PRAGNA प्रज्ञा

DEAN'S MESSAGE

B. Ramakrishnan

Dean, School of Mathematics and Computer sciences

Greetings on behalf of the School of Mathematics and Computer Sciences!

Congratulations to the Department of Computer Science for bringing its first newsletter.

The Department of Computer Science was inducted under the school during the academic year 2016-17, which runs a post-graduate programme and a Ph.D programme. With the addition of Department of Statistics and Applied Mathematics, our school houses three departments, including Mathematics Department.

With the recent induction of two Associate Professors (who joined CUTN during the last semester), the Department of Computer Science has two Associate Professors and four Assistant Professors. The faculty members of this department have a wide range of expertise in the subject and I wish that they will use them to have a fruitful collaborative academic programme(s) with other departments along with their own programmes. I am sure that the students will be benefited from these collaborative programmes, both in terms of academic career and for getting better employment opportunities. As Dean of the school, I extend my full support in achieving this goal.

Best wishes,

B. Ramakrishnan.

HOD'S MESSAGE

Dr. Chandra Mouli P.V.S.S.R.

Head,

Department of Computer science

Greetings from the Department of Computer Science.

Though this is the hard time for all of us due to Covid-19 pandemic, I am delighted to present our maiden newsletter PRAGNA, a Sanskrit word, which means Wisdom / Understanding.

Central University of Tamil Nadu has a total of 12 schools where each school comprises related departments. The department of Computer Science, along with the departments of Mathematics, Statistics & Applied Mathematics forms the School of Mathematics and Computer Sciences. The Computer Science department has been established in 2016 with four faculty members. Currently, we have two associate professors and four assistant professors. The department offers M.Sc. (Computer Science) and Ph.D. programmes. The major strength of the department is having expertise in data science and allied areas. The department has two general labs that cater to the needs of the students.

Despite the crisis due to Covid-19, we continued our teaching and learning process using state-of-the-art online lecturing tools viz. Cisco Webex meeting, Microsoft Teams and Skype. In order to keep the students occupied with their academics, we have used Google Forms and Microsoft Forms to conduct online quizzes topic by topic.

In the forthcoming days, we plan to establish the department with sponsored research projects, specialized labs and few centres of excellence that facilitate the research scholars to work on the latest trends in computer science.

The department is also looking forward in the coming years to start a Master of Computer Applications (MCA) program which has been made as a two year program by AICTE from the academic year 2020-21.

We, with the other two departments of our school, look forward to initiate a joint program on Data Science and Analytics under the guidance and constant support of our beloved Dean Prof. Ramakrishnan.

To further strengthen our research, we strive to publish our research in the most reputed science citation index journals.

I wish that the department will develop as a global leader in the field of Information Technology aiming to solve the real world problems of computer science.

I thank all the faculty members, research scholars and students for contributing their articles to this newsletter.

Finally, I thank the design and editorial teams for working tirelessly the past two weeks in designing this newsletter.

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VISION AND MISSION

Vision

To develop the department as a global leader in knowledge dissemination and to perform cutting edge research in computer science in compliance with international standards

Mission

- To excel in transforming graduates into software experts with high degree of technical creativity and managerial skills.
- To excel in imparting quality education with dedicated and strongly motivated faculty.
- To train the students to take up various challenges of latest technologies in the field of computer science.

Thrust areas

Artificial Intelligence, Machine Learning, Deep Learning, Digital Image Processing, Data Analytics, Big Data, Information Security, Steganography, Threshold Cryptography, AI, NLP, Text Mining, Network Security, IoT, Business Intelligence, Evolutionary Computing and other allied areas.

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ALAN TURING

Alan Mathison Turing

Father of Computer Science

In the first edition of the Newsletter by the Department of Computer Science, we would like to start the biographies section with Alan M Turing, OBE FRS.

From his early days, he had shown signs of genius, which was sadly not well appreciated at that time. Even in childhood, he had shown a natural inclination towards the physical sciences and mathematics. But in his time, these were not popular fields to be interested in. His headmaster has been quoted as writing to his parents thus: *"I hope he will not fall between two stools. If he is to stay at public school, he must aim at becoming **educated**. If he is to be solely a **Scientific Specialist**, he is wasting his time at a public school"* (emphasis mine). At the tender age of 16, he encountered Albert Einstein's work; not only did he grasp it, possibly he deduced Einstein's guess that Newton's laws aren't perfect.

Theoretical Computer Science

Alan Turing's work can be regarded as the foundation of computer science and of the artificial intelligence program. The paper "On Computable Numbers…" was his first and perhaps greatest triumph. It gave a definition of computation and an absolute limitation on what computation could achieve, which makes it the founding work of modern computer science.

His contention was that the computer, when properly programmed, could rival the brain. It founded the 'Artificial Intelligence' program of coming decades.

Turing's purpose was to embody the most general mechanical process as carried out by a human being. Turing established the remarkable fact that anything that is computable can in fact be computed by one machine, a universal Turing machine. Turing found, and justified on very general and far-reaching grounds, a precise mathematical formulation of the conception of a general process or method.

A big part of the theoretical basis for most of our modern electronic devices is due to his work on Turing Machines and Universal Turing Machines.

Turing's work also opened new areas for decidability questions within pure mathematics. From the 1970s, Turing machines also took on new life in the development of complexity theory, and as such underpin one of the most important research areas in computer science. This development exemplifies the lasting value of Turing's special quality of giving concrete illustration to abstract concepts.

By the expression 'genetical or evolutionary search', he also anticipated the 'genetic algorithms' which since the late 1980s have been developed as a less closely structured approach to self-modifying programs. It is important to note that Turing identified his prototype neural networks and genetic algorithms as computable.

Influence in World War II

Because of his immense talents in the required areas, Alan Turing was recruited for the War effort to help in decrypting the insanely complex Enigma's encryption. Already Poland had set up some groundwork in decrypting the signals, but that could only decrypt a tiny fraction of all important messages being sent. After Turing arrived, he immediately automated a big chunk of the process using an electromechanical device of his own specification, called the **bombe**. Their team had extremely less resources but they had such great potential to contribute. So, Turing and his colleaugues wrote directly to the then PM Winston Churchill. Immediately, all their difficulties vanished.
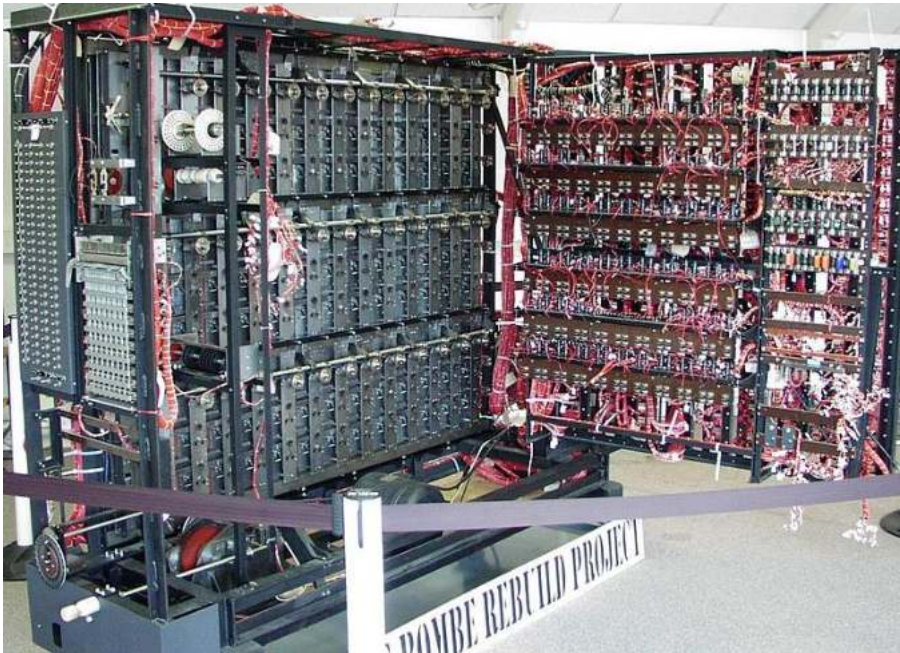

A replica of The Bombe, used to automate the decryption of German signals

Then, he moved on to tackle tougher problems, such as the German naval Enigma, which was a more complex device. He invented methods to make it easier for the bombe to decrypt signals.

He then took on other encrypting devices such as the Lorenz Cipher, and made it easy to decrypt them by inventing his own methods.

He then worked on secure voice communication over the telephone network. He was able to do this successfully, but it was too late for use in the War.
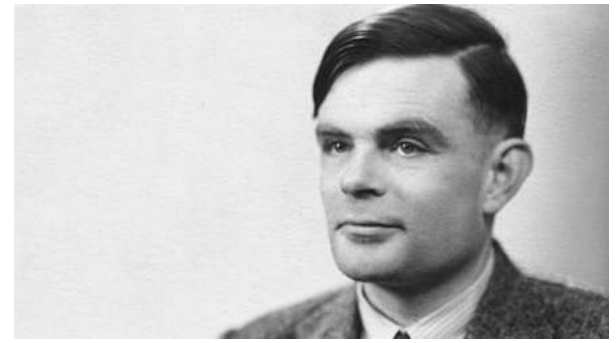

Overall, due to the decryption that became possible because of his mathematics, Britain could win many crucial engagements, especially in naval warfare. It is estimated that these events **helped to reduce the War by almost 2 years, and saved over 14,000,000 lives.**

Miscellaneous:

- He was an excellent long distance runner. His try-out time for the Olympics marathon was only 11 minutes slower than that of an Olympic silver medallist's race time of 2 hours 35 minutes. However, due to injuries he couldn't participate.

- He contributed to the field of mathematical biology by suggesting that a lot of morphogenesis can be explained by the diffusion of chemicals through space. This led to other scientists figuring out how spots and stripes form on the bodies of cats, asymmetry in the body, formation of digits in the limbs, growth of follicles, feathers, branching pattern in the lungs, etc.

