the direction in which the particle rotates after the observation, Irish physicist John Bell set up a very complex and ingenious experiment. The results were astounding, Bell proved that the entangled particle does not have a clue before it's observed, in which direction it would spin. The photon randomly chooses the spin only after the measurement. And this has proved that the elementary entangled particles like photons can transmit information faster than

the speed of light.

This experiment gave us more questions than the answers.

You must be thinking what does this has to do with Virtual Reality? Here is the explanation-

HOW QUANTUM ENTANGLEMENT AFFECTS OUR REALITY

Perhaps Einstein was right when he said that speed of light is the speed limit in the physical world. As I said, "Physical world", which means that this does not necessarily need to be true for a virtual world. If we substitute a virtual reality in place of a physical world the instant connection is easily explained. When two photons get entangled, their programs are combined to joint-see the two points. This combination of programs will respond for both pixels, if we can call them that, no matter where they are.

At the moment of measuring one particle, it's program randomly chooses one of the spins and the program of the second particle immediately reacts. It becomes clear why the distance isn't important. The processor doesn't need to go to the pixel to ask it to spin, even if so-called a screen is large, even if it's as large as a universe.

So this is a perfect example that can prove that our world is, in fact, a virtual stimulation since there is something that can travel faster than light.

CONCLUSION

Physicists say that no one really understands quantum mechanics. But if we assume that our world is virtual, everything quickly becomes quite clear. To describe the world of elementary particles and their interactions, scientists use quantum mechanics. And for the macro world, Einstein's general theory of relativity is used. But if these two worlds co-exist in nature, that would allow for both. And this is what exactly the hypothesis of simulation does. It perfectly explains this, the mysteries of the big bang, the curvature of the space, the tunnel effect, the dark energy and dark matter, all can be explained on the basis of the assumption.

Composed By

Suraj Kumar Singh

SE MECH A 65

POs attained: 1,2,3,4,5,8,11

On 29th September 2018 we had an opportunity to Interview Mr.Srinivas Singh, Senior Manager, Information System Security, Axis Bank. We had our student correspondents Ms. Sanya Gandhi and Ms. Priyanka Sharma for the event. He shared his industrial experience with us and gave a his insight on various trends like Blockchain and Cyber-security. We present you the excerpt of the same.

EXPERT TALK

Qs 1)Every achiever has a start of his journey where he once develop immense interest in that topic, What prompted your interest in Security?

A. As a developer taking a lecture, being a lecturer and during development, I was fascinated with the encryption system , and realized that in every field encryption played an important role .Also ,every project need a security team for compliance reviews and hence, this triggered me and I studied about it and I cracked the interview .Therefore ,I chose this career.

Qs 2) What are the stereotype that Cyber Security personnel deal with, if there are any?

-> Before answering this question let's talk about cyber security. Cyber security is a term affirmed to parameter, I'll explain this term with an example. Suppose an organization provides a network, if used by students then it does not get cyber security into picture while if hacked by an outsider is an issue of cyber security .One perception people have about Cyber Security manager is their ethicality .The second perception is regarding software development as it starts from us is thought in a manner that it will be stopped and this thing will act as a show stopper.

Qs 3) What kind of problems do you handle at your Job?

A. Many problems, even when I review final year projects of students, I find information security is not being considered during software development, website design or database design. Same goes with industry also, it is not considered there as well, it is like we are imposing it on them, like 'do have your database encrypted', 'have your disk encrypted', 'use a DCP plug' etc. So it is important to tell them that information security is important, not only for me and them, but for the entire organization. One of many major challenges is to create awareness, there is not much awareness, even in the budget, but as any cyber-attack happens, the budget for information security increases, like 'buy this tool', 'hack this firewall', 'hack that company's firewall', 'use machine learning implementation', so it is like, a reactive approach, so spreading awareness is a major challenge.

Qs 4) Blockchain, are some of the most trending buzzwords when Security is thought of, how can they change the banking procedure/environment?

A It works in 2 ways:

· It is immensely time saving, suppose you want to transfer money from Saudi Arabia to India, earlier it used to take around 5 to 7 days because it follows long procedure, from one category to another, and then it converts into rupees, but with blockchain, this process can be achieved within 5 seconds. It is a natural advantage, however, it is better to stick to a regulatory or concerned blockchain because in banking we are bounded by regulations.

· It enables information to be shared safely. For example, if I've sent some logs containing some analysis to some other people, what is the guarantee that my information has not been tampered with? And these logs are in TBs, nit even GBs, so here blockchain can help. They contain a hash or a ledger which will tell the receiver that the data is the one originally sent by the sender. And there are no regulations as such in this as such. Many people therefore use blockchain as a File Integrating Manager, suppose if I send a file to you, if it is manipulated or tampered with, blockchain will let me know. But I personally feel that blockchain still needs to evolve. From implementation point of view, it has evolved much, but with respect to security concern, it still needs to evolve, they need to inculcate more security measures.

Qs 5) Today people talk about internet security and privacy how is a balanced maintained between the two?

A Well, more secure the internet, more there will be privacy. But, there is a national security and private security, there should be a balance. Suppose NSA want to sniff or want to know what a person is talking about in order to get some information, then that is violation of privacy. But, national security comes at the top of everything, and that is what every country, every government tries to achieve. But there still needs to be a balance, I don't know how, but the talks keep happening. For example, in US, suppose you have put your database cloud in New York, the US government can still use a backdoor and read your data even if the agreement says it cannot, because it is your data not theirs, but their government can hold your database with data in it if it concerns their national security. So I personally feel that not much has been done, nor a large discussion has been made about this, and I'm sure some solution to this will come.

