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JSS SCIENCE AND TECHNOLOGY UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING



LINUX CAMPUS CLUB



CONNECT

Volume 12
FOSS CAMP EDITION
NOVEMBER 2019



CONNECT

Volume 12

“Simple can be harder than complex: You have to work hard to get your thinking clean to make it simple. But it is worth in the end because once you get there, you can move mountains.”

- Steve Jobs

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Message from the Principal

It gives me immense pleasure to note that, Linux Campus Club is organizing Foss Camp from 3rd to 8th November and technical event, Hackelite on 9th and 10th November 2019.

Linux Campus Club has been engaged in creating intellectual man power by organizing several workshops and invited talks on cutting edge technologies.

It is also providing a platform for industry based skills. The Linux Club has grown into a mature body by applying collective wisdom of its team in solving complex problems.

I congratulate the Linux Campus Club and wish all the best for their future endeavors.

- Dr. T N Nagabhusan
Principal and Dean (Engineering and Technology)
JSS Science and Technology University

Message from the Chief Mentor

I am filled with pride and delight to oversee the enthusiastic use of the Free and Open Source Software (FOSS) by the student-members of the Linux Campus Club (LCC) under the Department of Computer Science and Engineering, for a multitude of productive purposes.

Since its origin in 2004, the LCC has shown rapid growth, becoming the focal point of open source activity on campus, evidenced by the rising membership, a flurry of technical and related programmes organised, and the overall popularity among the student community.

The LCC 'Connect' magazine serves as a valuable medium for promising students to connect with the FOSS ecosystem. I encourage students to write and review articles, discuss and debate ideas among peers, and thereby contribute to the synthesis of knowledge which would be a fitting tribute to the open source movement.

My warmest congratulations to the editors and the entire team of the LCC Connect magazine. I wish the best for FOSS Camp 2019 and the LCC.

- Dr. M. P. Pushpalatha
Head, Department of CS&E
JSS STU

From the Editor

Linux Campus Club, in its sixteenth year, has come a long way since its initiation in 2004 by a small group of students passionate about creating awareness about Free and Open Source Software (FOSS). Being one of the most popular technical associations in the college, it has thrived to reach its potential. We have seen great response and active participation from the students in all the events and competitions held.

FOSS CAMP '19, our annual technical fest, provides a platform for enthusiastic students to explore, participate and gain insights into open source and experience the joys of programming.

We are thrilled to present you CONNECT '19, our yearly magazine, aimed at showcasing the developments in the world of technology and FOSS to the students.

"Alone we can do so little, together we can do so much." --Helen Keller

Thus, the success of LCC in all its endeavours is largely due to the efforts and hard work of all the faculty mentors, team members and volunteers, who have strived hard to help LCC achieve its goal.

We would like to sincerely thank our Head of the Department and Chief mentor, Dr. M. P. Pushpalatha for providing immense support and guidance throughout our journey.

I am extremely grateful to everybody who has contributed and supported me in successfully bringing out the CONNECT magazine.

Wishing everybody the very best in life!

- Shripriya Bhat
7th Sem, CS&E
Editor of CONNECT '19
Linux Campus Club

CONTENTS

1. Social Security Fraud and Machine Learning	1
2. Open source: Issues of concern	2
3. The First Lady of software	3
4. Security or Surveillance?	
What's the "Going Dark" debate about?	5
5. Virtual Reality	8
6. Entrepreneurs - Challenging the unknown	9
7. How Artificial Intelligence can create more job opportunities?	11
8. The Digital Era	13
9. Cyber security	14

1. Social Security Fraud and Machine Learning

- Dr. Anil Kumar K.M,
Associate Professor,
Dept of CS&E

Data-driven social security fraud detection has been given limited attention in research. Recently, social schemes have seen significant expansion across many developing countries including India.

United Nations and Governments across the world are committed to eradication of poverty by 2030. It means people who are poor and vulnerable will have equal rights to economic resources, basic services etc. For instance, Government of India has come up with a number of social welfare schemes like Deen Dayal Antyodaya Yojana (DAY), Atal pension Yojana, Midday Meal Scheme etc.