- The Turing Award, given by the ACM (Association for Computing Machinery) is generally recognized as the highest distinction in Computer Science, or as the Nobel Prize of computing.
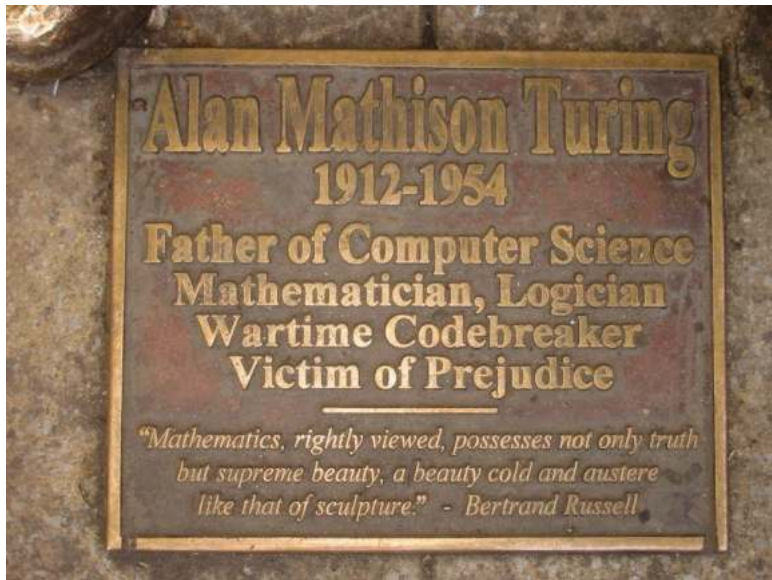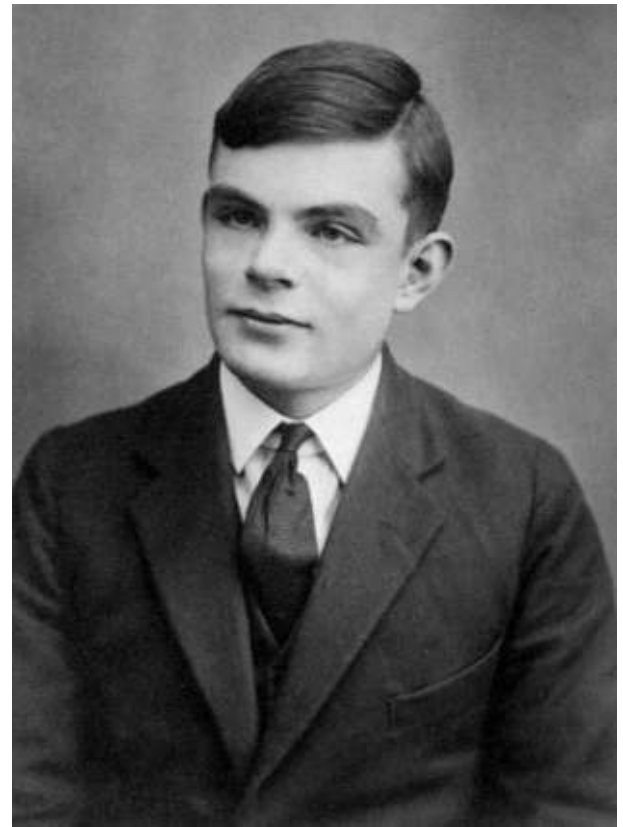
Turing Memorial Statue in Manchester

The Imitation Game

A movie has been made in his honour, which focuses largely on his role in the War. But please be warned, it is wildly inaccurate in comparison with true events. It is made for entertainment purposes only.
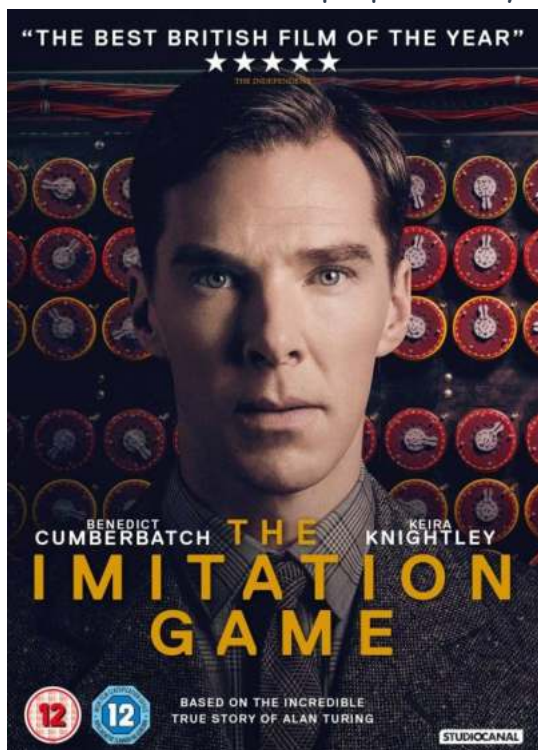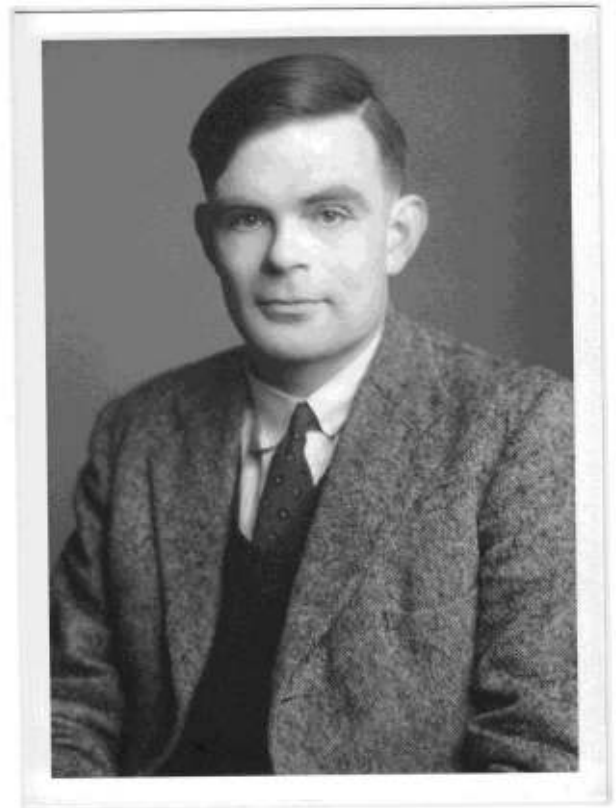
FROM ARTIFICIAL INTELLIGENCE TO DEEP LEARNING

Dr. P.V.S.S.R. Chandra Mouli
Associate Professor, CS Dept.

Artificial Intelligence (AI) has been a part of everyday life, whether in biometric recognition systems or route finding apps. Researchers are increasingly drawing on AI to understand society, design new materials and even improve our health. Yet other applications include product recommendation platforms, navigation tools, and voice recognition systems and so on. All of these rely on computer algorithms that process information and solve problems in a way similar to – and sometimes superior to – the human mind.

It paves the platform for scientists to study diverse disciplines.

To this end, Stanford researchers are deploying AI to map poverty in Africa, find safer alternatives to conventional rechargeable batteries and perhaps even understand our own minds.

One of the computer scientists of this century, Coursera cofounder Andrew Ng says, "fears that AI will replace humans are misplaced: Despite the hype and excitement about AI, it's still extremely limited today relative to human intelligence."

Major problems slowing down AI adoption are scarcity of data and talent. For AI to be meaningful, companies need to feed their algorithms vast amounts of data, which aren't always readily available. AI drew much inspiration from the human brain but went off in its own direction. Now, AI has come full circle and is helping neuroscientists better understand how our own brains work.

Although not explicitly designed to do so, certain artificial intelligence systems seem to mimic our brains' inner workings more closely than previously thought, suggesting that both AI and our minds have converged on the same approach to solving problems.

A vision problem for AI

Artificial intelligence has been borrowing from the brain since its early days, when computer scientists and psychologists developed algorithms called neural networks that loosely mimicked the brain. Those algorithms were frequently criticized for being biologically implausible. But computer scientists didn't care about biological plausibility. The scientists further extended neural network models culminating in what is now called deep learning.

