DJCSI

PROTOCOL

VOL. 15

TESTIMONIALS

The CSI student chapter of our college has been working diligently to help the students gain exposure to the various technological advancements along with their regular academic curriculum. The success and the magnitude of these events highlight the tremendous growth DJCSI has undergone year after year. This is further highlighted by the fact that the committee was awarded the best CSI Student Chapter of India. I wish the DJCSI committee all the very best for their future endeavors.

DR. HARI VASUDEVAN
PRINCIPAL, DJSCE

Dear students, I am delighted to present the 15th edition of Protocol. Every year DJCSI committee gears up with new development in the activities that not only benefits students in the technological advancements but also provides an opportunity to explore the outside world with confidence. This year Protocol magazine throws light on various events organized under DJCSI, the insightful technical articles and the outstanding research projects that will definitely enhance the technical knowledge and inspire the students to a great extent. I would also like to take this opportunity to thank our Principal, Dr. Hari Vasudevan, Dr. A.C. Daptadar, Vice Principal (Admin.), Dr. Manali Godse, Vice Principal (Academics) as well as the faculty of IT Department for their constant support and encouragement.

DR.VINAYA SAWANT
DJCSI STUDENT BRANCH COUNSELOR
HEAD OF DEPARTMENT, IT

TESTIMONIALS

One cannot reject the fact that technological developments and marvellous innovations play a vital role in our lives. I would say that technology is the bridge that connects reality and fantasies. Technology is constantly transforming the world, and DJCSI aims to contribute to this change by expediting research and knowledge sharing. Being the Chairperson of DJCSI, I have had the privilege to play a part to the aim of DJCSI and represent DJCSI at the national level.

I am eternally grateful to our HOD and Branch Counselor, Dr. Vinaya Sawant, and our faculty at the Dept. of Information Technology. Their endless support, guidance, and motivation have enabled us achieve remarkable success.

It was a challenging time for all of us, and the transition from online to offline mode was arduous. Amidst these circumstances, DJCSI stood strong, and the team deserves all the credit. I would like to thank my beautiful team for their awesome cooperation and for sharing the same dynamics to execute the objectives of DJCSI. The team always reinforced and inspired me to push past the limits and realize DJCSI's goals. I hope that in the years ahead, DJCSI persists to delve into the technology world to explore, accomplish its mission, and ignite the budding engineers' passion for technology!

CHIRAG JAGAD
CHAIRPERSON, DJCSI

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DJCSI

INSIGHTS INTO TECH

India - The Next Silicon Valley?

WRITTEN BY KRISHA ASHAR (SE-EXTC)

"India is on the threshold of a big IT revolution. We are encouraging it to fast-track the services to our 1.25 billion people. New technology and renewable energy is our new Mantra. These initiatives provide additional avenues for investment in modern technology and human resources." – Prime minister of India

India has beautifully adapted to the complete digital outlook thanks to inventive innovations enabling feasible digital alternatives. Be it digital payments or net-banking, the country's home-birthed tech-solutions have made it possible for it to reach the masses.

One such innovation changed the path of India's digital payment systems forever. India's digital payments landscape has transformed dramatically over the past five years. Today, 40% of payments (by value) are digital, contributing to a US$3 trillion digital payment market. This was possible because of UPI or Unified Payments Interface. The primary idea of UPI was to bring the user's bank account onto their mobile phone screen. For this, the base requirement would be a bank account for every user. With the Indian government's JanDhan Yojana, this was achieved via Aadhaar authentication and KYC- the world's largest identification database. With this, India Stack came into existence. India Stack is a set of open API's (Application Programming Interface) that allow governments, businesses and start-ups to utilize the digital infrastructure to lead India to

a completely cashless economy. India Stack is the largest open API in the world. The largest identification database and open API with the governments StartUp India scheme give a fertile ground for up and coming start-ups. Several domestic technology start-ups are soaring heights. EasyGov is a cloud solution to help Indian citizens discover their eligibility for thousands of welfare/benefit schemes of the government. Megdap is a technology platform that offers AI-based language processing, digitisation and analysis, in all major Indian languages. Haqdarshak is a mobile and web technology platform which aims to deliver government and private schemes and services to eligible citizens. All these start-ups have innovatively leveraged the stack and used it to their advantage. While these are just few prominent examples, there are several others in their early stages.

The country is doing exceptionally well in several sectors, the IT sector being a top runner. It is the largest employer in the country and delivers over 3.4 million jobs every year. India has 1.23 billion mobile phones and 7,705 million internet users. Data consumption in India is among the highest and cheapest in the world. Data being equivalent to gold in this information age, India is a gold mine.

Initiatives are being made to create a centre of excellence of IoT and AI which will provide open labs and infrastructure to create and validate solutions from design to prototype. There is a presence of skilled manpower with India being home to 4.1 million IT professionals. This along with favourable government policies and rapid growing urban infrastructure in the country provide a conducive environment for global companies to set up offices and invest in India. India is a manufacturing hub along with being a vast consumer base. Cheap labour, vast population and the pool of talent provide for enough reasons for tech giants to set up manufacturing plants in the nation. This imparts employment opportunities and further boosts the technological growth.

Thus, with the exponential growth and digitization, India is looking at a scintillating future. Increasing digitization results in need for tech solutions and hence creates requirement for tech savvy recruits. India is being dubbed as one of the biggest tech hubs of the world. With a work force so strong and the IT economy boosting, and the government focus on enabling tech infrastructure and start-ups, the country is set to be the global innovation hub for future digital technologies. The government's 'Make in India' campaign has enabled tech giants like Apple to shift their factories to the country creating several job opportunities for technically skilled individuals. Apple is only the initiator of this shift from China to India. Whirlpool shifted it's production from China to India because of issues of "sudden hikes in supplier rates". There are innumerable examples to justify India as an obvious choice for MnC's.

Indian companies like Ola continue to build their infrastructure by setting up manufacturing units in the country itself. Ola recently set up the largest electric scooter manufacturing facility in the world. With companies like TCS, Wipro and Infosys leading the way, Indian tech companies are now tapping upon domains such as data analysis, cloud computing and IoT to software and networking to security and building path-breaking solutions. This conducive environment ensures amicability for all us budding engineers. Many of us dream of moving abroad for education and eventually relocation. However, with this consistent growth, India will be at par to all the

developed nations if not ahead of them in a span of a few years. The demand for technically skilled individuals is set to rise exponentially. With a constant threat to job losses and H1-B visa in USA, several Indians working there are considering return to India.

What we are witnessing at the moment is the formation of a new India, a digital India, a technophile India. The 'Make in India' campaign is clearly set to be a grand success and has made the country self-sufficient where most of the products are made in the country and by the country. India sets an example of what the globe has been hinting at since decades. Some even say, India is on path to become the next Silicon Valley! Being an engineer, clearly there is no place you should rather be!

INSIGHTS INTO TECH

Quantum Computing and its Applications

WRITTEN BY VIJAY HARKARE (SE-CS)

Computer systems have emerged as an inseparable part of everyone's life. Today, computers are used in almost every known field: aviation, banking and finance, various types of businesses, telecommunications, defense and military affairs, education, medicine, transportation, multimedia, robotics, modeling, and more.
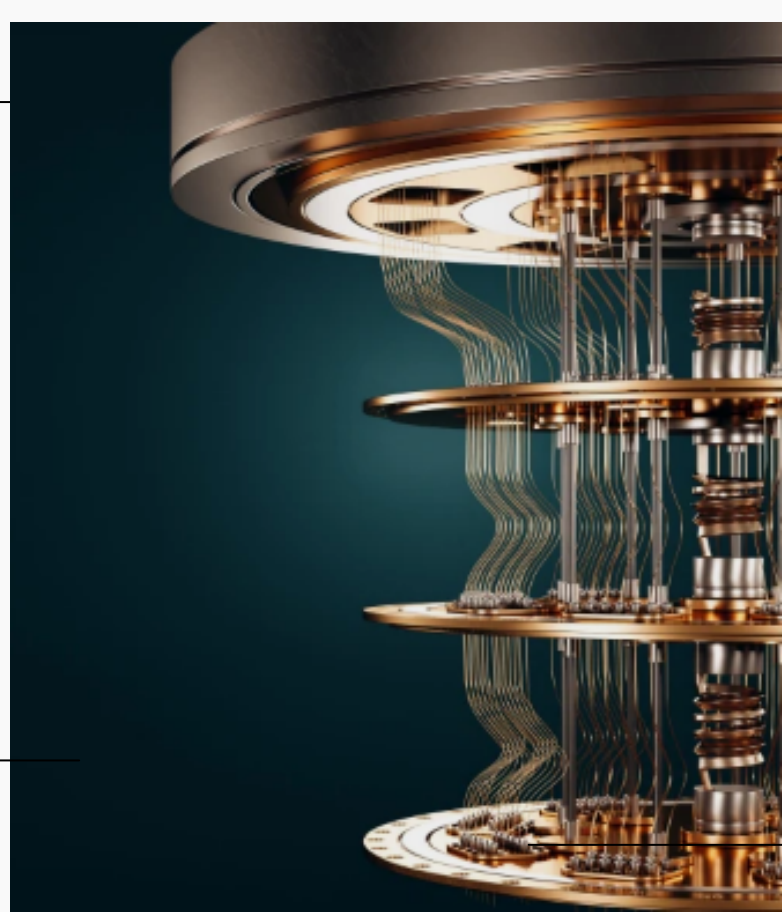
In the modern world of high-performance computing, there exist supercomputers. A supercomputer is a computational system with a higher degree of performance than a general-purpose or conventional computer. Still, supercomputers are struggling to solve problems of high levels of complexity.

Quantum computing is a type of computation that performs computations using the collective properties of quantum states, such as superposition, interference, and entanglement. Devices that use quantum computing are called quantum computers.

Quantum computers use qubits (CUE bits) to run multidimensional quantum algorithms.

Consider protein folding. Figuring out how proteins fold in the future is a very important issue in medicine and biology.

Supercomputers try to solve this problem by brute force. However, the number of possible combinations of folding with only 100 amino acid chains are about a trillion. No other computer in the world has enough RAM to handle so many individual folding combinations.