One of the world's largest food securities schemes introduced in India is called Targeted Public Distribution System (TPDS). It was set up in 1997 by modifying the previously Universal Public Distribution System (PDS) for the benefit of the people who need the most. The Government of India classifies all the families based on their income levels into Above Poverty Line (APL) and BPL (Below Poverty Line) classes to avail the schemes. The income tax department issues income certificates to determine whether a family belongs to APL or BPL category. Majority of the social schemes introduced by government are focused towards upliftment of families coming under BPL.

Unfortunately the methods followed by the government to issue income certificates have a lot of drawbacks. There is a lot of inconsistency in records maintained by the departments. Quite a number of families are excluded and misclassified due to various reasons like fraud of government officials, inadequate information, lack of awareness etc. It is possible that the families belonging to APL can submit false income certificate and avail benefits of social schemes. These abusers of social schemes will deprive the benefits reaching to the right and deserving recipients. Although fraud is considered an illegal offence and morally reprehensible, it is unfortunate that the prevalence of fraud in social benefit schemes is rampant and a significant challenge to address.

According to TII-CMS India corruption study 2007 report, nearly 3.5 million BPL households paid Indian Rupees 1,224 million as bribe. There is a need to develop automatic methods to address this problem and make sure these schemes reach to the actual beneficiaries.

Government of India is providing a unique ID to all citizens of the country called Aadhar Card issued by the Unique Identification Authority of India (UIDAI). The Government is making it mandatory to link this unique ID to all the administrative functionalities such as our Mobile numbers, Bank Accounts, Ration Cards, Permanent Account Number (PAN) Cards etc. Hence, it won't be possible to hide bank details from the government in the future.

Fraud Detection involving credit card fraud, banking fraud, insurance fraud, etc, is a very well established problem. However, the type

of fraud discussed is different and needs to be addressed by the nature of transactions carried out by the beneficiaries to wade out the abusers of social schemes.

Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it to learn for themselves.

The process of learning begins with observations or data, such as examples, direct experience, or instruction, in order to look for patterns in data and make better decisions. The primary aim is to allow the computers learn automatically without human intervention or assistance and adjust actions accordingly.

Machine learning techniques can play an important role in identifying economic fraud plaguing government and other institutes in developing and underdeveloped countries. For instance, it can be used to effectively classify the beneficiaries as BPL or APL using bank transaction data and identify genuine beneficiaries and abusers of social welfare schemes and for effective management of schemes. A combination of techniques can also be employed to detect the other economic frauds with high accuracy.

2. Open source: Issues of concern

- Prof P. M Shivamurthy,
Assistant Professor,
Dept of CS&E

Software development has taken a new facelift ever since the advent of open source technology. The term “open source” has led to many issues of debate in the software industry. There are as many pros and cons as well, which are still a matter of serious thinking. Almost after a decade of its growth in the field of software system development, still there are many issues which are unknown or either ignored by many young developers.

The feel of freedom is the real essence of open source technology. It has been celebrated and to be continued, leading to a great threat to the proprietary ownership. It has been a privilege for the developer to own the rights of implementing the great ideas and contribute towards an improved solutions to many of the problems. This is also an advantage for the end users to use those solutions free of cost. This has been growing in a huge way to sideline the proprietary ownership and may even eliminate them. The major players, who develop and deliver proprietary licensed software are struggling really hard to succeed and survive and few are really there.

Here comes the issues, how are they still be able to survive in spite of free software revolution. Are the users are still ready to spend on licensed software, when there is

free software available? If yes, Why? Is there any lacuna in the open source systems?

Open source systems are made available to the developer or user free of cost to allow them to create or customize the systems as per their needs. Many software industries are existing since many years and have given life to the field of software development and all are basically driven by business needs. The survival is mainly based on their business rating in major stock exchanges. This has led to proprietary ownership on their products and a competition leading to customer attractions. These business firms focus mainly towards customer satisfaction. An open source developer may not need to please the customer rather portray his talent. The customer needs are really not focused in open source technologies. Hence many solutions remain a failure and a lot many become a piece of junk code.