In 2012, AI researchers showed that a deep learning neural network could learn to identify objects in pictures as well as a human being, which got neuroscientists wondering: How did deep learning do it? The same way the brain does, as it turns out. It was showed that a deep learning system that had learned to identify objects in pictures – nearly as well as humans could – did so in a way that closely mimicked the way the brain processes vision. In fact, the computations the deep learning system performed matched activity in the brain's vision-processing circuits substantially better than any other model of those circuits.
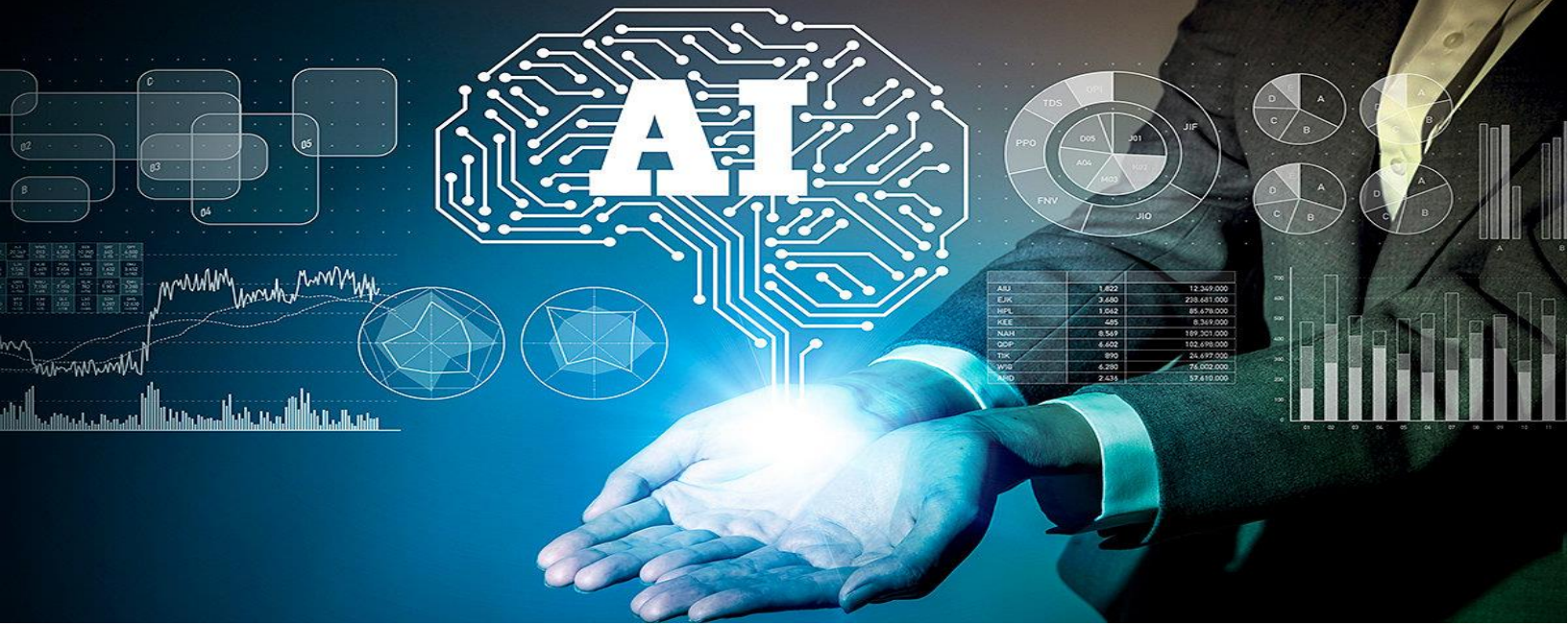
Around the same time, other research teams made similar observations that given the same kind of problem, deep learning and the brain had evolved similar ways of coming up with a solution. Deep learning's conceptual organization is borrowed directly from what neuroscientists already knew about the organization of neurons in the brain.

Deep learning has been proved to solve the most complex problems in the world and it provides the most demanding and promising topic of research for a decade.
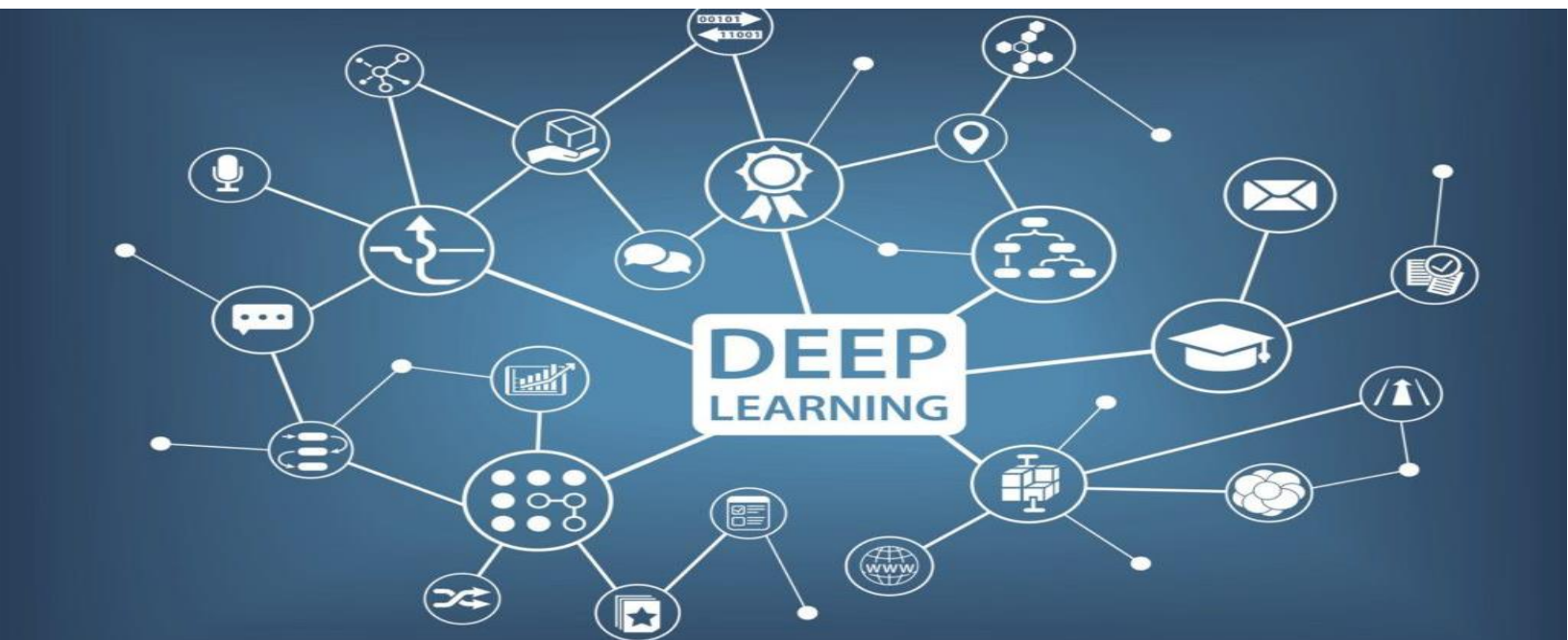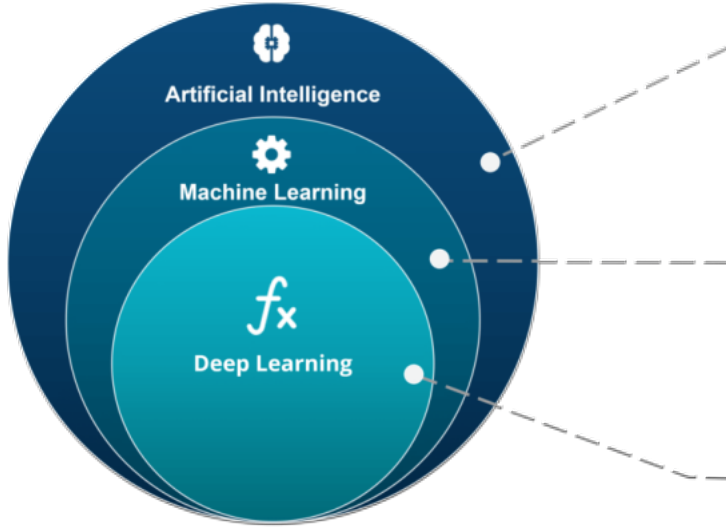
DEEP LEARNING FOR COMPUTER VISION

Dr. S Appavu Alias Balamurugan,
Associate Professor,
Computer Science Dept.

Deep learning is a fast-growing field of Artificial Intelligence (AI) concerned with the study and design of computer algorithms for learning good representations of data, at multiple levels of abstraction. Progress has been rapid in the field of Computer Vision, especially visual recognition, where the main aim is to build Intelligent Systems which can understand the rich visual world around us. This growth is mainly driven by the explosive growth of diverse applications of AI in production, the continued growth in data volume, advances in computing power, and the complexity of large-scale learning systems.

From the study of fossils, Andrew Parker states that the history of the Biological Vision dates back 543 million years ago and he also states that Vision is the main reason that caused the Evolution Big Bang, where the number of species on Earth has exploded with a short duration of time i.e. 10 million years. But when it comes to the history of Mechanical Vision, one of the early cameras that we know today is from 1600s, the Renaissance period of time called Camera Obscura and it is based on pinhole camera theory.

It's very similar to the early animals that developed eyes i.e. with a hole that collects light and then a plane in the back of the camera that collects the information and project the imagery. But the use of photographic film was pioneered by George Eastman, who started manufacturing paper film in 1885 before switching to celluloid in 1888-1889. His first camera, which he called the "Kodak," was first offered for sale in 1888.

Computer Vision has been one of the main areas of study in the field of Artificial Intelligence where the main goal is to develop agents that can sense and perceive the rich visual world around us. Computer Vision is highly interdisciplinary field which is a combination of Biology, Mathematics, Engineering, Physics, Psychology, Computer science etc. The basic challenges of Computer Vision include Camera Pose, Illumination, Deformation, Occlusion, Background Clutter and Intra-class Variations. The applications of computer vision are numerous that include agriculture, augmented reality, autonomous vehicles, biometrics, character recognition, forensics, industrial quality inspection, face recognition, gesture analysis, geoscience, image restoration, medical image analysis, pollution monitoring, process control, remote sensing, robotics, security and surveillance, transport etc

As we all know that humans glance at any scene/image and instantly know what objects are in the scene/image, where they are, and how they interact. But in the case of intelligent systems like robots and autonomous vehicles, performing such tasks is a major challenge. But in the recent years significant strides have been made towards this goal due to simultaneous advances in computing infrastructure, data gathering and algorithms, where Deep Learning has become a "de facto" tool to achieve those tasks. These methods have dramatically improved the state-of-the-art in speech recognition, visual object recognition, object detection, language translation, medical image analysis and many other domains such as drug discovery and genomics. Deep convolutional nets have brought about breakthroughs in processing images, video, speech and audio, whereas recurrent nets have shone light on sequential data such as text and speech.