Quantum computers create multidimensional spaces in which patterns connecting individual data points appear. The desired pattern here can be any combination of folds that requires a minimal amount of energy to create.

Now, let's talk more about quantum computers.

The two most important principles used in quantum computing are superposition and entanglement.

- **Superposition:** Quantum laws say that particles enter a superposition of states and behave as if they were in both states at the same time. Each qubit used can take a superposition of 0 or 1.
- **Entanglement:** Quantum entanglement allows qubits that are separated by vast distances to instantly interact with each other (but not limited to the speed of light). No matter how far apart the correlated particles are, they continue to remain entangled as long as they are isolated. Taken together, quantum superposition and entanglement create massively increased computational power.

There are several types of quantum computers: quantum circuit models, quantum Turing machines, adiabatic quantum computers, one-way quantum computers, and various quantum cellular automata. The most popular models are quantum circuits based on the quantum bits, or "qubits", which are somewhat similar to bits in classical computing. A qubit can be in quantum states 1 or 0, or in a superposition of states 1 and 0. However, when measured, it's always 1 or 0; the probability of either of the two outcomes completely depends on the quantum state of the qubit just before the measurement.

Now that we have understood what quantum computers are and how they work, let us see their advantages over other computers.

- Quantum computers can perform calculations in a few seconds for which today's supercomputers would need decades or even millennia.
- Calculations with quantum computers are particularly promising wherever incredibly complex processes with huge amounts of data are to be analysed or simulated.
- Quantum computers could facilitate a much more in-depth understanding of the relationship between individual elements, particles as well as the processes within the living cells, along with their interactions.
- Taking AI one step further, quantum computers can safely take on the task of predicting and evaluating data in the future.

Now, let's look at the potential applications of quantum computers.

- **Crypto:** One of the notable uses of quantum computing is to attack cryptographic systems in use today. Quantum computers can use Shor's algorithm to break many modern cryptosystems.
- **Search Problem:** The best-known example of a problem that allows for polynomial quantum acceleration is an unstructured search that finds the specified element in a list of n elements in a database. This problem can be solved by Grover's algorithm using $O(\sqrt{n})$ database queries which is quadratically smaller than the $\Omega(n)$ queries required by existing conventional algorithms. In this case, the advantage is optimal as well as provable.
- **Machine Learning:** Some researchers have suggested that quantum computers could speed up machine learning tasks. This is

because quantum computers can produce results that conventional computers cannot efficiently produce.
- Computational Biology: Quantum computing has been instrumental in solving many biological problems. In computer genomics, quantumcomputing has significantly reduced the time it takes to sequence the human genome.

Now let's focus on AI applications of quantum computing.

Currently, artificial intelligence uses classical computers for its computation. However, this is limited by the limitations of conventional computers. Quantum computers can increase the processing power of artificial intelligence to solve more complex problems in a variety of fields.

Quantum computing together with artificial intelligence is called "Quantum AI". It takes advantage of the computational superiority of quantum computing, to achieve results that are impossible with conventional computers.

Some applications of Quantum AI are:
- Processing of large sets of data
- Effective and fast solutions to complicated problems
- Building better business models and providing better insights
- Integration of multiple sets of data

Quantum AI implementation has already started around the world.

Google Quantum AI is upgrading modern quantum computing and contributing towards the development of tools for extending the capabilities of researchers beyond conventional boundaries.

Some research areas in Google Quantum AI are:
- Hardware control system
- Quantum control
- Superconducting processors
- Physic modelling and analysis
- Quantum algorithms and applications
- Quantum error correction

Thus, we have seen how quantum computing can prove to be a revolutionary technology having wide applications in the fields of cryptography, medicine, biology, artificial intelligence, machine

learning, data science, etc. This could help solve problems that today's supercomputers cannot handle. It can also speed up current computing. There are many problems with the implementation of quantum computers, but they will undoubtedly play an important role in the upcoming years!

INSIGHTS INTO TECH

The Future of Mobility We Truly Need

WRITTEN BY OM THAKRAR (SE-IT)

There is a major, visible shift of interest towards EVs in the current automobile market. The general opinion is that we are witnessing the last iterations of the internal combustion engine but are electric vehicles actually good enough to make such a massive shift?

Buying an EV may give us the instant satisfaction of saving the environment but the battery will come to its end of life at a definite point. The industry is using lithium-ion batteries and millions of electric vehicles have already been manufactured. We do not have 100% environmentally friendly methods for disposing of or recycling these batteries. Even if we do develop a new method, recycling this huge number of batteries is a mammoth task, and the businesses that will carry out this procedure will require huge amounts of land, which we are already falling short of. Recycling of these batteries is also an economic obstacle. Most of the time, it is cheaper for companies that make batteries to buy new metals than to use recycled materials.

Countries like the US and China are spending millions of dollars just to advance research on methods of recycling these car batteries. Instead of changing the way a car works as a whole, it would be easier and better for the environment to just formulate different fuels.

Nitin Gadkari, Union Minister of India, plans to run buses, trucks, and cars on green hydrogen that would be produced using sewage water and solid waste in cities. He had initiated an ambitious project in Nagpur where the sewage water would be recycled. Nagpur sells its sewage water to a Maharashtra government power plant and earns around INR 325 crore a year. Every municipality has this wastewater, so there would be a huge supply of green hydrogen. All buses, trucks, and cars can run on this fuel. EVs can take up to 30 minutes to charge at the "fastest" charging stations. On the other hand, hydrogen fuel cell vehicles can be ready to go in minutes, irrespective of the type of fuel station.

As part of the plan to be Net Zero Carbon by 2030, Formula One (F1) and its global partner Saudi Aramco want to start using 100% sustainable fuel by the middle of this decade. They hope to then scale up production so that commercial motorists and the rest of the transportation industry can use these fuels.

These fuels would be 100% sustainable 'drop-in fuels', meaning there would be no need to modify the engines to run on them. The current generation of Formula One cars operate on "E10" gasoline, a blend of 90% fossil fuel and 10% renewable ethanol that is already widely available at gas stations throughout the world.

F1's sustainable fuels will feature an advanced component that comes from either a carbon capture scheme, municipal waste, or non-food biomass like algae, agricultural waste, and non-food crops. Most importantly of all, the new fuel will achieve greenhouse gas emissions savings relative to fossil-derived petrol of at least 65%.

Carbon capture is a method they are keen on because it takes the carbon directly out of the air. The technology can capture up to 90% of carbon dioxide released by burning fossil fuels in electricity generation and industrial processes such as cement production. It involves capturing carbon dioxide at emission sources, and transporting and storing it underground for centuries or millennia. Carbon capture is in its infancy but there are plants in a few places like Canada, Switzerland, and South America that are doing it. According to Pat Symonds, Chief Technical Officer of Formula One, such plants will be prevalent in 20 years.

Only 8% of the 1.8 billion cars predicted to be on the road by 2030 will be fully electric vehicles (Battery Electric Vehicles, or BEVs), leaving over 1.6 billion cars with an internal combustion engine.

What's more, a full life cycle analysis conducted by the Institute of Mechanical Engineers last year showed that over the course of its useful life, a BEV driven by renewable energy would produce emissions of 58 grammes per kilometre (including mining raw materials for the batteries, eventual disposal of the battery and so on). In comparison, a totally sustainable petrol-powered internal combustion engine car emits 45 grammes of greenhouse gases per kilometre.

The combustion of sustainable fuels does produce carbon dioxide as a by-product. However, the net amount of CO_2 produced is zero. CO_2 is extracted from the atmosphere, treated, and reintroduced.

EVs also come with the problem of a lack of repair scope. If your EV breaks down, your one and only option are to contact the manufacturer. Even after that, you still have a non-functional vehicle. If a combustion vehicle breaks down, any mechanic in the world can make it run. Tesla vehicles are at high risk for damage by rats and mice because the company uses soya protein in the engine wires and peanut oil as a lubricant. Consequently, "Tesla Rat Problem" is a frequent Google search

term. India is a country that always faces the rat issue in parking spaces, and this would increase the expenses of the owners. Mass-related efficiency trade-offs in EVs are also huge as compared to conventional cars. Heavier vehicles also result in increased road and tyre wear, which contributes to fine particle pollution. Small and light electric vehicles are therefore fairly good for urban settings but when you need a lot of power but don't want to take up a lot of room, EVs fall short. So, having an alternate fuel becomes crucial when dealing with huge cargo vehicles, trains, aircraft, and high-performance road cars.

If all consumers choose EVs, power demand will increase, necessitating a larger de-carbonized grid. As a result, the price of battery metals and other raw materials will see an upsurge, and so will the net cost of electric vehicles.

Instead of relying solely on technology to save us, governments should adopt fleet-efficiency norms for electric vehicles, just like the Bharat Stage Emission Standards in India. Making electric vehicles that are truly energy efficient should be the priority instead of simply converting every model of a traditional combustion vehicle to run on electricity. Governments and leaders of the automotive industry should talk in-depth to discuss which modes of transport should be electric or combustion-based. Once that decision is made, research needs to be done in the right areas instead of just following the trend of EVs. Once the industry shifts its focus to alternative fuels, the "sustainability" project will become more holistic and transform into reality sooner.

INSIGHTS INTO TECH
The Villain Parole

WRITTEN BY YASH BRAHMBHATT (SE-IT)

Data breaches concerning cyber security have led to many large scale disasters.

It is very important for everybody to be aware about the threats they impose and the importance of maintaining minimal digital imprints.

Some of the highlighted events resemble the danger that many known fictional villainous characters have imbibed as their character. Defining the intriguing analogy to these villains, the well known data breaching episodes get their character and epitome of threat that they impose.

Having seen the great villains in movies, tv shows and comics, this can be a way to relate them in real life.
With great power comes great responsibility...

The Joker
The breach faced by the US government can be mocked by using the tagline of JOKER, "Why so serious?"

The SolarWinds hack is the ordinarily utilized term to allude to the production network breach that elaborate the SolarWinds Orion framework.

In this hack, the involved country state hackers have been recognized as a gathering known as Nobelium by Microsoft and frequently known as the SolarWinds Hackers by different researchers.