Thinking along these lines, the open source technologies are neither attracting the customers nor are they making business. A completely open source based firm cannot raise their revenues and may not be able to sustain longer in the business world. A reduced business may lead to reduced fiscal growth of the overall software industry leading to an imbalance in the global economy. Hence it is time to think towards industrializing the open source development along the lines of linking customer satisfaction under focus.

This will lead to deployment of suitable regulatory system in the field of open source development. A proper set of business guidelines need to be brought in and a strategic way of controlling and managing open source software development has to be established. This will avoid dirty hands

destroy the integrity of the open source and stop becoming a piece of junk code.

Let the open source systems be regulated and controlled by certain standards and focus on end user needs to contribute towards global economy.

3. The First Lady of software

- Ramya Krishna K,
5th Sem, CSE

“You don't manage people, you manage things. You lead people.” - Grace Murray Hopper



Technology is undoubtedly one of the most important parts of our lives. All of the technology we have today is built from years of dedication and untiring efforts of thousands of people. Despite this technology governing almost every aspect of every day of our lives, we forget to give credit where it

is due. One among many such pioneers in computing is Grace Murray Hopper.

Hopper was recognized as a computer scientist and a United States Navy rear admiral. But she was much more than that. She is called '*the grandmother of computer programming*'. It is said that she taught computers to talk!

Initially in her career, Hopper worked as a Math professor at Vassar College with three Math degrees under her belt. Funnily enough, when she applied to the same college to study years before she was employed there, she was rejected!

In 1952, she revolutionised programming. Hopper is responsible for writing one of the very first programming languages. She, along with her team, invented the first ever compiler - a program that converts worded instructions into binary language that can be read by computers. Every programming language that came afterwards was built on her work. Programming as we know it, is literally owed to her.

"Nobody believed that I had a running compiler and nobody would touch it. They told me computers could only do arithmetic.", expressed Hopper in one of her interviews.

When World War II broke out, she wanted to help her country. She joined the WAVES program, that accepted and trained women volunteers for emergency services. There, she was put to work on the Mark series of computers of Harvard.

While working on the Mark II, Hopper discovered an unexpected glitch. A computer she was working on shorted out without any explanation. Later, it was found that the issue was due to a moth stuck in the

hardware. The bug was removed, and hence the term '*debugging*' was coined.

Hopper is called '*The mother of COBOL*'. In 1959, she worked along with a group of people and came up with a new computer language, COBOL.

The list does not end there. She was also responsible for the constant pressure within the industry to make computers and computing more accessible, and to bring the research & career interests of women in computing to the forefront.

In one of her interviews, she was asked about her opinions on the computer revolution. "... we're only at the beginning. We're at the preliminaries. We've got the Model T, that's where we are now", she said. She recognized the potential of technology back when the general public found it very hard to believe that there could be any further advancement in computing and technology.

She has, through sheer conscientiousness, achieved much more than that which deserves our awe and respect. Her list of accolades is, by no metric, a short one. Despite all that, when asked which of these she was the most proud of, she said and I quote: "All the young minds that I have trained."

4. Security or Surveillance? What's the "Going Dark" debate about?

- Shripriya Bhat
7th Sem, CSE

The last few years Hollywood has taken a liking to Hacking. Security and surveillance have featured heavily in films and TV series. Ranging from Snowden to Mr.Robot, they have addressed the ongoing debates about surveillance, privacy and anonymity on the Internet, while touching the fundamental, also controversial, issues consisting of the various practices of government institutions monitoring its citizens in the name of security, thus portraying it both as a necessity and at times a threat to freedom and liberty of people.

In the pilot episode, Mr.Robot says, "People don't know how vulnerable they are." And this is true, in a society where every last detail of people's lives is captured and shared online, our data has become a much-coveted commodity. Governments monitor our phone records and WhatsApp threads, corporations sell our interests and search records to the highest bidder, and – somewhere in the murky and deep corners of the internet – a dark army of phishers, spammers and general hackers lies in wait, ready to steal our credit card details or leak our darkest secrets to the wider web.