INTERNET OF THINGS

IoT

A GLIMPSE INTO THE FUTURE

Dr. R. Saranya
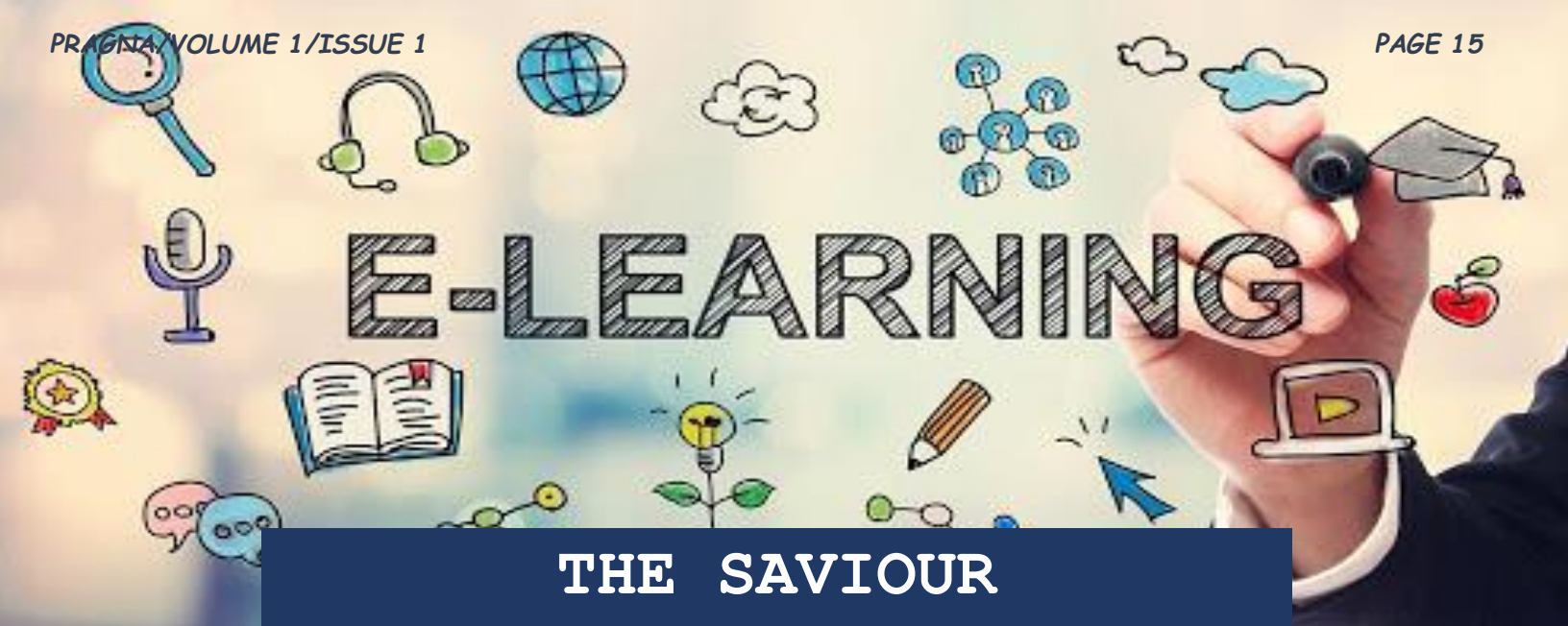### Assistant professor, CS Dept.

An intense scientific revolution of 21st century, which is all about connecting devices or objects over the internet, letting them talk to us, and each other via Wireless sensor networks and that which captivates me is the phrase **Internet of Things (IoT)**. **CISCO** called this as '**The Next Revolution of Internet**', an internet of everything i.e., which automates and controls the stuff around us. The essential ingredients of IoT includes sensors and actuators (embedded devices), local processing and storage using edge computing analytics, IoT gateway (network/ internet protocols like CoAP& MQTT which provides mechanisms for asynchronous communication which runs over IP), cloud technologies for aggregate ,making inference and for storage of data.

The hype around the IoT is huge and it touches every facets of our lives. It can be applied to many fields ranging from agriculture (smart farming), transportation (connected cars and smart cities), healthcare (real time remote monitoring of patients via. wearables) to building automation (smart home and smart renewable energy). The effect of IoT in healthcare industries enables the transformation of IoT imposed mobile based medical data into insights for smarter patient care with improved quality and accessibility of digital health and fitness products (wearables).

In the view of current global perspective of Coronavirus pandemic, the role of IoT would accelerate its positive impact by assisting and tracking the spread of virus using connected devices such as thermometers, blood pressure monitors which could be used for continuous monitoring of patient's body temperature at real time (increases safety), identifying patients who are at high-risk and sends notification to the healthcare centers. Such digital innovation wouldbe employed to slow down and control the infection which consequently predict and reduce the mortality rate.

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THE SAVIOUR

Dr. K. Nandhini
Assistant Professor,
Computer Science Dept.

Education through face to face by nature inculcates moral values in it, which these digital education lacks. But during this COVID-19 lockdown period, eLearning is the only solution in providing education to both schools and colleges students. In a traditional classroom teaching, faculty can observe students, and interact face to face. The direct sensory contact with students is missing in the case of online educational settings and the student is often far away from the workplace and the faculty. For the faculty of online courses, the main concern is students failing to complete assignments on time, a lack of presence in online discussions and failure to respond to emails/phone calls [1].

Online teaching can pose initial challenges to teachers and students in remote areas. Gradually increasing their exposure to digital technology and proper training to teachers can help them to overcome this current situation and to achieve the goal of complete 'digitization of education in rural India.

Well established institutes manage these situations in a better way, as they are already using LMS to deliver their coursework and have adopted a few courses in MOOCs, NPTEL as supplementary. Institutes which are reluctant to adopt eLearning, find it as a greater challenge to handle this moment.

Poor infrastructure, lack of strong internet connectivity, electricity problems, and many such problems can be alleviated using a mix of synchronous and asynchronous teaching learning process. Coursework can be created, uploaded and organized using easily available tools like Google Classroom, Blackboard, Edmodo etc.,

Content needs to be created with four quadrant approaches in mind. Face to face interaction can be done through Skype, Cisco WebEx, Zoom, Google meet etc.,

The Lecture videos can be recorded with simple screen recording tools like ObsStudio [4], Screen-o-cast [5], PPT2007 [6], and so on. Simple smart phone can also be used for recording [2].

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7. https://vidreader.com/

There exist various Assessments tools to evaluate the performance of the students. To name a few are Google Forms, hotpotatoes, kahoot, classmarker and so on. Faculty can use already existing videos on YouTube, add questions, discussion prompts, and additional resources and can share with their students and also track their progress [3]. Transcriptions of videos can also be done to facilitate easy comprehension [7].

Conclusion If this situation persists, online programs continue to expand its wings widely in the coming years. The stress of coursework can lead to emotional distress in students whether they are in traditional classrooms or in online classes. For these reasons it is essential that school, college and university administrators need to focus on policies to develop mental health and wellness for both the faculty and the students.
However, simply introducing modern methods of education won't be sufficient for quality learning. One-to-one interactions among teachers and peers are very crucial for learning. On a digital platform, how students learn and communicate with others largely rely on the readiness of both students and teachers to accept and adopt online education as it is the only light at the end of the tunnel.

Stay Home, Stay Safe and Stay Connected

An Artificial Intelligence Based Recommender System to Predict Future Severity of Covid-19 Patient

Dr. A Martin

Assistant Professor, CS Dept

Covid-19 challenged the normal life of human being across the world. It has affected all the constituent of the society like health, medicine, business, agriculture, education, transport, food and other things. Every day we have enormous amount of data about Covid-19 like Coronavirus cases by district, state and country, clinical data, virological data, patient's data and so on. Among these data, patient data is very important which consists of underlying conditions of patient and symptoms, past disease history, treatments undertaken, present health condition, patient demographic data and age group and so on. The objective of the research is to design and develop an AI based recommendation system to predict the future severity of patient (will become a normal case or critical case or very critical case).The obtained patient's data are analyzed and predictions about future severity of patient are provided using AI based recommendation system for physician. Recommender Systems (RSs) are software tools that are used to provide suggestions / recommendations to user according to their requirement. The suggestions associate with various decision-making processes, such as which action to take, which items to buy, what music to listen to. "Item" is the general term used to denote what the system recommends to users. There are different kinds of recommender systems have been developed such as collaborative-filtering, Content-based filtering, demographic filtering, hybrid filtering and knowledge based recommendation system. This research proposes a knowledge based recommendation system that will provide predictions / recommendations for future severity of Covid-19 patient. Also this research analyzes Covid-19 patient's data using big data analytics to make import decision to make policies, guidance and recommendations for COVID-19 to its Stakeholders.

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BLOCKCHAIN

Kiran Kumar Kondru (R171302)

Ph.D. Research Scholar, under the guidance of Dr. R Saranya Ph.D., Department of Computer Science,

Introduction

A blockchain is defined as a public, decentralized register in which transactions between two peers of the same network are stored in a secure, verifiable, and permanent way. But the blockchain space is growing rapidly since it was first introduced in 2008. Hence, this definition of Blockchain might not hold true or might not be adequate. In midst of the 2008 financial crisis, a paper released by some unknown Satoshi Nakamoto titled "**Bitcoin: Peer to peer Electronic cash system**" gained instant fame as it promised a Bankless Banking system. A no intermediary system of transacting. Here we are going to discuss this completely decentralized system called **Bitcoin** and how it works

Bitcoin is considered the first Blockchain and by understanding how it works we can get a bird's eye view of how a blockchain in general works. In essence, Bitcoin is the simplest form of Blockchain. We will first look at the traditional banking system and then see how the Bitcoin Network works. This discussion has been greatly simplified so that it can be understood by everyone

Traditional Banking
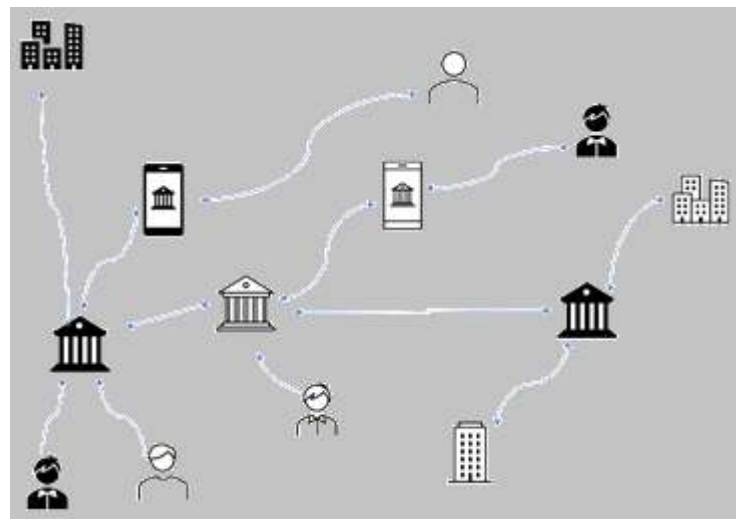
Traditional Banking in the modern context [2]

Traditional Banking

Traditional Banking as we know is an intermediary and keeps a centralized ledger of transactions between parties. When one person wants to transfer some money to another, say from person A to person B, an amount of Rs 100,, and these two persons have an account at the same bank, their transaction is recorded

as in the bank's ledger debiting from person A's account and crediting into person B's account. And it's done in that order. First debiting and then crediting. This transaction can be understood as an ATOMIC transaction in Computer Science literature.