The hackers utilized a technique known as an inventory network assault to embed vindictive code into the Orion framework. A store network assault works by focusing on an outsider with admittance to an association's frameworks instead of attempting to straightforwardly hack the organization.

The outsider software, for this situation the SolarWinds Orion Platform, makes a second passage through which hackers can get to and imitate clients and records of casualty associations. The malware could likewise access framework documents and mix in with real SolarWinds activity without being found out, even by antivirus software.

SolarWinds was an ideal objective for this sort of store network assault. Since their Orion software is utilized by numerous global organizations and government offices, all that the hackers needed to do was to introduce the pernicious code into another clump of software circulated by SolarWinds as an update or fix.

Dr Octopus
The hacking of accounts of famous personalities on Twitter can be related to Dr Octavious who destroys using his multiple arms...

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On July 15, 2020, cybercriminals hacked Twitter's frameworks through social designing to send Tweets from high-profile accounts, including Joe Biden, Barack Obama, Bill Gates, Elon Musk, Warren Buffett, Kanye West, Apple, and Uber, to give some examples.

Twitter is alluding to the episode as a "phone spear phishing assault" yet is obscure about the details of how cybercriminals penetrated the social organization's frameworks.
One should be most likely acquainted with a phishing assault, where cybercriminals convey a "ridiculed" message (at times a call) empowering the casualty to click a connection or offer delicate data.
In a typical phishing assault (a sort of social designing), crooks will send these messages all at once and see who "bites". There's no particular objective.
A spear phishing assault is undeniably more complex and targeted. Cybercriminals research an individual or an association to track down weaknesses.

The hack was the after-effect of the meticulous examination that Graham Ivan Clark, of age 17 at the hour of assault and the other two hackers did into Twitter employees. They began by scratching LinkedIn looking for Twitter employees who were probably having access to account-holder devices. The hackers then utilized the features LinkedIn makes accessible to work enrollment specialists to acquire the representatives' mobile phone numbers and other confidential contact data.

The attackers called the representatives and utilized the data acquired from LinkedIn and other public sources to persuade them that they were approved by Twitter faculty. Work-at-home plans brought about by the COVID-19 pandemic likewise kept the representatives from utilizing ordinary techniques, for example, face-to-face contact to confirm the personalities of the guests.

Ultron
The unethical exposure of a user's genes, leading to the identification of other family members can be related to the threat faced if Ultron gets to know the genes pattern, he would destroy everyone related, fulfilling his dream of ending organic life on Earth and destroying humanity in particular.

GEDMatch is a site that allows clients to track down family members and progenitors by uploading their DNA. It's well known for having driven specialists to the Golden State killer in 2018. However, following that occasion, the site offered clients the ability to quit imparting information to regulation enforcement.

Then, on July 19 and 20 2020, GEDMatch experienced two information breaches, in which hackers reset client protection settings, so every individual who had opted out of imparting their information to law enforcement was automatically picked back in.

The organization shared that the assault was "coordinated through a refined assault on one of our servers by means of an existing client account." Days after the fact, MyHeritage, another genealogy site, detailed that its clients were being mailed in a designated phishing campaign. The main impacted clients were the individuals who additionally had GEDmatch accounts, showing that the attackers didn't simply change security settings; they stole information. Some have hypothesized that the hackers had a philosophical motive as opposed to a financial rationale, considering how explicit their objective appears to have been.

There are numerous ways yet unknown, using which, such daunting events can occur. The best practice which can aid individuals, as well as institutions, is to be aware of the data that they are publicizing. Prevention being taken care of can avoid large-scale threats and unprecedented incidents. A data breach is just one of the myriad possible manners of being held at stake while on the internet. Learning from the occurrences in the past and avoiding weak data security measures, the internet will become tesseract in the right hands ;)

INSIGHTS INTO TECH

Artificial Intelligence in Healthcare

WRITTEN BY PRATHAMESH NAYAK (SE-IT)

Everyone knows what Artificial Intelligence is. Ever since its foundations were laid back in the 1950s by Alan Turing (widely regarded as the father of AI, portrayed in cinema by Benedict Cumberbatch), the field has been growing exponentially and has expanded into practically every domain, from the stock market to dating apps. One of the most important domains it has influenced is Healthcare. From the dawn of mankind, man has strived to find better ways to treat himself and others. We've come leaps and bounds from the Stone Age when humans believed in witch doctors and shamans. Researchers have been trying to make doctors' jobs easier and artificial intelligence plays a huge role in this.

The very first influences of AI in the healthcare industry can be felt back in the 1970s. Not long after, the Artificial Intelligence in Medicine international journal was founded and in 1980 the American Association for Artificial Intelligence was established with a subgroup on medical applications. AI was incorporated into clinical settings very quickly after that.

The rate of progression of AI in healthcare has been exponential since. According to a study, AI in medicine was valued at $719 million globally in 2017. This figure is projected to be $18.1 billion with a growth rate of 49.6% by 2025.

You might wonder, how exactly is AI implemented in healthcare? Well, the possibilities are endless.

Artificial Intelligence is bringing about a paradigm the shift in the healthcare industry.

AI can help in various sectors of the healthcare industry:

- AI can analyse complex medical data and improve the efficiency of drug discovery. It can also help manage clinical trials without approximating human cognition. This can overcome lots of problems like inflation, scarcity of workers, etc

- Automation of redundant tasks like filling up and maintaining patient documents. Microsoft research scientists have introduced a model for predictive form filling called the Collaborative and Contextually Frequently Used (CCFU) model.

- In radiology, to quantify specific radiographic characteristics, such as the 3D shape of a tumour or its intratumoral texture and distribution of pixel intensities. It can also have an impact on radionics, clinical biobanks, clinical decision support systems, structured reporting and workflow. Convolutional Neural Networks are used to study the images.

- In cancer detection: Microsoft's Hanover Project is a real-life implementation of AI in cancer research. A team of researchers is using machine learning and natural language processing to help the world's leading

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oncologists figure out the most effective, individualised cancer treatment for their patients by providing an intuitive way to sort through all the research data available. They have done so by combining deep learning and probabilistic logic, and have managed to achieve a decent amount of success. Research scientists have come up with a method called self-supervised self-supervision (S4) to automatically propose self-supervision.

- Drug selection: Training a neural network with the results of past attempts can rule out the need to test every combination. It can guide new treatment discovery processes and speed up the drug selection process. Drug development as of today requires an average of 12 years of development and a $2.16 billion investment for each drug eventually made available to the patient. AI will help to reduce the cost and time tremendously. The neighbour recommender method along with ensemble learning algorithms are used here.
- Remote patient monitoring: Patients with cardiovascular and neurological disorders have increasingly benefited from the use of telehealth in remote monitoring. Since there is a pressing need to reduce morbidity and mortality of these diseases, the preference for remote patient monitoring will remain the same in the future. The adoption of AI is boosting the revenue streams for the players in the remote health monitoring market. Support Vector Machine (SVM) and Artificial Neural Network classifiers with physiological datasets from wearable devices can be used for remote patient monitoring.

The AI and machine learning technologies used in the healthcare domain are endless, but a few famous ones like Image Processing and Natural Language Processing are the most commonly used.

Machines can be taught to recognise and analyse images in much more depth than the human eyes and brain can. The technology used for this is called Image Processing. Many open-source libraries like OpenCV, Visualization Library and VGG image annotator are available to perform computer vision and image processing tasks in python. Deep Learning algorithms like Artificial Neural Networks and Convolutional Neural Networks are applied to the image datasets and the accuracy, F1 score etc is calculated.

The models are modified until the accuracy score is high enough, and then they can be applied to the images sent by the doctor to precisely identify the tumour or whatever they are designed to recognise.

Artificial Intelligence has been of great help during the COVID-19 pandemic. From forecasting the spread of the virus to detecting if a person has the virus or not, AI is being used in every realm of the pandemic control effort. It has been used in prediction, tracking, contact tracing, monitoring of cases and reducing the burden on medical practitioners and healthcare staff. Another place AI is being used is in preventing the spread of misinformation, which has been rampant in recent times.

The future of AI in healthcare can include very simple tasks as well as more complicated tasks. Everything from answering the phone to reviewing medical records, calculating and analysing population trends, designing therapeutic drugs, scanning and understanding radiology reports, making clinical diagnoses and treatment plans, and even talking to patients will become automated.

We can conclude that Artificial Intelligence and Healthcare go hand in hand and this symbiotic relationship will only strengthen in the future. AI has been a boon for healthcare professionals and has reduced menial as well as major tasks for them and improved the accuracy of diagnosis. The fact that these machine learning models keep training themselves and improving with every piece of data fed to them means that their accuracy will grow exponentially, and eventually, doctors will be able to rely on AI to a large extent to help them with their job.

The Rise of ARM-based Processors -Is the World Ready to RISC It?

WRITTEN BY VAIRAG PARIKH (SE-IT)
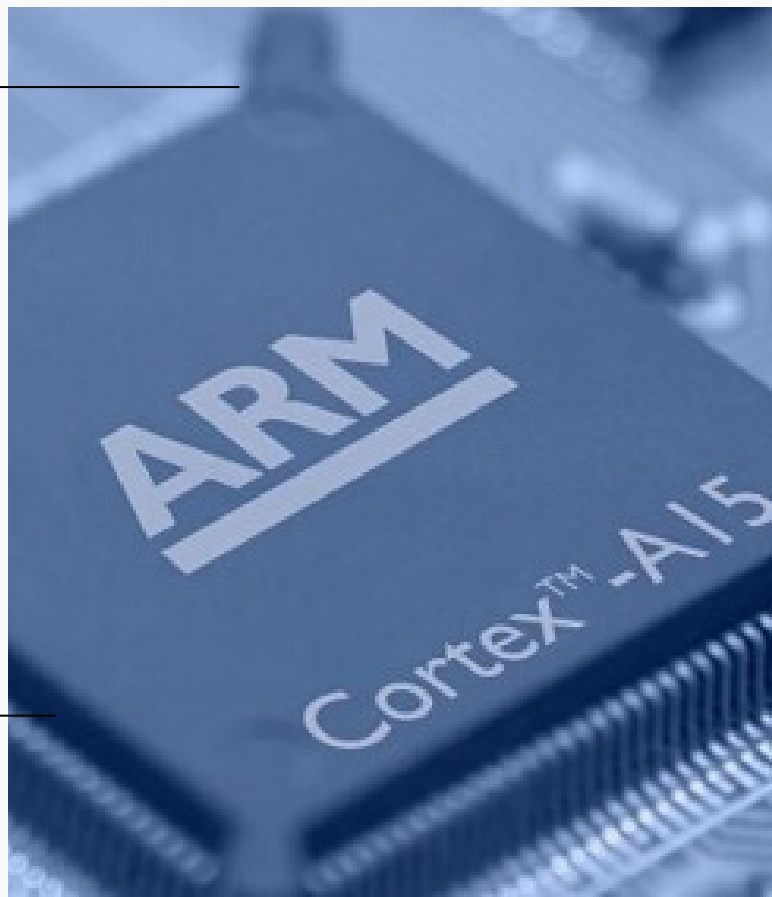
All of us are familiar with CPUs and their importance to computers. However, not all CPUs are created equal. In general, CPUs can be categorized according to their architecture. This aids in classifying the various CPU types according to their advantages, disadvantages, and software compatibility. The two main approaches to CPU architecture are as follows: processors with a reduced instruction set (RISC) and a complex instruction set (CISC).