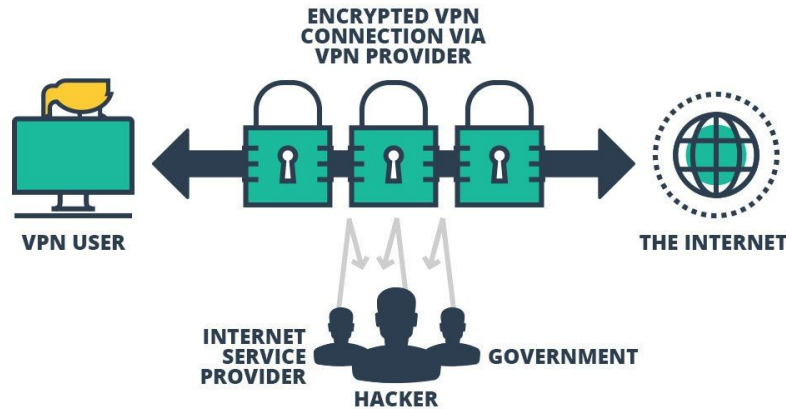
In this article, we will first look at how important encryption is, and the value of anonymity on the web. Later we will examine the "going dark" debate, how is the dark web related to all this, and examine the law enforcement's challenges in investigative measures. Then conclude with ways that we can protect ourselves, because in the end, the Internet and our smartphones are a window into our entire life - a slice of our identity.

Encryption and maintaining anonymity.

Encryption is the process of scrambling information, making it unreadable in order to protect it from unauthorized access. In today's world of computers and networks, the value of encryption cannot be overstated. Simply put, encryption keeps you protected. Any weakness in encryption can be exploited.

End-to-end encryption is being used to describe situations in which information is being encrypted at the end points of a communication channel, and only the original sender and intended recipient possess the keys necessary to decrypt the message. In other words, the information is not capable of being read by anyone who sees it traverse a network between the sender and the receiver. Similarly, in device encryption keys exist only on locked devices

HOW A VPN HIDES INTERNET BROWSING ACTIVITY FROM PRYING EYES



which prevents the contents from being read by anyone who does not possess the keys/passcodes.

Everything that you do with the modern day communication devices leaves a digital trail. And this trail is followed intensely not just by giant corporations and hackers, but also by governments and their security services. As a result, online anonymity is now much more difficult than before, and looks to become less and less achievable.

The crucial question here is can anonymity online be saved? To make anonymity real, there is a lot to be done. Starting with encryption, changes in the existing laws to a deeper understanding of what privacy really means and why it matters.

“Going Dark” and the Dark Web. Who exactly are you hiding from?

So the real problem here is are we okay with the breakdown of our privacy, simply because non-wired life is mostly unimaginable to a lot of us, and the loss of privacy seems unavoidable. Social media sites are busy collecting information and

building profiles on people. The data is out there, easily available, and the government is powerful enough to get what it wants.

Law enforcement has the legal authority to intercept and access communications and information according to court orders, however it often lacks the ability to do so because of the current and emerging technology. This scenario is called “Going Dark” - where the law enforcement agencies are not successful in tracking your activities. Going dark poses a major problem for the intelligence agencies across the world, and they have been a vocal regarding the issue. The use of surveillance technology in governmental institutions has been a controversial practice, but in their defence, they need surveillance to detect serious threats to society, like terrorist attacks and crimes. So it all comes down to how much surveillance is too much?!

How does the dark web fit into this?! Anonymity is the link. In our society, people are starting to respect and value their privacy. Slowly but surely.

Hence going dark is becoming a necessary answer to the increase in surveillance and invasion of privacy.

Ways to encrypt your devices, stay safe on the Internet and maintain your privacy.