As such both parties A and B have to trust the intermediary. Here, in this case, it's a Bank. And as a reward, the bank charges some transaction fees. This system hasn't changed for many centuries, though Banks also lend money for interest. It's a different story. The fundamental duty of a Bank is to act as a trusted third party for (monetary) transactions between two parties. Similar third-party intermediaries like Notaries also existed for centuries. Where a (land) deed is transferred from one party to another for an exchange of certain money.

This trusted third party system gives authority to validate or invalidate transactions. The 2008 financial crisis bought about distrust in the whole financial sector. And the paper titled **Bitcoin** introduced by the mysterious Satoshi Nakamoto challenged this whole centralized system by introducing a decentralized, peer to peer electronic cash system. In the midst of distrust in the financial institutions, Bitcoin as an alternate currency took off.
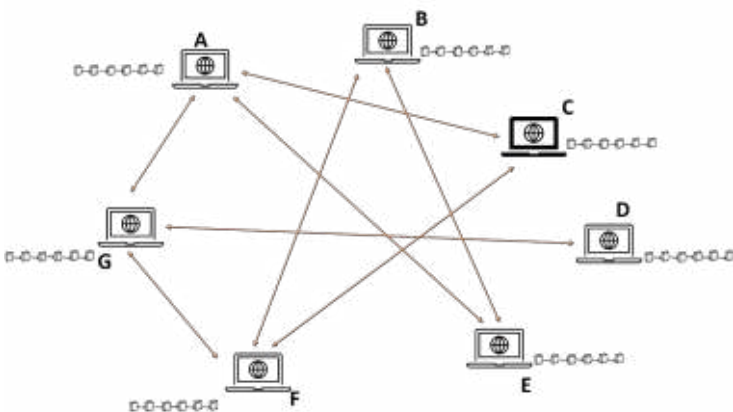
Bitcoin Network – Overview [1]

Bitcoin, for a Bank

Bitcoin [1] introduced a novel way to exchange value, in the form of its own currency, cryptocurrency. Bitcoin used varied concepts of cryptography and game theory to achieve a distributed and decentralized network of electronic cash system. This innovative money transfer system provides greater anonymity than physical cash. It has a self-regulating system with verifiability built into it, which, essentially replaces the need for a centralized verifier.

The properties of Bitcoin are

- Immutability

- Innovative consensus-driven peer-to-peer replication

- Verifiability/Auditability

- Byzantine Fault-tolerant [3] /No single point of failure

- Reward System for maintaining the integrity of the system

How these properties can be translated into a banking model is demonstrated below

- In the Bitcoin network, every node has a client software installed on it, which has access to the whole of the shared ledger. Let's say there are 6 members in the network: A, B, C, D, E, and F each having Rs 100 in their respective accounts.

- "A" wants to send Rs 35 to "C" for some service rendered or for some product purchased. This transaction is a simple entry in the ledger as shown below.

- This transaction is broadcast all over the network as it has to be verified and has to be recorded in a shared ledger with all the member nodes. This process gives **verifiability** or **auditability** to the whole system. Every member here can trace back this new transaction and check whether A really has money in his account and that he hasn't spent the same money twice or more on other transactions. This process essentially prevents something called **double-spending**[4] in the banking parlance.

- After broadcasting the transaction each node (the client software), collects all the new transactions and forms a block. Then each node tried to find a difficult **Proof-of-work (PoW)**[5] for its block. Whenever a node finds this, it broadcasts the block along with the PoW proof across the network. Each node accepts the block only if all the transactions are valid and not double spent.

Nodes express their acceptance of the blocks by working on creating the next block in the chain using the information of the accepted block. This creates a chain of blocks each using the information of the previous block (hash) to create a current block. So, in order to change any transaction information in a block, that user has to change all the subsequent blocks created after that block and get that **replicated** all over the network. Since all the transactions can be verified by all the users in the network, any attempt at malicious change in the transaction is not accepted by the majority of the nodes. This makes the whole system **Immutable**. Once the transactions are verified and put it in a block and replicated in the whole network, they are permanent.

- To encourage nodes to verify and form blocks, a **reward mechanism** is encoded into the Bitcoin system. Whoever wins this difficult puzzle **Proof-of-work**, will get new Bitcoins added to their accounts automatically, without anyone sending them. It's similar to minting new money. The winner's block will be verified and accepted by all the member nodes in the network along with the transaction of newly minted Bitcoin.

- Replication is only possible in this decentralized peer-to-peer network only with consensus and **consensus** is achieved by checking the result of the Proof-of-work of the wining block. And since all the blocks are replicated across the network, with no centralized server, there is no **single point of failure**.

Block creation and Replication [1]

Conclusion

All these features are innovatively combined to form a near non breakable electronic banking system with no banks as an intermediary. This in itself is a powerful idea, challenging the existing centralized systems like Banks by creating a well functioning working model of decentralized money exchange. Till now, the Bitcoin network has not been hacked as it essentially relies on the **game-theoretic** [6] approach of encouraging all the participants in the network to verify all the transactions. This is achieved by the reward mechanism of minting new money, a process called **mining** [7]in popular parlance.

Blockchain has evolved from a simple transaction system to include Smart Contracts. To ensure greater privacy, private and permissioned blockchains came into existence. And many more innovations came in this blockchain space and more keep joining. Day by day more applications of blockchain are coming along. It would be interesting to see how blockchains could fundamentally change how we transact.

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PASSWORD MANAGEMENT

Vessesh Hebbar, I MSc CS

So. Covid is here. Here to stay. And it has forced us to accelerate 10, 15 maybe even 20 years into the future. Whether we like it or not, much of human activity is going to go online. Monetary affairs such as banking, our identities, our documents, our correspondence, our private, personal, even intimate aspects of our lives, are in some way or another going to go digital.

The only thing that prevents this huge collection of data from being accessed by unauthorized entities is a small phrase or word – just a few characters long, maybe a few tens of bytes long. Biometrics technology is still not there yet. It has its own gaping flaws that need to be corrected. Until we invent better methods of authentication (I doubt it's going to happen), passwords are here to stay.

Passwords are not foolproof either, but if good security practices and habits are followed, they're still one of the best forms of security around. So, what are the weaknesses of passwords? How do we secure against them? It is imperative that we know about these things immediately and start following them.

So what is a password manager, and how does it help us?

A password manager is either a software or a service that helps us to manage all our passwords and store them in a single, secure location. The benefits are:

1. Passwords can be stored digitally in a secure, remote place after encrypting the password database. So, all resources can be concentrated on ensuring the security of that remote place. Even if an attacker somehow gains access to the remote place, passwords are stored in encrypted form.

2. Multiple long, secure passwords can be stored.

3. Can be accessed easily and securely.

4. Random passwords with very high entropy (unpredictability) can be generated and stored very easily. Thus, it becomes almost impossible for an attacker to "guess" the password even after many attempts.

5. We can set reminders to automatically remind us to change our passwords periodically so that even if a password is compromised, it will soon become outdated.

6. We need to remember only the master password. This master password is used to encrypt the database containing all the passwords. It is known only to the user, and it is not stored anywhere, even on the server side.

7. We can have systems that allow us to share each specified password with others securely.

How do we generate a Master Password?

Our master password needs to be strong. But it is very important that we should also be able to remember it. We will see what the characteristics of a weak password are in the next issue.

For now, we'll just focus on generating one strong master password that we will remember forever.

There are many techniques that we can choose from, each favored by different individuals.

These Include:

The Bruce Shneier Method: Take a long, memorable sentence that is personal to you. For example, "I rock to the music of Linkin Park, the popular rock band". Then make up any rule that you can easily remember. For example, take the first two letters in each word and combine the whole thing. Thus, the password is "IrotothmuofLiPa,thporoba" similarly, with some other rules, "Woohoo! The Fnatics won the PMIS!" becomes "wOO!thFnwothPmis!".

Phonetic Muscle Memory: Go to a password generator website, and generate a lot of random passwords with only letters and numbers.

Scan the passwords, looking for phonetic structure—basically try to find passwords that you can sound out in your head. For example: drEnaba5Et (doctor enaba 5 E.T.) or BragUtheV5 (brag you the V5).

Take note of how easy they are to type and how quickly you can type them. The easy to-type passwords tend to get stuck in my muscle memory quicker.

Keep the phonetic, muscle-memory passwords and leave the rest.

Use only these ones.