One of the most ubiquitously used CPU architectures, x86, belongs to the CISC family. The 8086 architecture was the name given to it initially. It was originally a 16-bit architecture. It has recently been updated to handle both 32-bit and 64-bit, though. The Ryzen 5, 6, and 7 series from AMD and the Core i3, i5, and i7 series from Intel are all examples of x86 architecture or CISC architecture.

RISC-based ARM processors have so far remained a quiet player in the background. In your smart home, refrigerator, TV, washing machine, TV, microwave, RGB mice, keyboards, phones, both smart and dumb, servers, and other devices, you can find these processors. Today, ARM rules the globe, with x86 coming in a distant second. PCs, laptops, servers, and consoles all can run x86 but it is also gradually losing ground to ARM-based processors in these categories,

What are ARM-based Processors?

ARM stands for Advanced RISC Machines. Originally, these processors were preferred for low-level machines as they allowed for highly efficient, cheap, and portable devices. These would revolutionise the entire sector. The fact that ARM could be licenced was its standout quality. A specific corporation used X86 and its different iterations as its intellectual property. In essence, x86 is purchased, whereas ARM is licenced. Modern ARM processors outperform x86 processors because they are packaged, or System on a Chip (SoC). All three key pieces of computer hardware—a CPU, RAM, and storage—are covered by a single ARM processor. Components like RAM and storage must be installed separately on an x86 device. Consequently, ARM processors are incredibly effective, small, and power-efficient. In actuality, ARM-based CPUs power almost 95% of modern smartphones.

Apart from the technical advantages, ARM processors allow for a more streamlined and efficient manufacturing procedure as everything needs to be fabricated on the same silicon.

If an ARM is so popular, why haven't we heard of it?
This is mostly due to the fact that Arm LTD, the business that makes ARM chips, does not need to market itself or sell directly to consumers. Arm

LTD develops templates of different ARM processors, which businesses like Qualcomm and Apple licence to produce consumer-facing and successfully marketed goods. These businesses use licenced Arm Ltd. templates to manufacture their own CPUs. So even though you may not be familiar with the ARM Cortex A-76, you undoubtedly are familiar with the Apple M1 or the Qualcomm Snapdragon 888.

ARM-based processors are now beginning to gain popularity in computer-related markets as well. With the introduction of Chromebooks a few years back, it had already seen early adoption. ARM processors made it possible for great interoperability and power efficiency, which lead to longer battery life on ARM-based Chromebooks.

Why Did Apple's Entry Create Ripples in the Industry?

The most significant blow to Intel x86 came in November 2020, when Apple officially announced they would replace their entire Intel-based line-up with their custom ARM processors. The Apple M1 was instantly successful and welcomed by tech gurus and consumers. People were delighted by its performance, weight, and, most importantly, battery life and cooling efficiency. This was just a taste of what ARM processors could offer in the PC space. Slowly, Apple started phasing out Intel processors in all their MacOS devices, from their MacBooks to iMacs. Later, Apple shocked everyone by introducing their PC-grade M1 SoC in their iPad line-up. This basically made the iPad a really good alternative to full-fledged computers. This was possible due to M1 being an ARM-based processor. This is an excellent example of how ARM-based processors allow for easy compatibility. As of now, Apple's entire lineup of devices has been converted to ARM-based processors. According to a report by CounterPoint, one in 5 iPads sold in 2022 is said to be equipped with the M1 SoC.

What are the Advantages of ARM Over x86?

When a giant like Apple is going all out on ARM-based processors, it must be something special. Apart from the battery and efficiency gains mentioned earlier, it has several other benefits. At its keynote, Apple claimed around 2x the performance of an Intel i7 while using only 75% less power. Generally, one of the primary ways to make a processor more powerful is by supplying it with more power. However, this has its own

the downside in terms of cooling this excessive heat. The M1 runs at a peak power consumption of only 10W. Idle power consumption of numerous x86 processors is higher than that. Another benefit is the cross-compatibility and software transition. Most smartphones today run on ARM-based processors, Macbooks have already made the switch, and Windows-based laptops are slowly transitioning. If this switch is successful, it'll massively help developers port their software from one device to another. Thanks to how ARM-based processors are designed, companies can now make their own custom processors and not depend on Intel or AMD. ARM processors are also generally more secure.

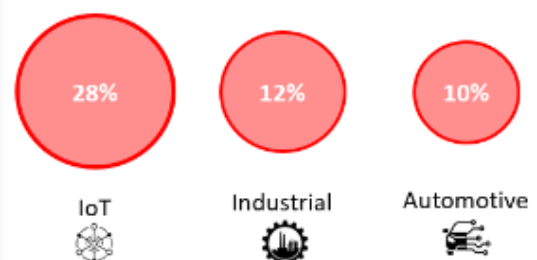## Is this the end of x86 Processors?

While the market coverage of x86 may decline, they are here to stay. Currently, there are various limitations and gaps in ARM-based processors. They don't offer any kind of future-proofing or upgradability as all components are soldered onto one PCB. These are the areas where x86 still shines. X86 processors allow the consumer to tinker around with their hardware and create a configuration that works best for them. It is true that ARM technology is rapidly evolving, but x86 isn't far behind either. Intel's 12th gen and AMD's Zen 4 processors provide a massive performance jump over their respective predecessors. They're still and will be the preferred choice in intensive systems where power consumption or heating aren't a limit, like servers and professional-grade machines.
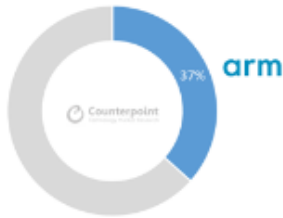
What are the upcoming players?
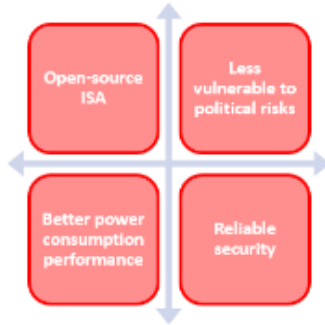

Semiconductor IP market size, 2020 vs 2025

2020 — $5.2 bn
2025 — $8.6 bn

RISC-V Penetration Rate by 2025

28% IoT
12% Industrial
10% Automotive

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ARM dominates global pure play IP market with 37% share

Advantages RISC-V offers

Open-source ISA

Less vulnerable to political risks

Better power consumption performance

Reliable security

Nvidia recently tried to acquire Arm Ltd for 40 billion USD, but its acquisition failed due to monopoly concerns. ARM doesn't sell chips but licences their designs to players who want to build their own solutions. This eliminates the dependency on companies like Intel and AMD, who sell their own chipsets. Thanks to ARM, companies are no longer at the mercy of chipset manufacturers. This can be seen in Apple's M1 in the consumer market, AWS's Graviton in the server market, and Google's arm-based chipsets in the AI/ML field. Therefore, ARM is gaining interest from all sectors. Microsoft is developing a separate version of Windows for ARM-based Windows computers.

The future for ARM looks quite promising, and it might finally come as a breath of fresh air we all have been waiting for.

India Networking Towards 5G

WRITTEN BY HETVI SOLANKI (SE-IT)