The internet has changed our lives in a number of positive ways, but it also has a dark side. Personal privacy has been lost, leaving you at risk from cyber criminals, commercial companies, government organisations and security agencies. There is no such thing as perfect security, but there are steps you can take to limit your exposure, keeping your activities and information safe and sound.

1. Secure your Devices

- Be mindful of every app you install as every app will ask for permissions to your phone's features or data.
- Forget password, think passphrase or use a password-management app like LastPass or 1Password.
- Avoid using services that require location information.

2. Secure your Messaging

- Use Encrypted Messaging Apps such as: Apple Messages, Signal, Whatsapp, Wickr Me.
- Encrypting your Emails can be tricky, as the contents can be kept private, but for the metadata, there isn't much we can do to secure it. Hence use paid services like FastMail or consider services that don't require you to handle private keys, such as ProtonMail.

3. Secure your Browsing and Internet Traffic

- Use the Tor Browser: It lets its users browse the internet anonymously by

bouncing traffic through multiple sources.

- Use a VPN.
- Use your phone's Data for better Security.
- Public WiFi Networks are a big "NO" : Remember, If you ever use a public network, like a Wi-Fi hotspot in a coffee shop or anywhere else, be extremely careful.
- Use HTTPS everywhere to enhance your security, which forces websites to use encryption by default.



Concluding Thoughts.

Bruce Schneier, a renowned cryptographer, computer security professional, rightly said, "The going dark debate is painted as a trade-off between security and privacy. It's not. It's a trade-off between more security and less security."

With more visibility, it's possible that we would be better protected. But it's a difficult choice to make.

Thus the "going dark" debate, or the "crypto wars" are far from over. Ultimately, you don't have to pick a side. But you will.

5. Virtual Reality

- Yashaswi G Sagar,
5th Sem, CSE

Have you ever thought of walking on the moon or living in a completely different real world? You'll probably never be able to do all these. But if virtual reality ever lives up to it's promise, you might be able to do all these things and many more without even leaving your home!

Virtual reality is something that allows us to *experience the impossible*. It is a technology which allows a user to interact with a computer-simulated environment, whether that environment is just a simulation of the real world or an imaginary world. VR is basically the key to experiencing, feeling and touching the past, present and future.

In a virtual environment system a computer generates sensory impressions that are delivered to the human senses. The type and quality of these impressions determine the level of immersion and the feeling of presence in virtual reality. Ideally information should be presented to all of the user's senses with high-resolution and high quality. Moreover, the environment itself should react realistically to the user's actions. The practice, however, is different from the ideal case as many applications simulate only a few senses.

Virtual reality is now well established in multiple industries and sectors, ranging from entertainment, communications and education to design, scientific research and defense. In a virtual world, we are inside an environment of pure information creating an illusion which makes us see, hear and touch

things which have actually never happened. An example is *oculus rift*. This is a history-defining 3D headset which lets us mentally feel that we are actually inside a video game. Similarly there are many other virtual reality devices like oculus quest, HTC Vive, oculus go, google cardboard etc.



Virtual reality isn't just for gaming - it's a technology that can make a real difference to our collective futures. Utilised in many fields like education, defense, medicine, entertainment, it can be used to train people for difficult jobs like making a parachute jump or carrying out a brain surgery. Surgical training through virtual reality interface would make for better-trained, better performing surgeons – something that's better for all of us! VR could also be an outlet for the disabled and otherwise housebound to experience what the able-bodied often take for granted, thus improving their quality of life. Though the promise of virtual reality has loomed large over the world of computing for at least the last quarter century, yet it remains largely unfulfilled. There is still a long way to go before virtual reality lives up to the fantasy it has created.

Like any technology, virtual reality has both good and bad points. It can lead to problems like losing track of reality, isolation and also

it can cause health issues like eyesight problems and nausea which can throw people off balance. Despite this, the potential ground breaking effects that loom behind this technology is uncanny. With the ability to save lives, act as a medium for business development and provide its users with endless hours of entertainment and discovery, the world should be pushing for an increased presence of this product. Though the disadvantages of virtual reality are minute in comparison to its wide benefits it is very important that those issues are addressed. However, the effects of virtual reality depends on how we use it. Overuse of anything leads to side effects! Thus, if utilized and controlled properly virtual reality can create wonders with its endless possibilities which would make a real difference to our collective futures.