Use the Keyboard: Imagine the keyboard as a constellation and try to make memorable shapes that you can draw in the keyboard. Like this:
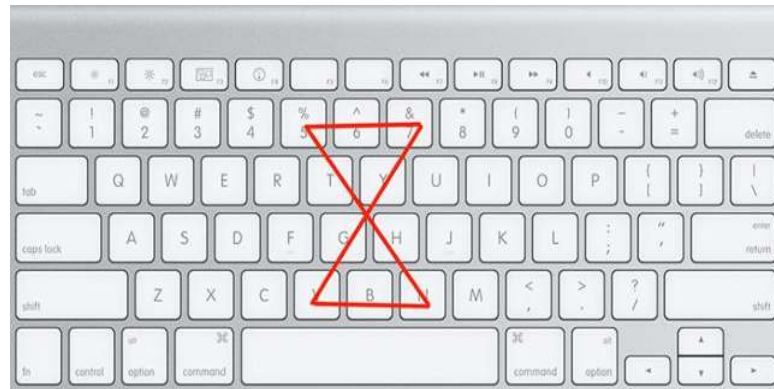
Or else, if you know how to play the piano, play a song in the keyboard.

You can use it however you want. One row for the 7 white piano keys, and another for the 5 black keys? You can use the shift key now and then to introduce some special characters like ! @ # $ % ^ & * or capital letters to the song. You can even play the same song in a different scale.

Or use the keyboard in any other imaginative way you want. But make sure that the resulting password is not weak (we'll cover what makes a password weak in the next issue).

So how do I get started?

There are many, many, many password managers out there. You can choose your preferred one depending on your personal preferences. Some of the things to consider are:

• Are you willing to pay for the service? If so, how much?

• How many passwords (estimated) would you expect to use?

• What are the devices in which you would need access to the PM? Does the PM support that many devices in your preferred subscription plan?

• What are all the platforms and OSes that needs to be supported?

• Do you prefer to store passwords locally, or on the cloud?

• Do you prefer to use a web client that you can access from any device, or do you prefer an app?

• Do you prefer to use the PM only from the device you personally own, or do you expect to use it in public devices too?

• Do you wish to integrate it with your browser for convenient AutoFill?

• Do you expect to migrate between various services frequently?

• Do you wish to share your passwords regularly between colleagues/family, etc?

• Do you want it to be Free and Open Source Software?

Here is a partial list of Password Managers already available.

https://en.wikipedia.org/List_of_password_managers

I honestly cannot sum up the need for password managers better than this quote by PC Mag's Eric Griffin:

"Passwords are like Underwear:

1. You shouldn't share it with others.

2. You shouldn't leave them out in the open for others to see

3. You should change them often"

Hoping to see you again in the next issue, where I can elaborate on other issues related to password security.

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CYBER SECURITY

Madhumitha, I MSc CS

Cyber security or information technology security is the protection of computer systems and networks from the theft or damage to hardware, software or data. But nowadays how do we ensure security? Attackers try to bring down websites, steal data or commit fraud. All these activities we now call cybercrime. Cybercrime is any crime that takes place online or primarily online. Cyber criminals often commit crimes by targeting computer networks or devices. As the sophistication of cyber criminals continues to increase, their methods and targets have also evolved. Instead of building the large Internet worms that have become so familiar, these criminals are now spending more time concentrating on wealth gathering crimes,

CyberMedia states that most of all attacks are aimed at home users. As attacks on home users increase, new techniques are surfacing, including the use of malicious code to attack web browsers and desktop applications.

Some of the attacks done are password attacks, eavesdropping attack, brute-force and dictionary attacks, web attacks, malware attacks etc.

The following is a short review of some techniques that are easily employed and can help stem the tide of these criminal cyber-attacks:

- Install and use an regularly updated antivirus and anti-spyware software on the computer

- Use a firewall for your internet connection. The firewall's purpose is to stop unauthorized contact or entry onto the system. However, a firewall does not remove things that are already on the computer or network. Anti-virus software is needed as well to handle malicious code that may slip through the firewall undetected.

- Download and install software updates for operating system and application software as and when they become available

- Regularly change the password and use strong ones. We can use password managers to help us in this task

- Use two-factor or multi-factor authentication - it's add additional layer of security to your personal data

- Use your mobile device securely because mobile devices are now a target for more new incidents of mobile malware.

Buy software only from reputable resources, such as the official website for the product. Never download or install apps from third party websites or advertisements.

These are cybersecurity basics for protecting your computer network and they only scratch the surface. There are many other ways in which we can properly protect our systems.

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CHESS - HUMAN AGAINST AI

Kamil Khan, I MSc CS

Most human beings are in awe of the Game called Chess. We are secretlyjealous of Chess Grandmasters because of their intelligence. Even the all-time Great,the theoretical physicist Dr. Albert Einstein is very fond of this game. You can view his only recorded chess game here: https://www.chessgames.com/perl/chessgame?gid=1261614.

Had he followed his passion, we would have escaped from all the complicated physics that he introduced :) In this article, I want to give you a perspective of how humans, especially Computer Scientists, endeavour to beat the Grand Masters in their own game by exploiting the computational power of Computers.

The first machine designed as to be a chess player was made in the 18th Century. Leaving aside theethical and moral compass, many of us probably agree that cheating is a part of intelligence. Thefirst machine known as Turk is constructed by a certain Wolfgang von Kempelen. A human chessmaster was concealed inside the cabinet with a series of levers. It was just an elaboratesimulation of a mechanical machine. With a Skilled Operator, the Turk won most of the games including a game against Napoleon Bonaparte.

El Ajedrecista (English: The Chess Player) was an automaton built in 1912 by Leonardo Torres y Quevedo. It was the first Computer Chess Engine ever built. This automaton had the capability to detect illegal chess moves and it had the capability to checkmate even the grandmaster opponents, provided that the pieces are hugely favoured in the machine's side.

Computer programmers started to write chess programs during the 1950s, emboldened by probably the all time great computer scientist Alan Turing's famous notion of Universal Turing Machine. A Universal Turing Machine is a machine which could perform all the tasks that any other computation machine can. We all agree that the Human Brain is a computation machine. According to the Church–Turing thesis, Turing machines and the lambda calculus are capable of computing anything that is computable. Now computer engineers are doubly sure that when a human brain can defeat another human being in a chess game, why not a machine? A breakthrough is achieved, Hurray (!!!)

In the late 1970's, Computer Programs start defeating Top Human players. In the year of Hearst's statement, Northwestern University's Chess 4.5 at the Paul Masson American Chess Championship's Class B level became the first machine to win a human tournament.

Garry Kasparov is considered by many including this author as the all time great chess
player. He is a top of his class, intelligent chess player and is the one who started his sporting career from reading books and the one who went through the transition of domination by humans to domination by chess engines. By tracking his career with the evolution of computer chess engines and his views about artificial intelligence from time to time would give us a good understanding of the evolution of Artificial Intelligence.

1985 Vs 32 chess computers:

Kasparov scored a perfect 32-0. Let's Listen to Kasparov about what he had to say regarding those games.

'At one point I realized that I was drifting into trouble in a game against one of the

"Kasparov" brand models. If this machine scored a win or even a draw, people would bequick to say that I had thrown the game to get PR for the company, so I had to intensifymy efforts. Eventually I found a way to trick the machine with a sacrifice it should haverefused. From the human perspective, or at least from my perspective, those were the goodold days of man vs. machine chess.

1996 Vs Deep Blue:

The first match began on 10 February 1996, in which Deep Blue became the first machine to win a chess game against a reigning world champion (Garry Kasparov) under regular time controls. However, Kasparov won three and drew two of the following five games, beating Deep Blue by a score of 4–2 (wins count as 1 point, draws count as a 1/2 point). The match concluded on 17 February 1996.

Kasparov called Deep Blue an "alien opponent" but later stated that "It was as intelligent as your alarm clock". According to Martin Amis, two grandmasters who played Deep Blue agreed with each other that "It's like a wall coming at you".

1997 Vs Deep Blue (Rematch):

Deep Blue won game six, there by winning the six-game rematch 31/2–21/2 and becoming the first computer system to defeat a reigning world champion in a match under standard chess tournament time controls. Kasparov accused IBM of cheating but slowly he began acknowledging that Computers are overcoming human beings rather exponentially

1998 onwards:

Till that point, computer chess programs efficiency was directly related to hardware and from 1998 it shifted to Software due to the increasing processing power and improved evaluation functions.

Rebel 10 defeated Viswanathan Anand, who at the time was ranked second in the world, by a score of 5–3.

In the early 2000s, commercially available programs such as Junior and Fritz were

able to draw matches against former world champion Garry Kasparov and classical world champion Vladimir Kramnik.

In October 2002, Vladimir Kramnik and Deep Fritz competed in the eight-game

Brains in Bahrain match, which ended in a draw.

In January 2003, Garry Kasparov played Junior, another chess computer program, in

New York City. The match ended 3–3.

In November 2003, Garry Kasparov played X3D Fritz. The match ended 2–2.

In 2005, Hydra, a dedicated chess computer with custom hardware and sixty-four processors and also winner of the 14th IPCCC in 2005, defeated seventh-ranked Michael

Adams 5.5–0.5 in a six-game match (though Adams' preparation was far less thorough than Kramnik's for the 2002 series)

In November–December 2006, World Champion Vladimir Kramnik played Deep Fritz. This time the computer won; the match ended 2–4. Kramnik was able to view the computer's opening book. In the first five games Kramnik steered the game into a typical "anti-computer" positional contest. He lost one game (overlooking a mate in one), and drew the next four.

In the final game, in an attempt to draw the match, Kramnik played the more aggressive Sicilian Defence and was crushed.

AlphaZero is a computer program developed by artificial intelligence research company DeepMind to master the games of chess, shogi and go. This algorithm uses an approach similar to AlphaGo Zero.

On December 5, 2017, the DeepMind team released a preprint introducing
AlphaZero, which within 24 hours of training achieved a superhuman level of play in these three games by defeating world-champion programs Stockfish, elmo, and the 3-day version of AlphaGo Zero.
In the late 1990's, computer programs started to win the world championship and from 2006 onwards, Computer programs were always superior. Now, some of the chess enthusiasts have started watching computer championships instead of human championships only.

When a human can't win against a machine, what is the point in watching human championship?