We have all been anticipating the age of 5G for a while, and the wait is finally over. The 5G launch in India is in full swing and with the following article, one is going to be amazed at how progressively fast India is going ahead with today's 5G game. Upon completing the article, the reader will have some solid facts and updates on the current 5G trends in India.
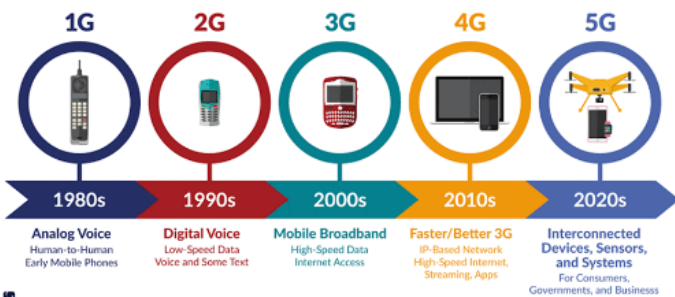
Why 5G, and more importantly WHY IN INDIA? The answer to this question is that, as per the National Digital Communications Policy, it is believed that India's digital economy has the potential to reach $1 trillion in the foreseen years. Supporting this statement, prime minister Narendra Modi has said that India is expecting a whopping 7.5 per cent growth this year, which makes us the "fastest-growing major economy." The adoption of 5G is going to be a necessity rather than a luxury in order to maintain pace and compete with the leading developed economies of the world.
 Big data, cloud computing, industrial automation, connected devices, smart cities- you name it, 5G
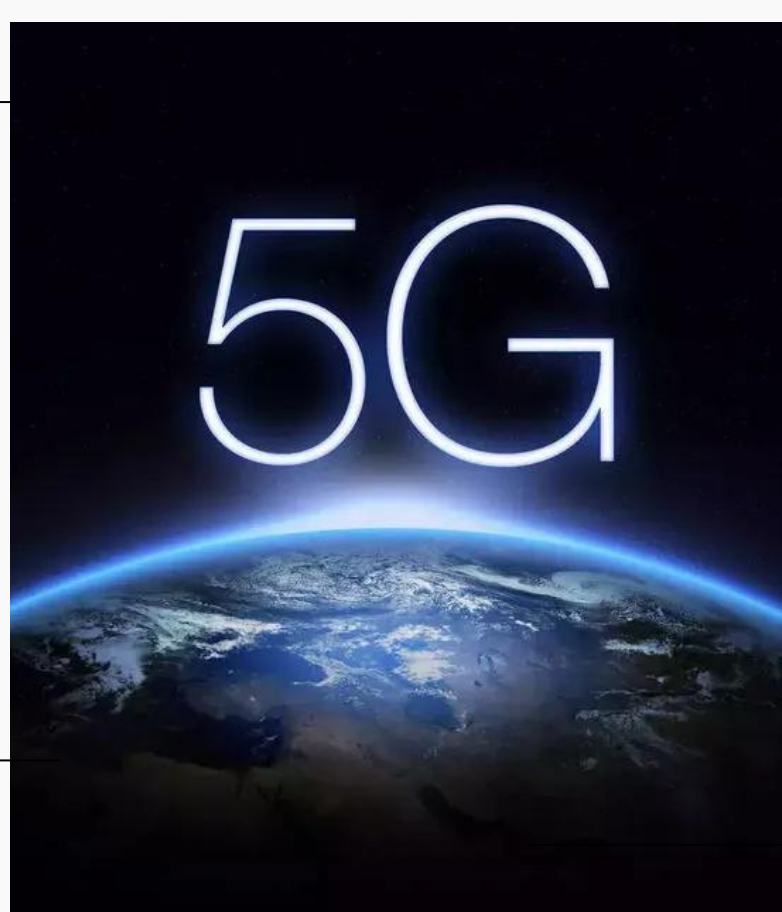
has it! 5G is envisaged to be the key catalyst that can fuel this growth.

Want to know how rapidly we are moving into the 5G world?
Through the 'Make in India' campaign and various policy measures, the Indian government aims to establish the country as a global manufacturing hub. The 5G services will start rolling out in India from August-September 2022 onwards with Airtel and Jio both having claimed to be the first telecom operator to launch the 5G network in our country. Adding to it, The DoT (Department of Telecommunications) in a press statement has confirmed that the 5G services will be available in as many as 13 cities across the country by late 2022.

Considering its readiness, we also have to look at putting 5G to use. We all know how India is recognised worldwide for its welcoming nature. 5G is going to have one such grand welcome too. India and its operators are all suited up, ready for 5G to blow away the telecom industries and revolutionize data handling.

Starting with one of the major telecom companies-Jio. Billionaire Mukesh Ambani's Reliance Jio is already quite ahead of others in its

5G game. Why so?

That is because Jio is the only operator with an all-IP network, which is an important requirement for launching 5G services. Jio strategy head Anshuman Thakur said they already have the necessary network and backhaul infrastructure in place, needing only to invest in spectrum and equipment.

Jio will also start conducting 5G trials with Samsung, the supplier of its 4G network, and has said it will extend its partnerships for 5G trials to include big names of the telecom industry and other multinational technology corporations like Huawei, Ericsson, and Nokia.

Not to forget, Google has held hands with Jio, stating that it would invest ₹337 billion ($4.5 billion) in Jio to support the operator's upgrade. Jio also has support from Qualcomm and Intel for its 5G plan.

Having talked about the auctions in the previous sub-heading, according to the information released by the telecom department as part of the list of pre-qualified bidders, Reliance Jio has submitted an EMD (earnest money deposit) of Rs. 14,000 crores, the highest among the four players in fray of spectrum bidding.

Next up, moving on to Airtel, another well-known name in the industry:

Airtel is going strong with its 5G game as well. It already has some great companies on hand, popular names among them being Huawei, ZTE, Ericsson, and Nokia. Airtel will be working with them on its trials. Also worth noting is that it has deployed 100 hops of 5G technology transmission equipment supplied by Huawei. This will be improving its backhaul capacity by a factor of four, and has struck deals with Cisco and Ericsson to speed up its core network in readiness for 5G service.

Another set of additions to the companies list that Airtel will be working with, to test the 5G-based solutions are: Apollo Hospitals, Flipkart, and several manufacturing companies. Considering the auctions, as per the DoT's website, Sunil Mittal-led Bharti Airtel has put in Rs 5,500 crores as EMD.

Adding one more competitor to the race, we have Vodafone.

Vodafone Idea collectively will conduct its trials with Huawei, ZTE, Ericsson, and Nokia, and is already using 5G AI technology from Huawei to boost the capabilities of its 4G netork. The amount submitted
by Vodafone Idea stands at Rs 2,200 crores as for the auction bidding, as mentioned by the DoT.

Availing 5G
Knowing all of this, it makes us believe that we are almost there with the 5G era. We have all waited for this for a long time, but more patience and a longer delay is what seems to be coming.

The above-mentioned statement is a by-product of the fact that all the previous deadlines for 5G have been missed. Having said this, it should be a matter of concern as 5G networks were once expected to be launched in India by late 2021.

Another part of the reality that might cause disquiet to the citizens is that for Indians to benefit from 5G services, they will need access to 5G-enabled phones or other devices, and their network operators will need 5G radio spectrum and 5G network equipment.

As a counterpoint to the above fact, even though the smartphone shipments in India in the March quarter grew by just 1.6% year-on-year (YoY), the shipments of 5G smartphones grew by 300% as shown by the CyberMedia Research's (CMR) latest quarterly report. Noticeably, the 2G feature phone and 4G feature phone segment declined by 42 percent and 50 percent YoY respectively for the Q1 2022.

As for the 5G quarterly growth, Samsung topped the 5G smartphone leaderboard with its new 5G offerings, and was NO 1 - value for money Price Band(7000-25000K). These numbers are nothing but affirmations and signs of progress as we take one step at a time towards 5G.

Just a matter of time, and we will be up here availing all the 5G services that we intend on using. With a little patience and optimism in hand, along with hardworking smart minds from the industry, we will soon witness the 5G homecoming.

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Department Of Information Technology Collaboration With CDAC Mumbai

The students of Second Year and Third Year IT successfully contributed to ONLINE LABS (OLABS), developed by Amrita Vishwa Vidyapeetham & CDAC Mumbai and Funded by the Ministry of Electronics & Information Technology. OLABS is based on the idea that lab experiments can be taught using the Internet, more efficiently and less expensively. Its content is aligned to NCERT/CBSE and State Board Syllabus for Physics, Chemistry, and Biology Labs from Class 9 to Class 12 and includes interactive simulations, animations, and lab videos. Following are the details of the Virtual Labs and Educational Games developed by the students under the mentorship of Dr Sasikumar, Executive Director (CDAC Mumbai) and successfully deployed in the OLABS repository.

Following is the list of projects developed by students:

Golf-based educational game about elements and properties

Edu games is an interactive game that is built with the purpose to engage students and provide an interesting way to learn about the properties of the periodic table. The game is designed with a golf setup as the background wherein every correct answer in a multiple choice question would make the golf ball move towards the goal and for every wrong answer, the ball moves towards the pit. The user is given a set number of tries before the question is changed. There is also an option of using a hint to guess the answer.

Team Members: Kashvi Dedhia, Saloni Dagli, Mallika Konkar, Shivam Kejriwal, Devika Patadia, Dhruvil Shah, Siddhi Lathi.

Educational Game on Financial Literacy

An educational game developed using React JS, designed to instruct students about the basic concepts of finance like insurance, stock markets and fixed deposits through a fun board game-like interface. Students had to navigate through the game and at each block they have to complete a task that results in some kind of transaction. At the end of the game, if the player manages to turn out a net profit, they are declared winners. This project was developed in an attempt to improve financial literacy in our country.

Team Members: Shaurya Magar, Arjav Parekh, Shazia Talib, Tanvi Save

Virtual Lab - To Study the process of Evaporation

The virtual lab simulator enables the user to perform the experiment demonstrating "To Study the process of evaporation" in a virtual environment providing a user-friendly and flow-oriented interface. This enables the student to grasp the core concept clearly and assists the student to perform the experiment multiple times till he/she masters the concept/working of the experiment.

Team Members: Naitik Vora , Rohan Pramanik, Arwa Ujjain

walaVirtual Lab - Conduction of Electricity through acids and bases

This project helps in the stimulation of the conduction of electricity. It does so by giving students a chance to pass different solutions through the adjacent setups to see how different solutions react to the situation and what type of ions they release which in turn tell us about what kind of solutions they are.

Acidic and basic solutions when passed through the setup release H+ and OH- ions respectively and conduct electricity whereas neutral solutions like Alcohol and Glucose do not release any ions and as a result, they do not conduct electricity.

Team Members: Jay Thadeshwar, Jenil Shah, Karan Nandaniya

Virtual Lab - Observation of pond water for the presence of micro-organisms

Developed a Class 8th Biology Experiment aligned to CBSE curriculum based on Identification of Microorganisms in Pond Water using Electron js with Javascript Animations. It has been developed to supplement the traditional physical labs

Team Members: Jainam Rambhia „Kharanshu Mehta,Manan Doshi ,Rashi Lodha

Virtual Lab - Archimedes Principle

A chemistry virtual lab designed to demonstrate the Archimedes Principle for students, keeping in mind that students could not get access to physical labs due to COVID 19. This was achieved through interactive UI/Animations and functionality that showcased the simultaneous execution of the water beaker, weighing scale, and crown for the given experiment. Tech Stack Used: HTML, CSS , JavaScript ,Canvas

Team Members: Deep Shah, Harsh Agarwal, Harsh Sanghani

Virtual Lab - Heat Transfer through Conduction

This virtual experiment educates the students of Class 7 (CBSE boards) about heat transfer through conduction. This experiment introduces students to the concept of good and bad conductors of heat. After performing this experiment students will be able to conclude that metals are good conductors of heat and would transfer heat through conduction and the lesser time a material requires to transfer heat (or melt the wax piece), the better conductor it is

Team Members: Abhinav Patel, Hardik Patel, Janmey Patel, Yash Shah

learning, data science, etc. This could help solve problems that today's supercomputers cannot handle. It can also speed up current computing. There are many problems with the implementation of quantum computers, but they will undoubtedly play an important role in the upcoming years!