6. Entrepreneurs - Challenging the unknown

- Meghanath Reddy,
CSE

Entrepreneurs are individuals who recognize opportunities where others see chaos or confusion. They are the aggressive catalysts. The passion and drive of entrepreneurs moves the world of business forward. They challenge the unknown and continuously create the future.

The word Entrepreneur is derived from a French word “entreprendre”, meaning “to undertake”. Today, an entrepreneur is an innovator or developer who recognizes and

seizes opportunities, convert those opportunities into workable/marketable ideas and adds value through time, effort, money and skills.



Myths of Entrepreneurship :

1. *Entrepreneurs are born, not made*

The idea that the characteristics of entrepreneurs cannot be taught or learnt that they are innate traits one must be born with. These traits include aggressiveness, initiative, drive, willingness to take risks, analytical ability, and skill in human relations. But however we can inculcate these qualities. So now a days Entrepreneurship had become a discipline, which can be learnt as other disciplines. Entrepreneurs can be developed through achievement motivation training.

2. *Entrepreneurs are not just thinkers but do-ers*

All visionaries start as thinkers and dreamers. It is the combination of both thinking and doing that makes an entrepreneur.

3. *Entrepreneurs are always inventors*

The idea that entrepreneurs are inventors is a result of misunderstanding and tunnel vision. Although many inventors are entrepreneurs, numerous entrepreneurs encompass all sorts of innovative activity. For example, Ray Kroc did not invent the

fast-food franchise but his innovative ideas made Mc Donald's the largest fast-food enterprise in the world.

4. Entrepreneurs are academic and social misfits

Historically, in fact, educational and social organizations did not recognize the entrepreneur. They abandoned him or her as a misfit in a world of corporate giants. No longer is a misfit, the entrepreneur now viewed as a professional role model.

5. Entrepreneurs must fit the profile

A standard entrepreneurial profile is hard to compile. The environment, the venture, and the entrepreneur have interactive effects, which may result in many different profiles.

6. All entrepreneurs need is money

It is true that venture need captive to survive, it is also true that a large number of business failures occur because of lack of adequate financing. Failure due to lack of proper financing is often an indicator of other problems.

7. All entrepreneurs need is luck

Begin in "the right place at the right time" is always an advantage-But "luck happens when preparation meets opportunity" is an equally appropriate adage. What appears to be luck is actually preparation, determination, desire, knowledge, and innovativeness.

8. Entrepreneurship is unstructured and chaotic

Entrepreneurs are heavily involved in all facets of their ventures and they usually have a number of balls in the air at the same

time. Their system may seem strange to the casual observer, but it works.

9. Most entrepreneurial initiatives fail

Many entrepreneurs do suffer a number of failures before they are successful. They follow the adage "If at first you don't succeed, try, and try again". In fact, failure can teach many lessons to those willing to learn, and often it leads to future successes.

10. Entrepreneurs are extreme risk takers..... The Gamblers!

Risk is a major element in the entrepreneurial process. However, the public's perception of the risk most entrepreneurs assume is distorted. Although it may appear that an entrepreneur is "gambling" on a wild chance, the entrepreneur is usually working on a moderate or "calculated" risk. Most successful entrepreneurs work hard through planning and preparation to minimize the risk involved and better control the destiny of their vision.

Thus it takes capacity and willingness to develop, organize and manage a business venture along with any of its risks in order to make a profit which not everyone can do and succeed altogether.

7. How Artificial Intelligence can create more job opportunities?

- Shreyas Rao
1st Sem, CTM

The impact of AI and robotics on employment goes far deeper than just job creation. AI and subsequently robotics are niche technologies that demand an extensive understanding of every associated parameter.