Let me conclude with Kasparov's words:
Self modifying Programs usually reflect the priorities and prejudices of programmers, but because
AlphaZero programs itself, I would say that its style reflects the truth. This superior understanding allowed it to outclass the world's top traditional program [Stockfish] despite calculating far fewer positions per second. It's the embodiment of the cliché,

"Work smarter, not harder."

TECHNOLOGY AGAINST COVID

Beulah Evanjalin I Msc CS

At the moment, irrespective of who we are and where we live in the world, the Novel Corona virus (COVID-19) pandemic is pushing us into what we call 'new normal'. A lot has changed in society since the arrival of the Novel Corona virus.The world has been hit in several ways through this pandemic. This novel virus has impacted the economic structures of various counties in the world. Many sectors that grows a countries economy has been halted all in an attempt to control community spread.

One sector on the other hand has seen tremendous growth and yes that sector is the IT sector. One can say that this pandemic has in a way pushed this sector beyond its limits.The IT sectors response to the novel corona virus has staged a global acceptance and use of Technology.

Technology has always been a part of our everyday activities but I can boldly say it has been come an essential part to our survival in this current times.

First of all, I like to praise 'Artificial Intelligence'. To stay ahead of the pandemic AI is being used in various ways. With the help of Data Analytics and AI, medical professionals are able to learn, understand and make helpful predictions about the novel virus. AI together with various technologies are being put together to track and keep tabs on persons who have come in contact with infected people. In an attempt to control the spread of the virus, AI Powered robots are being used.

AI together with Robotics allow health professionals to remotely communicate and attend to the needs of their quarantined patients. These Robots are used to deliver essential items to the patients. In restaurantsnow food is delivered to tables using robots.

AI powered dronesare also extensively being used to help disinfect the infected areas, patrol and broadcast necessary information to the general public.Again AI powered drones are also deliveries to areas under the Hotspot regions.
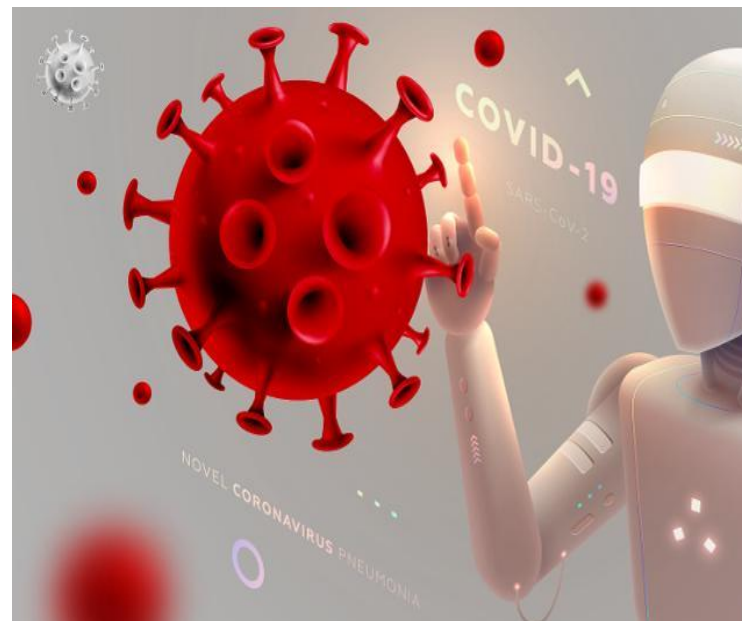
Today, Phones and watches embedded with AI technology allow individuals to also keep track of their healthand also keep their respective medical professionals updated.

Though the educational sector was also affected due to this pandemic Technology found a way to bring the school to the comfort of the home. Some Students may agree and accept this revolution while other might still fight it. But to minimize human contact as much as possible eLearning is the way forward. ELearning platforms have seen an interesting rise in traffic as they have become an essential tool for the educational sector.

"Working from Home, The new normal". Employers and employees are now tasked to perform all the necessary work remotely. In departments where physical presence isn't a necessity for task to be accomplished, E-business platforms are being used to get work down from the comfort of our homes.

Social media platforms and various telecommunication applications has become the ideal way to keep in touch with friends and family. It's amazing how we are advised to maintain social distancing protocols but thanks to technology we are able to connect with our friends virtually.

Platforms like Facebook, twitter, Skype, Google meet like and many more don't only help us to connect with friends and family but also have very interesting contents that keeps us entertained.
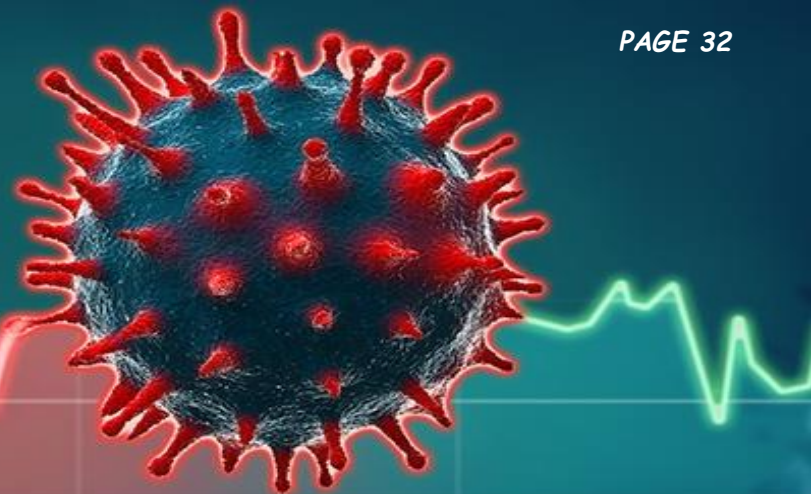
This Novel Corona virus COVID-19 isn't the first pandemic the globe has faced and it is also won't be the last. Epidemics and pandemics have been threatening the human race again and again. But no matter what the challenge be, the Spanish flu or the Swine flu, the HIV/AIDS crisis or the Ebola, technology is one weapon that will give the human race an edge.

AI, Robotics, Cloud computing, IOT, Data science, Machine learning and the many upcoming technologies will surely ramp up our capabilities as a human race and make our lives beautiful.

It's exciting to know we have technology in our corner in the fight against the novel Coronavirus. We are definitely going to win this.

COVID 19 & MATHEMATICS

Kamil Khan I MSc CS

Let me start with a Thanks!!! I was supposed to leave CUTN from Bangalore on a Sunday. I got a call from the hostel warden asking me to cancel the trip and not to come back to college till further orders. The call was firm, crisp but with care. He saved a lot of travel and hardship. I wouldlike to thank the hostel warden. Thank you very much, Warden.

The Queen of Science, Ms.Mathematics, plays a huge role in our daily life - from maximising the profits of a company to controlling the spread of disease. For Mathematics, anything and everything under the sky is a function, and the treatment of that function with appropriate mathematical discipline would give us an answer. The invention of the computer expedites the mathematical calculations. We, from the Department of Computer Science under the School of Mathematical sciences, would like to "threaten" you with some of the possible Mathematical questions that are going to be asked in examinations post COVID-19.

Generating Functions:

In how many ways can we distribute 12 Covid-Patients among Hospitals A,B and C, such that A gets at least 4, and B and C get at least 2, but C gets no more than 5?

Linear Programming:

A hospital has 50 ventilators to help the patients with respiratory problems X and Covid Patients Y.

The profit from patient X and Y per patient are estimated as Rs 10,500 and Rs 9,000 respectively.

To treat the patients, a particular medicine has to be used for patients X and Y at rates of 2 and 10 per patient. Further, no more than 800 tablets of that medicine should be used in order to use that medicine for emergency use. How many ventilators should be allocated to each patient to maximise the hospital's profit?

Permutation and Combination:

5 friends are going to a restaurant. They chose a table with 10 seats. Sitting immediately adjacent to each other is disallowed due to COVID-19 restrictions. Out of those 5, 2 have a temporary quarrel and they do not want to sit nearby. In how many ways they can sit among themselves?

Probability:

By PCR test, the probability that Covid-19 is detected when a personis actually suffering is 0.99. The probability of a healthy person diagnosed tohave Covid-19 is 0.001. In a certain city, 1 in 1000 people suffers from Covid-19. A person is selected at random and is diagnosed to have Covid-19. What is the probability that he actually has Covid-19?

Please hope that COVID-19 goes away soon. The more it stays, the more Ms.Mathematics is going to punish us all with tougher and tougher questions. Stay Safe. Stay Home

MINDSET

42 Days of Quarantine

When I first heard about college closing due to coronavirus I was so happy, because I could go to my home and I could eat homemade food. The first week was fun because there was nothing to do. But after a couple of days since the online classes started, I felt that online classes are less effective for my studies in comparison to physical classes. This is because in the college I can approach teachers at any time whenever I have any doubts, and I can also discuss the same with my classmates. And now I am missing my friends and those college days. Staying at home for such a long time is so boring.

When I started hearing about it on the news I didn't think it would turn out to be a big crisis like this. But after our country went into the first lockdown, the dangers are becoming apparent. Some days later our family also fell into 42 days of quarantine. Whenever I think about those days I feel afraid because those days was filled with a lot of fear and tension. We did not have the freedom to get out of our home, and nobody came to our home. Everyone was looking at us with fear in their faces. The worst part was that we were not allowed to use anything used by our family members and to keep distance even within the home. After a few days it became a part of life.

But there is another side to life in quarantine. It helped me to find my hidden talents. During this lockdown I was able to take part in many contests on social media conducted by different communities, clubs and colleges like singing, dancing, drawing, photography etc. Finally, corona taught me that man needs very few things to live. The rest are unnecessary.

- Linet M Shaji, I MSc CS

Online classes may reduce traveling time as well as the fatigue of traveling to distant places. We can learn from the house itself. But if we learn from classrooms that would be even more interactive and efficient than online classes. It's good, but we miss the classroom fun, chatting in class and the funny moments in class. Because of COVID we fell into this situation. And now the world is eagerly expecting for the vaccine so that we can return to leading our routine life. I hope it will happen soon. But the woeful thing is, if we are looking back to our college days we won't get any memories of college life. Only assignments would be there; But Classroom is Classroom - There is no replacement for that.