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PROJECTS

Smart Cradle

Families with both working parents have become the norm in these evolving times. This has resulted in an increase in demand for products that assist parents in caring for their infants. The Smart Baby Cradle can help parents in this regard.

The design of smartness and innovation includes the use of technologies/methodologies such as internet of things (IOT) (modules such as raspberry pi/Arduino, humidity & temperature sensing), swing automation, cry detecting mechanism using machine learning, live video and audio surveillance, cloud computing (data storage), and user-friendly mobile application (for user controls).
user controls).

To detect each and every activity of the baby, various sensors/modules are attached to the cradle, which include a humidity & temperature sensing module for detecting wetness of the bed, a PIR motion sensor to detect the baby's motions, which helps to record the baby's sleeping patterns, weight sensors that detect the baby's weight and also check the baby's presence in the cradle, a camera module on top of the cradle for live video footage, and a cry detection circuit that analyses cry patterns to trigger the swinging mechanism (if required, based on the range of frequency).

All data collected from sensors/modules is stored in the cloud and analysed at regular intervals. If any abnormal activity (something unusual, baby crying, or wetness due to baby urine) is detected in the Android mobile application that has been developed, an instant mobile notification is generated. It has UI controls that allow you to control the cradle's swinging mechanism (which can maintain the swing speed and be turned on and off), play music, switch on the camera live footage, and play the toy/projector whenever the baby cries.

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PROJECTS

Project Idea Buddy

Selecting a project in college years can be a difficult task because many of the projects you can think of are already implemented previously. Our project aims to solve this problem. By providing an abstract of a new project topic, we aim to do a detailed comparison to find out how much it overlaps with the existing projects. This way students do not need to manually go through previous blackbooks or depend on faculties to remember what was done previously. Therefore, students can either build on the existing work or try to approach the problem from a new perspective, or come up with another idea together. We also provide a complete overview of past projects, on searching for a topic we provide the list of similar projects that are already implemented in that field and also provide the latest articles or words related to it by using web scraping. The objective of our system is to develop a portal for the I.T department to help teachers and students come up with innovative ideas for the final year project. They can input the abstract of their ideas, which would then be checked against the previous projects' blackbooks, which would be stored in a preprocessed form on cloud-based storage, to see whether a similar kind of project already exists or not.

To achieve this, we cannot simply do a one-to-one comparison of the two abstracts', as they will differ in details, and we also need more information about the completed project like the tools, and technologies used. Therefore, to focus

on the specific information we convert an entire blackbook into an HTML file. The specific contents are then extracted using the BeautifulSoup library, by focussing on the font style of the contents. After the specific sections of text are extracted, we load the spaCy library's prebuilt pipeline with POS tagging, NER, and dependency parsing. After manually going through the dependency visualization of the whitebooks, we recognized the sentence structure patterns and various rule-based patterns to extract information. The different information is then encoded using the Universal Sentence Encoder and compared using the cosine similarity measure. Students can search for online posts, research papers, blogs, etc., using the SERP API which fetches top results from the Google search engine result page.

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Pronuance - English Pronunciation Trainer

In the modern job market, English is an essential skill. All professional communications take place in English, and employees are expected to be fluent in the language. The problem is that, in vernacular medium schools, English is largely treated as a foreign language. Therefore, for the sake of examinations, emphasis is mainly on memorizing textbook questions and their answers. The important aspects of any language like listening, speaking, reading and writing are ignored with such a method of learning. After their primary language, English is considered secondary. In addition to rote learning, minimal importance is put on practising speaking skills. A study has shown that Production Practice, i.e. speaking, during language learning provides a much stronger learning experience. Even the lack of effective teachers creates graduates who are not proficient in the English language. Therefore, an interactive resource

that acts as a learning aid could be a potential solution. Computer Assisted Language Learning software provides an interactive way to learn a language.

Computer Assisted Pronunciation Training systems either follow a standardized curriculum or require external intervention for personalized learning. Through this research, we plan on creating a system that learns the user's weaknesses and provides a personalized experience for each user. We accomplish this through the use of the two processes listed below:

a. Mispronunciation Detection:
Given a sentence and an audio recording of the speaker, check the pronunciation and track the constantly mispronounced features.
b.Overcoming the Mispronouncing Possibility:
Suggest to the user with words that he or she is likely to mispronounce.

The project aims to provide each user with personalized pronunciation training. We aim to improve learners' pronunciation by overcoming their weak points. The project works on the basis of learning through repetition. This project focuses on Indian Speakers, as the goal is to limit pronunciation errors without completely eliminating local accents. An accent isn't inherently negative or positive, and it is an important part of a speaker's identity. The project also provides users with the option to practice the recommended words either as standalone words or as parts of sentences taken from a large corpus.

To achieve proper Intelligent Tutoring for Pronunciation, we need to resolve two sub-problems.

First, we need to detect the words that the user pronounces incorrectly. Second, we need to suggest the user's words that he or she is likely to mispronounce.

Pronunciation Detection can be further subdivided into two problems, namely, speech-to

-text conversion and comparing the speech's predicted text with respect to the original text that was read aloud. The speech recognition system tends to return incorrect words when the user does not pronounce the given words correctly. This property can be used to detect mispronounced words after running the predicted text and original text through a word comparison.

Personalized Recommendations: For each user, use the constantly mispronounced features to recommend phrases or words that focus on the user's weaknesses and help improve their pronunciation.

After a sufficient amount of mispronounced and correctly pronounced names are recorded, we can use the Collaborative Filtering algorithm to recommend the user with words that are similar to the mispronounced words. For example, if the user mispronounces the words "station" and "tuition", they are likely to mispronounce "competition". Collaborative filtering helps us find such patterns.
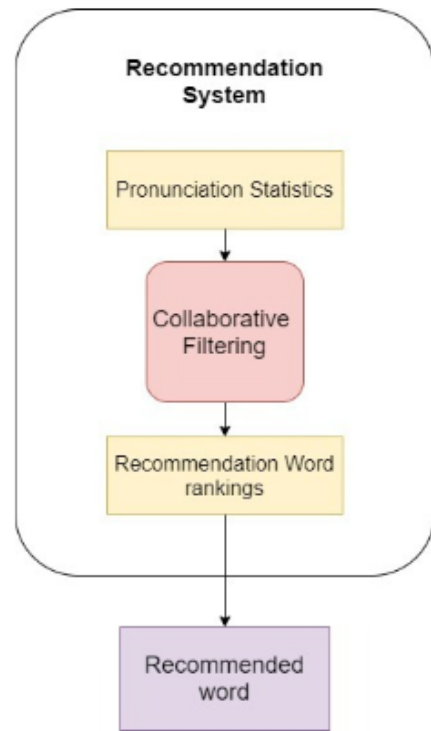
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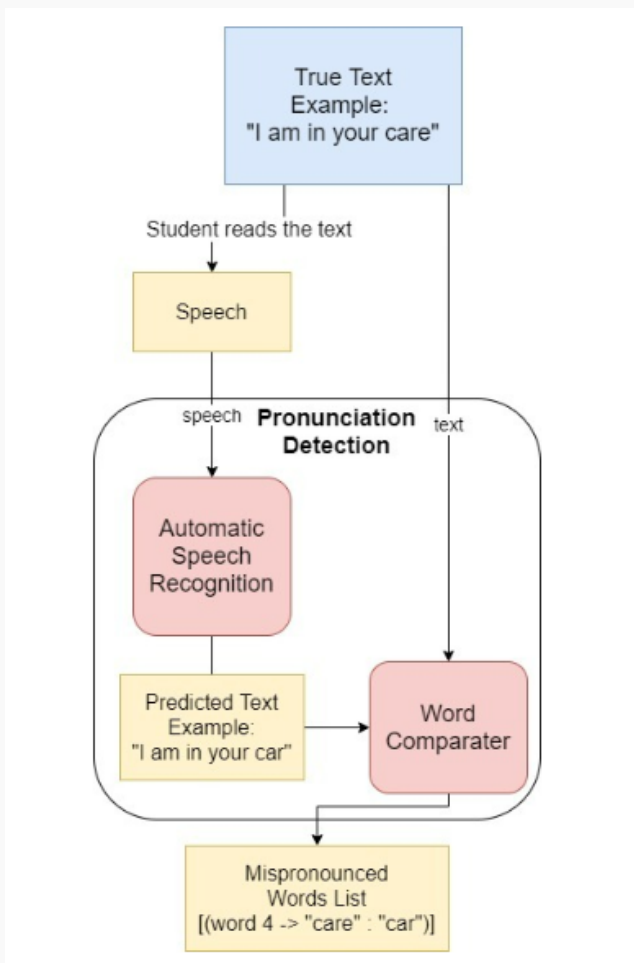
PROJECTS

Intelligent Tutoring System for Math

Mathematics is all around us and enables us to understand and solve real-world problems. Mathematics brings order to life and prevents chaos. Many students find fractions and algebra challenging and perplexing, yet as they age, they will be required to comprehend these ideas.

Intelligent tutoring systems (ITS) are computer programs that help the teaching-learning process (TLP) by employing a wide range of technological resources. It is a computer system designed to offer students quick, personalized teaching or feedback, typically without the involvement of a human teacher.

The user interface enables navigation throughout the system. When a student chooses to answer a question, the domain module creates additional questions and answers. The "pedagogical manager" comprises two modules: fraction and algebra. The learner can use any of the pedagogic manager's modules to solve challenges. Since the student may make a mistake while solving a problem, the "tutor module" employs feedback and hint mechanisms to advise the student of his or her error. The tutor will interact with the learner by providing feedback and hints when they seek help or make an error while completing a task.

The feedback method simply notifies the student that he or she has made a mistake in the solution. The tutor poses a question to the student, to which a response is anticipated. The system will also generate a response to the same question dynamically. The student's response and the one provided by the system are cross-checked.