The impact of artificial intelligence and robotics on employment opportunities has always been a topic of much speculation. When it comes to organising and manipulating data, processing complex mathematical problems and executing tasks in the blink of an eye, AI and robotics are the most preferred choices. As a result, AI has penetrated into almost every industry. From construction, transport, and manufacturing to business intelligence, education, and healthcare. It is, therefore, not surprising that many great figures, including Facebook CEO Mark Zuckerberg, who believes that not only can artificial

intelligence support and enhance existing jobs, but it can also create new roles.

A report generated by Gartner suggests that by 2020, AI would generate an estimated 2.3 million jobs. This figure was calculated by taking into account the 1.8 million jobs made simpler by automation. However, like any other technology, when it comes to domain skills, AI and robotics also require dedicated training courses. This has spurred the need for artificial intelligence courses, thus preparing professionals for a new wave of change brought about by innovations in robotics and artificial intelligence.

Requirements of new job roles:

The AI and robotics sector never fails to impress people with innovations. Tasks that used to be considered extremely complex until previously have now been rendered simple, thus giving professionals a broader space to focus on other tasks. In addition to this, the proliferation of AI techniques has yet another benefit. As the number of AI and robotics devices increase, so will the need for job roles to support and maintain their functioning.

As a result, there will be a demand for professionals who understand robotics and AI at every stage of the development cycle. This amounts to at least a two-thirds increase in the current job scenario. In a recent study conducted by Capgemini, nearly 80 percent of the 1,000 organisations who implement artificial intelligence have stated that they would be hiring AI and robotics professionals for new job roles.



Requirement for trained professionals:

As I mentioned earlier, the impact of AI and robotics on employment goes far deeper than just job creation. AI, and subsequently, robotics, is niche technologies that demand an extensive understanding of every associated parameter. Consequently, there is a massive demand for performing micro tasks like data analyses and virtual imaging, which require a significant level of expertise. This means that there is an ever-growing market for professionals who can perform these tasks, as evident by the rapid popularity of artificial intelligence courses.

According to industry estimates, the year 2017 faced significant labour shortages in the technology sector. So much so that for 500,000 open developer positions in the U.S alone, there were less than 50,000 computer graduates to satisfy the demand. A survey conducted by Sales force Research stated that 52 percent of IT recruiters faced a significant skill gap in their organisations. Judging by these trends, in the current era of business improvement that is dominated by AI and robotics, there would be even more demand for skilled professionals. Hence, this is as good a time as any to invest in artificial intelligence courses to fill in the ever-increasing demand for skilled professionals.

Innovative job roles:

In a study conducted by Michael Page on professionals about the impact of AI and robotics in their industry, the majority of survey takers were looking forward to AI generating more innovative and exciting job roles. Interestingly, these professionals were not just limited to the IT industry but were working in the fields of manufacturing, marketing, finance, sales, and accounting. Advances in AI and robotics will enable machines to efficiently and quickly perform more mundane and time-consuming tasks, thus allowing professionals to take up more innovative job roles. Examples of these innovations are already available in the form of driverless cars and automated healthcare assistants, both as a result of advancements in AI and robotics. Propelled by these innovations, industries would hire more highly skilled people to invent, develop, and maintain allied and complementary products.

Training, research, and development:

As with every other technology, AI and robotics will flourish only through innovation. When assessed from a macroscopic viewpoint, the industry is still at a fledgling stage, and much is yet to be discovered and implemented. This brings to focus the next layer of employment opportunities in AI and robotics, that of research, development, and skill enhancement. Some positions are already in demand by some of the leading tech companies for roles of AI trainers, data scientists and architects, statistical modelling, machine learning, computational intelligence, psychology, mathematics, neuroscience, and linguistics.

As robotics advances to more and more areas of human intelligence and tasks, research and development to better perfect robotic models are very much in demand. Firms who are investing in AI and robotics are always on the lookout for experienced professionals in their R&D department who can perform research and drive innovations in their existing prototypes.