Qs 6)Have you ever encountered any major cyber attack and if yes, how did you tackle it?

A. I cannot reveal that, it is against my banking policy. But the world recently faced a major cyber-attack called WannaCry, you must have heard of that, where almost 50 to 60 percent of the world population was affected and India was among them, majorly affected one was Europe. Major reason was patching of the systems that we all have, like we all do in our personal laptops, we do not care much about regular updates, patching, security, antivirus, WannaCry used the same against us. It was the most major attack ever, that the world has ever faced, not in terms of revenue, but in terms of propagation, it was highly impactful.

Qs 7)We would like to know your take on the reliability of VPN service providers?

A. Ok. I will give you an analogy. Let's say you create a database and you place it in Google cloud or any other data center. Now, there is no VPN and let's use Oracle Database. As Oracle is a brand name we think it is secure but it is not. So data inside your database is your concern. Have encryption in place, the key of encryption needs to be with you and not with the Oracle server or someone else. Same way, let's say a VPN is equally threatened. Now we need to place additional patrols inside a VPN to secure it. Otherwise, nothing is secure; it is our responsibility as a whole. So taking a VPN server as an example, if it is not communicating with the outside world on its own that means it might be sharing data to some third person. Many such products are available in the market. At the end it should be our concern, that we should have control for this. Otherwise all VPNs are insecure. Likewise all databases are insecure.

Qs 8) As you must be knowing that Automation is a step towards efficiency, how will automation affect banking?

A Nothing specific. What the world is doing and what India is doing is nothing different. By 'world' I mean the US and Europe. People in India are trying to mimic the human being. For e.g. I have been assigned a role and every morning I will login in a portal, download the ticketing information and send it to my Manager. Now same stuff can be done with the help of automation. There will be software with some privileges and rights with some login ID. Every morning at scheduled time it will login, download, create a file and send it to the required person. However, when we say Automation, it is more than mimicking a human being. Automation is like having Artificial Intelligence inbuilt, the robots learning on its own using Machine Learning algorithm where the software learns to optimize the

Qs 9) What are the areas in banking where automation is feasible?

A. Anything and everything can be automated. In banking for e.g., If you are filling a physical forma and you need to enter that data in the database, then instead of typing it all, you can use an OCR implementer to scan the page. The OCR will scan the page for text and then processed data can be automatically transferred to the database. Anything with manual intervention can be automated but at the same time you can't automate 100%. You should have some quality checker, some maker checker. A robot might be used to create some object, but there needs to be some human checker until the robot is fully matured. When you see that 100% of data is being correctly processed then you can remove the manual check. So it works parallel.

Qs 10) Tell us about some interpersonal skills we should have outside academics and how to manage them with technical skills?

A. Ethics is the one thing because normally hackers are seen as criminals. The cyber or any information security should have an ethical balance and loyal to its organization. Other soft skills and communication skills, because in many places this roles like official security office are very authoritive. It is like if we don't approve, anything will not move to production and the new software won't be bought by any organization. So many times people feel that authority and behave rudely. So they should see that in a different way. They have authority but at the same time they have responsibility. If I stop everything my business would go down and because of business I am there. So this three things I personally feel everyone should have.

Qs 11) What are the Job Opportunities for an IT graduate in the field of Banking Security?

A. A lot! You must be knowing the speed at which the world is moving towards digitization. Everything like robotics, websites, applications, IOT, Blockchain and cloud computing. But their vulnerabilities are not considered and there are chances of manipulation and exploitation. So there are a lot of chances due to the speed of digitization according to me.

Qs 12) Do you have any messages for the budding Engineers of TCET?

A. They should use and manage their time properly and try to explore new things. Also more important is try to figure out what they wish and what they want to achieve. Both are different things. For example, I wish to have a Ferrari but I can only settle down for a small car or a Sedan. So that is what I personally think they should achieve in their life while doing their studies.

OUR TOPPERS

RIBAH SHAIKH BE B
SEM 6 - CGPA 10

KIRAN YADAV BE B
SEM 6 - CGPA 10

SNEHA JAISWAL BE A
SEM 6 - CGPA 10

OUR TOPPERS

AKASH KHANDELIA TE A

SEM 4 - CGPA 9.85

AMISH PUNMIYA TE B

SEM 4 - CGPA 9.69

RUCHA BELGALI SE A

SEM 2 - CGPA 9.56

RIDDHI THANKI SE B

SEM 2 - CGPA 9.48

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AFTERWORD.

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SINCERELY YOURS,

DIVYAM CHOUDHARY

CODE OF ETHICS

The Department of Information Technology of TCET believes that IT Engineers make a direct impact on almost all aspects of Human Life for its betterment. IT engineers should strictly adhere to the highest principles of ethics of ethical conduct. In order to inculcate high standards in professional behavior, the department advocates the following code of ethics for all the students, Faculty members, & staff of the department.

1. Strive to be professional competent to provide high quality product & services.

2. To responsibly make decisions, minimizing hazards to society and to disclose potential factors that may be a threat to health and society.

3. Be fair to all individuals and not discriminate between individual based on religion, race, sex, age, disability, national, origin, etc.

4. Give credits to contribution of others viz. copyrights, patents, intellectual property.

5. Protect and respect privacy and ensure confidentiality of information whenever appropriate.

6. The Knowledge gained during the course of study will not be misused for carrying out any illegal activities, intruding and hacking of networks