The hint mechanism is used to obtain hints about the correct answer. The tutor encourages the student to begin responding to the question at the outset of the dialogue. In this hint method, the instructor interacts with the student by asking questions. If the student provides the correct response, the tutor will display the next phase of the question and expect the student to deliver the correct response. The learner is now one step closer to identifying the correct response.

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Automated Database and API Management System

While developing applications for multiple devices, we always face the issue of maintaining and persisting a common database. All platforms use different programming languages to build a rock-solid backend solution which is a continuous and costly job. This led us to develop -**Automated Database and API Management** system which is a common platform to connect all the applications and work with a persistent database.

The system provides a backend to all the applications. The system makes the complete solution automated meaning there is no requirement for writing any sort of code. It provides an HTTP/HTTPS endpoint based on the REST API concept which a developer can use directly in the frontend application. This allows users to create a complete backend solution and will allow them to use it readily in their existing frontend application. We have also provided a database so the hassle of connecting the backend reduces by a substantial level. In a nutshell, the system completely removes the hassle of maintaining the database and writing code for connecting the backend and frontend and thus makes the developer's life easier.

The system intends to be deployed on the internet so that it can be used by all the developers. Since the system provides the entire backend, the user's sole concern is the frontend. The system can be used with both web and app since we are using HTTPS endpoints. Even novices with little knowledge of the internet and HTTP protocol can use our system.

The application starts with a signup and login screen. Users can login if they already have an account. If the user doesn't have an account, then they can create a new one. After successful authentication user will be directed to the dashboard.

The dashboard has the following modules.
• Create Database: This will create a database for the user. User can create as many databases and tables as he wants. Each database will have multiple tables. The user can define the schema for each table and then perform all the CRUD operations with the table. Users can perform functions like bulk delete and also search for particular data.
• Get endpoints: This module is used to get an endpoint for a particular database and table. Users can generate a Read or Write endpoint. All the endpoints created by the user will be listed in the Manage API module.
• Accounts: This will display the username and API key of the user.
• Manage API: This will list all the routes created by the user in the form of a table.

These benefits make the product a delight to use for the developers and aim to make their development process faster, convenient, and a pleasant experience.

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Placement Prediction Portal

Students studying at engineering colleges are constantly in a dilemma regarding what to pursue after graduation. There is a wide range of options available from pursuing Higher Studies abroad to getting employed by various MNCs; adding to this are the considerations like salary and the various opportunities associated with it. Real-Time platforms where the student may monitor his progress from the start of his engineering course and take activities to decrease this gap for the future aren't readily available.

There is a need for a platform where the students can monitor their progress and work on their strengths and weaknesses. Thus, this project aims to develop a complete, easy-to-use, and robust platform.

An integrated system was developed by them for implementing the placement test portal. Students can register and attempt the scheduled tests. This portal is a proctored employability assessment for third and fourth-year engineering students. It gives information on a candidate's performance and areas for improvement across modules that are important for a successful career. Students can gain knowledge and experience of the skill needs of organizations as well as the benchmarks they use for entry-level and lateral recruitment across all major industries by attempting such tests. These insights can be used to improve skills and take a step forward in a long-term career.

A Student must register using his google account.

Once he registers, a profile page will be opened where he must fill in the required input fields and submit the form. After submitting the details, the admin accepts the student, and he is able to attempt the test. After receiving the relevant permissions in the mail, the student must log in and pass the system requirements to attempt the test. After completing the test, the test results are displayed to him along with the readiness score for placements.

This portal helps the faculty placement coordinators identify and assess students' key skills and expertise, as well as their readiness for placements. The various modules in this portal cover all the relevant aspects such as cognitive, domain, personality, and others that will aid them in their preparation for placements.

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E- Lecture Summarizer

In these troubled times of the pandemic, the teaching-learning process has been adversely affected at every level of education. Schools and colleges had to shift and adapt to various online platforms for achieving academic goals set by their respective universities and boards and to emulate the past trends of the academic year and the overall curriculum.

Some cons of this online process are that the lectures can be long, boring, and monotonous. In the absence of a classroom environment, the personal touch is lost, and because of this, students have a shorter attention span than usual. If a student misses a lecture or wishes to revise a concept from the recordings, he/she needs to view the entire recording of the lecture.

Moreover, the student must put in extra time and effort into compiling notes. This is not always feasible, especially when the student is in a time crunch. Thus, we have attempted to develop a system that aids students in studying for their exams and utilizing their studying time efficiently. This aid can be acquired by using AI methodologies to generate summaries of lectures in the form of concise lecture notes and time-indexed videos according to subtopics.

Our system is divided into three modules, namely, the User Model, the Summarizer and, lastly, the Indexer Module. The User Module involves the creation and maintenance of the website as well as the assignment of student/professor roles to the users. The Summarizer module provides the users with the transcript of the video and the summary of the entire lecture in the form of key points. The Indexer Module automates the method of creating bookmarks, enabling the students to navigate between important topics in the lecture. Our proposed system not only makes the learner process easier but also helps students save study time. Students can easily view summaries before their exams instead of having to go through the trouble of frantically searching through study materials and resources. This, in turn, will boost the academic grades of the students.

IMPLEMENTED BY:

DR ABHIJIT JOSHI
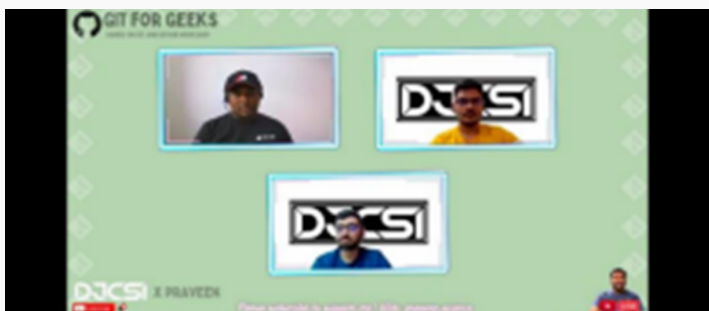VARUN VORA (BE-IT)
MANAV SHAH (BE-IT)
AKANKSHA MANSHARAMANI (BE-IT)

Git For Geeks

1ST NOVEMBER, 2021

Praveen Kumar explained the working of open-source projects with the help of an excellent allegory. He then proceeded to show his website and Github profile to provide attendees with some insight as to what their websites should look like. Practical approach being the focus of this workshop, a Github repository was created by the speaker to illustrate the various functions of git. The git commands init, clone, commit and many more were explained and demonstrated. Several questions related to Git and GitHub, Open Source, and future career opportunities were discussed by Mr Praveen Kumar.

He proceeded to give a demo of VScode, a popular source-code editor, and its various extensions. The uses of Emmet and GitLens were explained briefly. Around 100 participants were still tuned in to the live stream.

Realising the need to educate students on open source, DJCSI conducted a hands-on workshop on Git and Github titled "Git for Geeks". The event garnered over 230 registrations, with students across all branches and years, eager to master Git and Github. The speaker for this workshop was Mr Praveen Kumar Purushothaman, an open-source contributor and full-stack developer specialising in Javascript technologies based in London.

Speaker Mr Praveen Kumar with committee members

The workshop took place online as a live-stream event on Mr Praveen Kumar's YouTube channel on 1st November 2021, from 4:00 pm onwards. It was co-hosted by Chirag Jagad, Chairperson of DJCSI and Shaurya Magar, Secretary of DJCSI.

The event was flagged off with an introduction of the speaker and his work. Following that, Mr

Session in progress

Practical approach being the focus of this workshop, a Github repository was created by the speaker to illustrate the various functions of git. The git commands init, clone, commit and many more were explained and demonstrated. Several

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questions related to Git and GitHub, Open Source, and future career opportunities were discussed by Mr Praveen Kumar.

He proceeded to give a demo of VScode, a popular source-code editor, and its various extensions. The uses of Emmet and GitLens were explained briefly. Around 100 participants were still tuned in to the live stream.

Live code demonstrations

The hosts introduced the viewers to various open-source programs like Major League Hacking, Girl Script and Google Summer of Code. The Chairperson spoke about Outreachy. The recently concluded Hacktoberfest was also discussed. Mr Praveen showcased some of the projects he had developed for Hacktoberfest.
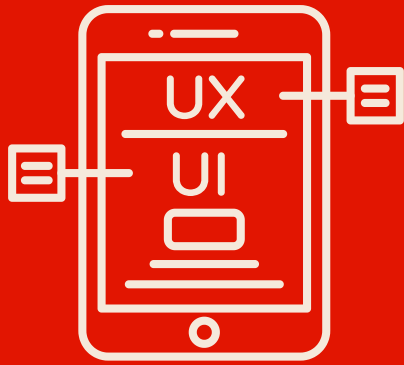

Project demonstration

A volunteer was invited from the chat to perform a live demo. A portfolio website was created for the volunteer using Git and GitHub. This practice helped the viewers get hands-on knowledge of the various uses of GitHub and its various functions.

To test the knowledge of the attendees, two quizzes were shared with questions related to open source, Git and GitHub. The winners were awarded jerseys and mock interviews to help them get prepared.

The session provided the attendees with practical and hands-on knowledge about the various aspects of open-source programming. All in all, the workshop was a huge success, and the feedback received was majorly positive. The attendees left the workshop satisfied and able to operate Git and GitHub.
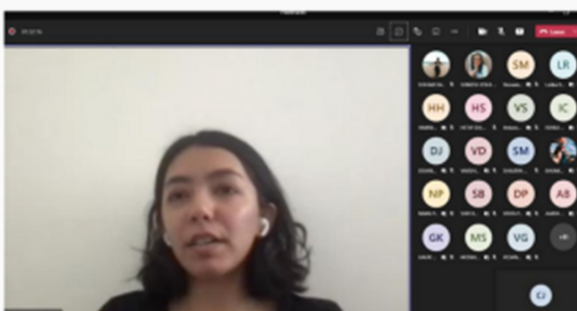
... your journey into UI/UX

Pixel Hacks

29TH NOVEMBER, 2021

On the 29th of November, 2021, DJCSI in collaboration with GDSC conducted an interactive workshop on User Interface and User Experience. The event was hosted by Ms Hetvi Solanki and Ms Shweta Joshi, co-committee members of DJCSI and GDSC respectively. Our speaker for the event was Ms Ruchita Parmar, an alumnus of DJSCE who further completed her education in Human-Computer Interaction at Georgia Institute of Technology last summer. She has immense experience and accolades to her name in the field of UI and UX design.