To conclude:

The future of most industries is dominated by optimisation of robotics and AI. Workplaces will become more efficient, and the way enterprises conduct their businesses is undoubtedly expected to change for the better. It is, therefore, as perfect a time as any for AI and robotics professionals to anticipate how these technologies will impact more employment opportunities. As opposed to the fear of machines taking over jobs, AI and robotics are instead poised to create new and more exciting job role, thus significantly improving the employment prospects of people in not just IT, but in almost every industry.

8. The Digital Era

- Jayesh Jain,
1st Sem, CSE

It all commenced with a smartphone in hand and guidance of its usage.



Surely, the motive wasn't to involve in digital abuse nor digital accuse but for digital use.

As they said the sphere got smaller, we got attached to millions of hearts and minds!!! A million stories came ahead and we explored the one we adored, shared the one we could connect and that's how we started to grow substantially. Substantial development is what many countries are hunting for!

There is development in a particular region only when there is a real cause and a proper solution for them.

Problems were exposed online, fruitful mind gave cures. It takes a lot to make these cures an existence, but for sure it will happen soon and the world will roar.

Lately, Digital Era emerged with *social media*!

The more dramatic hearts in the present world are due to the usage of social media :(It's because many lack the proper awareness

of Social Media and it's practice. Social media is more of influencing a person's beliefs by comparing one's lifestyle with others. The one who doesn't start comparing himself stands out of this race because it's meant to showcase your creativity that is nurtured in a regular ingredient.

Several talents got a platform to rise and to ace. Take your time, there is no need to pace. Art grows with consistency, not speed.

The person with a hurry mind might miss the deliciousness of life. You are in a world of increasing knowledge. There is so much to learn together than to fight single-handedly. Ultimately, your knowledge and its utilisation drove you apart! There is a saying " If you don't update your knowledge today, you're outdated tomorrow".

You come jointly and share your opinions.

Some criticise by saying “awful” and some by even fair, it differs with individuals but surely it develops us to face the society that is made of analysts and reviewers.

But to be recalled 'Never let anyone blow your self-esteem and consider yourself accidental to have someone who helps you to prosper it'.

Lastly, you need to rise till you fall and again rise.

9. Cybersecurity

- Thursday,
5th Sem, CSE



We all live in a digital era where millions of resources are shared in milliseconds. Just by one search on your search engine, you will be able to get any required information on the internet. Somewhere at one corner of the world, someone might be trying to hack into servers of an organization to steal documents, personal information or even money which can happen within seconds. Many organizations invest in security and prevention of cyber attacks. There are different bodies that provide security to organizations, be it an anti virus software or a firewall.

Software and Frameworks used :

- *Kali Linux*, a Debian-derived Linux distribution designed for digital forensics and penetration testing.
- The *Metasploit Framework*, a Ruby-based, modular penetration testing platform that enables you to write, test, and execute exploit code. The Metasploit Framework contains

a suite of tools that is used to test security vulnerabilities, enumerate networks, execute attacks, and evade detection.

- *Ghidra*, an NSA software used for reverse engineering, made available as an open source software in March 2019. It helps analyze malicious code and malware like viruses, and can give cybersecurity professionals a better understanding of potential vulnerabilities in their networks and systems.
- *Nmap*, a free and open-source network scanner. Nmap is used to discover hosts and services on a computer network by sending packets and analyzing the responses. Nmap provides a number of features for robing computer networks, including host discovery and service and operating system detection.

studying it we are able to help this evolving world. For example, after collecting specific data related to weather and climate of an area and studying it for years, it has helped immensely in weather forecasting and taking preventive measures in tackling natural disasters in that area. Some of the software used by data scientists or data analysts are as follows:

- *Tableau* is one of the software used for data visualization.
- *R* is a programming language and a free software environment used for statistical computing and graphics.
- *Python* programming language is also used for data science. It provides more of a general approach to data science.

Both Python & R are state of the art in terms of programming languages oriented towards data science.

Data Science



Either it's your data or their data, it will always be an important part of this digitized world. Data management is crucial as you can study it's behaviour and also analyze it. Not only your personal information is a data, but also data exists in many forms. By