- Sri Durga, I MSc CS

This pandemic has forced us to skip several years and advance several years into the future. But the question is: is humanity ready? I think not. I believe that this pandemic, in the long term, will only serve to increase the rich-poor gap. :'(

-Vessesh Hebbar, I MSc CS

Covid 19 has made it a difficult time for all of us and makes us anxious and panicked as we are hearing about the spread of Covid 19 from all over the world. We should be aware of this virus and we need to take precautions to protect ourselves from this virus.

Online classes are different compared to learning from the classroom. It gave us the opportunity to plan our study time and makes us feel comfortable to learn from home.

 -Thenmozhi K, I MSc CS

I'm glad to be a CUTNian because it is being with me even in this pandemic situation. We are engaged in online classes. It is quite interesting to learn from home. We are being threatened by Covid -19. We are in a miserable situation. We don't know when it will stop. Till then learning should be continued. Learning is the only thing which will be there for us all the time.

- Nivetha, I MSc CS

"Pandemic", "lockdown", "quarantine", these words can't be heard if not for this virus. I think it's a virus that not only kills humans but it also repairs our nature. I'm not being sarcastic, I'm quite serious. We can't breathe without oxygen. Similarly, Severe Acute Respiratory Syndrome Corona VIrus 2 (SARS-COV2) or COVID 19 is a virus that affects the lungs and we are unable to breathe. This is indirectly telling us that we are affecting nature as well. We got in return what we gave to it..... Henceforth, let us give more importance to nature and let mankind live to its full potential on earth.

-B Mounika, I MSc CS

The main goal of education is to learn new things through the proper channels. During this lockdown period initially I felt very bad about education, how can I learn and finish my studies. But these online classes help me a lot to learn new things and clarify my doubts with our faculty. The difficulty in connectivity is also faced by us but the recorded video of those classes helps a lot to learn the subject and I also can clarify doubts with the concerned faculty. I really feel thank full to our faculty for conducting and clarifying our doubts online. We are all separated by distance but learning from home is like a classroom feeling. Stay home and gain knowledge at home.

 - Ahalya, II MSc CS

The shocking news regarding the cancellation of classes due to the pandemic, has caused a deep injury in our hearts. It didn't even give us a day to bid farewell to each other.

Students were instructed to continue staying in their allotted rooms and follow social distancing all the time. Entry and exit gates were guarded and those who wanted to venture out of the campus had to follow certain regulations.

I have never experienced such a painstaking situation in my life. Not only did I lose the chance to say goodbye to my buddies, but I also missed the chance to enjoy the final days of my PG days in the campus.

 - Athulya, II MSc CS

Slowly but steadily, parents, faculty, and students are getting comfortable with the online classes started by the university in the wake of the corona virus pandemic. But there are some challenges faced by all. Still everyone is adapting to change. - Kayalvizhi, I MSc CS

As our whole Country went into Janatha Curfew with its many restrictions, it was so easy to focus on negatives. Even though this global pandemic caused me stress and anxiety, I tried hard to overcome these negativities with positive thoughts and to maintain good mental health. With all these crises, this lockdown has given me deep solace and has taught me so many things. Sometimes back I barely had time to think about other people and spend quality time with fellow mates. But now, this COVID lockdown has taught me how to communicate with others and how to extend unconditional love, how to encourage and also live for others. Yes! Now I understood what humanity is.

This pandemic has also opened my eyes to realize how fortunate some of us are. To have food when others are barely getting anything to eat. I remember always complaining about how food taste and wasting it when I have no interest. Looking at people starve during this hard time broke my heart. I realized I don't actually get everything we wish. But I understand now that sometimes we have to take a step back appreciate the little we have.

I have also learnt the importance of family and have truly come to understand the famous quote "there is no place like home"

I have come to appreciate life even more during this trial moments with the Novel coronavirus on rampage.

Difficult times usually bring us together and make us stronger. Moving forward we should able to look out for ourselves and find the best in us all.

Let this be the time for us to appreciate what we have and live our life meaningfully.

-Beulah Evanjalin I Msc CS

In a foreign land during a pandemic can be very hard on an individual but like the famous quote,"Home is where your heart is", I have found a home in this land because I have made amazing friends with whom I have grown strong bonds.
This pandemic has taught me to appreciate freedom and moving forward lets strive to make good use of our freedom – **Afari Jesse, I MSc CS**

Online classes - Started with chaos, Streamlined after few classes, Ended with Positive experience that Online is on Par with class room experience (Boom).

Covid - Our generation knows the word "Virally" in Social Media. Covid-19 made me to know that root word of Virally stems from the word Virus - hard lesson – **Kamil Khan, I MSc CS**

HOW IS THE COVID-19 PANDEMIC AFFECTING YOU?
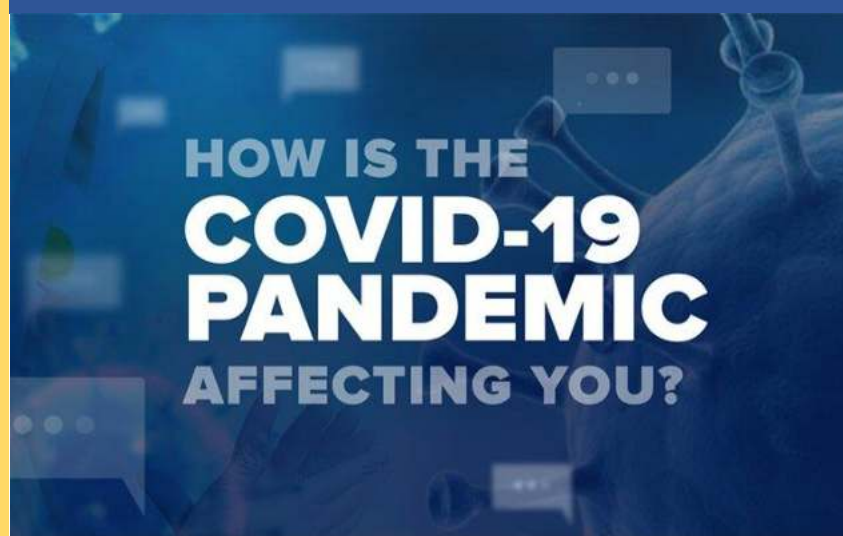
TECH FACTS

FACT 1

BACK IN 1964, DOUG ENGELBART INVENTED THE FIRST EVER COMPUTER

MOUSE! BACK THEN, IT WAS MADE OUT OF WOOD.

IT WAS RECTANGULAR AND FEATURED A LITTLE BUTTON ON THE TOP RIGHT

WITH TWO METALLIC WHEELS.

HE CALLED IT A MOUSE BECAUSE THE CORD COMING OUT OF THE BACK

REMINDED HIM OF THE TINY RODENTS.

FACT 2

There are over 3.5 billion searches per day on Google. Over 3.8 billion people use the internet today, which is 40% of the world's population.8 billion devices will be connected to the internet by 2020.

FACT 3

A Computer is able to perform about 38 thousand trillion operations per second and hold about 3,584 terabytes of memory. The average computer user blinks 7 times a minute.

FACT 4

The fact that keyboard have 'Q' 'W' 'R' 'T' "y' types of button :When the keyboard was invented , it had buttons in alphabetical order, as a result the typing speed was too fast and the computer used to hang .So, to reduce the speed of a person, qwerty keyboard were invented.

FACT 5

More than 570 new websites are created every minute. Every minute 24 hours of video is uploaded to YouTube. There are more than 300 million photos uploaded to Facebook every day, 800 million likes per day, and 175 million love reactions per day.

DEPARTMENT ACTIVITES

Department Inauguration

Dr. P. Thiyagarajan delivering welcome address

Net Coaching Class commenced on 09.09.2017

Net Coaching Class for PG Students in Department of Computer Science, Central University of Tamil Nadu was started on 09.09.2017.

Workshop on Digital India

One day workshop on Digital India Initiatives was conducted by **Department of Computer Science**, Central University of Tamil Nadu on 07.10.2017

First Board of Studies (BoS) Meeting

First Board of Studies (BoS) Meeting in Department of Computer Science, Central University of Tamil Nadu was held on 13.10.2017.   The BoS external members are:

1) **Prof.R.Ramanujam** from Indian Institute of Mathematical Sciences (IMSc), Chennai

2) **Prof.B.Ravindran** from Indian Institute of Technology (IIT) Chennai

3) **Prof.Ranjani Parthasarathy** from Anna University, Chennai

STUDENT'S ACHIEVEMENTS

- The Head, Faculty, Non-Teaching staff, Students and Scholars of Department of Computer Science, CUTN takes pride in congratulating Mr.Munawwar K.V for qualifying UGC NET December 2019.
- Mr.Munawwar K.V is currently pursuing his final semester M.Sc. Computer Science in CUTN
- II year M.Sc. Student Mr. Munnawar K.V. (Regd. No. P181313) has cleared the NET examination held in 2019.

- We wish Mr.Munawwar K.V (UGC NET Roll no: TN0205207616) all the very best for his bright academic and research career ahead.

- Project proposal submitted by II M.Sc. students got sanctioned. Details are as follows:

Project Title: A Study and Development of Mobile App for Fisherwomen in Nagapattinam District to Reduce Complexities for Selling of Fishes

Funding Agency: TAMILNADU STATE COUNCIL FOR SCIENCE AND TECHNOLOGY, DOTE Campus, Chennai-600025

Scheme Name: STUDENT PROJECT SCHEME 2019-2020

Sanctioned Amount: Rs. 7500/-

Students involved:

- K. Ahalya
- Gangapatla Mounika
- V.S. Arjun Raj
- P. Pasupathi

FUN STUFF!