The workshop began on an enthusiastic note with Ms Ruchita explaining the basics of UI/UX, including its definition, importance in the 21st century, scope and the difference between UI and UX.

Speaker for the event, Ms Ruchita Parmar

Further, she went on to display the top universities in the United States which offer a master's in science program in Human-Computer Interaction (HCI). This was followed by citing the skills required for pursuing a career in UI/UX design and how to know if you would be a perfect fit for the same. Problem-solving abilities and persuasive skills topped the charts, she mentioned how and why patience is key throughout the process. Moreover, she highlighted the common jobs you can bag with education in UI/UX background. The job application process was intricately explained with stress on how a person's networking skills are of paramount importance.
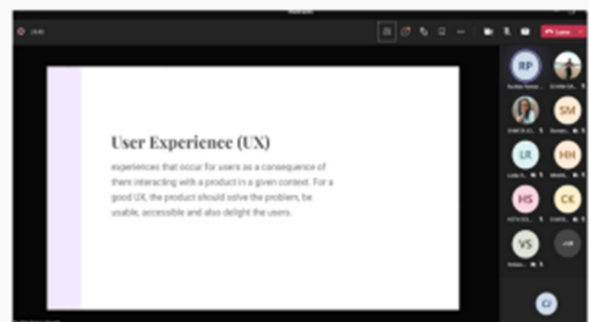
Ms Ruchita guided the attendees through her career timeline, mentioning snippets from her experience in the UI/UX design industry. She walked everyone through her project on a "Library reservation system" along with mentioning her next Aquarium project.

Session in progress

Having been a student until recently, she could understand the point of view and pain points of all the attendees and answered each and every

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question with utmost knowledge and patience during the Q&A session. The session terminated smoothly with the hosts presenting the thank you note. With a quorum of over 100 attendees, this session can be deemed successful.

Session in progress

"The best way to create value in the 21st century is to connect creativity and technology."- Steve Jobs. The user interface and User experience are proof of this! This session was successful in giving students a better understanding of UI/UX, its importance and the process it follows first hand from the speaker. It was the perfect introduction into the realm of UI/UX.

Pixel Paranoia

18TH & 19TH DECEMBER, 2021

UI / UX HACKATHON

Following the success of their flagship hackathon event CodeShastra and the previous well-held workshop PixelHacks which gave an insight into the world of UI/UX, DJCSI expanded its horizons into the design domain and conducted Pixel Paranoia, a two-day design hackathon. There were two events, the first one centred on graphic design and the second one focused on user experience (UI/UX). Both events were conducted on a specially curated Discord server. They required zero coding and this amazing opportunity was taken up by several. The events garnered over 70 team registrations competing for the top prizes, which included internship offers with staggering stipends and much more. The participants were asked to design working prototypes for real-time corporate problem statements. Each competitor received participation certificates as well.

Day 1: Graphic Design (Saturday, 18/11/21)
The event was flagged off at 8 am, on Pixel Paranoia's Discord server with an introduction to the event.

The opening took place an hour before the scheduled start time of the event. Participants were given an overview of the timeline for the day

and procedure to be followed. All rules and regulations for the event were stated and participants were offered words of encouragement for the competition to follow. The participants were wished luck followed by the release of problem statements.

Each competitor kick-started their design with great gusto keeping in mind the specifications put down in the problem statements. They had the facility of reaching out to the organising committee at any point during the day to clear any doubts they may have had. Halfway through the designing time, they had the opportunity to interact with mentors to discuss progress.

The mentors for the teams provided any sort of help that the team required and guided their way through the hackathon. The designing process continued until 4 pm, after which the participants had to submit their work and the judging round began.

The teams explained their solutions to the judges. They put forth their thought processes and the idea behind their designs. The judges in turn questioned the participants on their submissions and the winners were decided after deliberation.

One of the solutions submitted

The winners were as follows:

Position	Name	College
First	Pusti Sheth	D J Sanghvi College of Engineering
Second	Likla Sinha	DBIT, Mumbai
Third	EBRAHIM SICKKANDER NIHAL P	Francis Xavier Engineering College

Day 2: UI/UX (Sunday, 19/11/21)

The day started with a welcome speech and orientation on the discord server at 8:15 AM. Rules and timelines were laid out for the participants. The various problem statements had been released on the server at 8:00 AM. Participants had to give preference for problem statements of their liking and they were assigned one of the problems on first come first basis.

The teams were asked to join their respective private voice channels and start the design process at 9:00 AM. A help desk channel was set up to provide support to the competitors at any stage of the event. Midway through the competition, mentors stared making rounds around the server.

One by one, the mentors visited each team channel and guided the teams with their challenges. The teams showed their progress, asked any doubts and were given feedback by the mentors. The teams carried on with their work and called upon the mentors additionally whenever they needed help. The time for competing stopped at 4:00 PM and participants were instructed to submit their work.

The teams were asked to present their solution to a panel of judges (on discord). The judges quizzed them about their work and understood the thought process behind each submission. Once all the teams were done presenting, the judges reviewed the results and decided the winners. The results were announced via Instagram the next day. Participation Certificates were handed out to all the participants.

The winners were as follows:

Position	Team Name	College
First	Pitch Perfect	Srishti Institute of Art, Design and Technology
Second	Velvet Thunder	D J Sanghvi College of Engineering
Third	Frost	D J Sanghvi College of Engineering

The enthusiasm and pep of each participant and the diligently working committee of DJCSI are what made Pixel Paranoia a thriving success! DJCSI looks forward to more such triumphant events to be held in the near future!

Codeshastra 8.0

26TH & 27TH MARCH, 2022

Web Development. The following were the problem Statements for CodeShastra 8.0:

Day 01: Saturday, 26 March
The event was kicked off at 08:00 AM in the morning when the participants started coming to DJ Sanghvi College of Engineering, the offline

CodeShastra is DJCSI's flagship event and this year it was bigger than ever, being in collaboration with GDSC DJSCE. Fresh off the success of Pixel Paranoia (a UI/UX and Graphic Design hackathon), DJCSI worked seamlessly along with GDSC DJSCE to publicise and organise this event.

The eighth edition of CodeShastra garnered 800+ registrations, out of which a total of 70 teams were shortlisted. 45 teams got the opportunity to participate offline at the venue while 25 teams participated online through Discord, in the comfort of their homes.

DJCSI and GDSC DJSCE were proud and honoured to collaborate with Neebal Technologies as the Title Sponsor, and Hoopr as the Associate Sponsor of CodeShastra 8.0.

The participants were asked to design solutions for the problem statements provided by our sponsors. "Tech for the Future, Changes for the Better" was the theme this year and our problem statements ranged from a selection of domains trending in the industry such as Cloud Computing, Blockchain, AI/ML, IoT, App Development and

venue for the event. The event was held in a hybrid manner keeping the COVID protocols in mind.

At 09:00 AM, the inauguration ceremony began in the Seminar Hall of the D. J. Sanghvi College. The ceremony was hosted by Divya Patel and Allan Almeida, co-committee members of DJCSI and GDSC DJSCE respectively. Speeches were given by Dr Hari Vasudevan (Principal of DJSCE), Dr Ashish Daptardar (Vice-Principal Administration), Dr Manali Godse (Vice-Principal Academic) and Dr Vinaya Sawant (Head of Department, Information Technology).

Dr Hari Vasudevan (Principal), addressing the participants

Dr Ashish Daptardar (Vice-Principal Administration), addressing the participants

The hackathon was officially commenced and the coding began at exactly 11:00 AM.

At 01:30 PM, teams took their first well-deserved break as lunch was served. At 03:30 PM, the mentors started visiting all the rooms to help our participants out with invaluable advice. The teams were allowed to call the mentors as and when required.

Leisure rooms served as a mode of entertainment for the participants and were made available from 05:00 PM. These rooms were set up with karaoke, gaming consoles, and card games. To freshen up the participants, tea/coffee was served at 06:00 PM.

Later at 09:00 PM, dinner was served and the college gates were shut down as our participants settled in for the night. Snacks and drinks were distributed at midnight to help the participants power through the long, sleepless night. A room with mattresses was set up for participants who wished to take some rest but most of our participants were busy coding and only took a few entertainment breaks in between.

Midnight Mentoring Round

Day 02: Sunday, 27 March
The second day started with breakfast at 09:00 AM. After breakfast, the teams geared up to complete their projects on time.

Coding stopped at 11:00 AM sharp and the teams submitted the projects on Devfolio by 11:30 AM. Shortly after, the first judging round began. Each team presented their solutions to the judges one after another. The teams present offline in college presented their solutions to the judges in person, while the teams participating online presented via Discord.

Our esteemed panel of judges for the event were:
Mr Vijay Agarwal: Chief Executive Officer, Neebal Technologies
Mr Ravi Balgi: Chief Evangelist, Neebal Technologies
Mr Lekhraj Varshney: Senior Associate, JPMorgan Chase & Co.
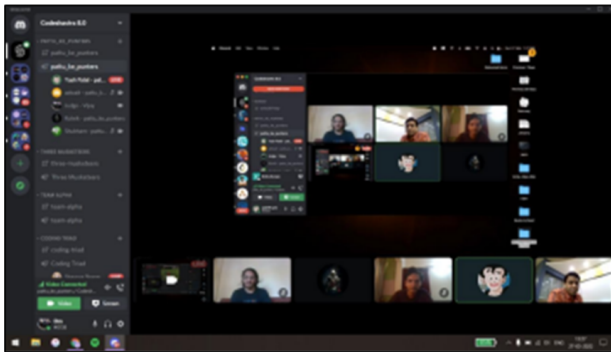**Mr Parth Kansara:** Software Development Engineer, Willis Towers Watson
Mr Allan Pinto: Co-founder and CTO, Protto

Panel of Judges

Team presenting their solution in the offline Judging Round

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Team presenting their solution in the online Judging Round on Discord

The judges finished their reviewing process at around 03:00 PM and the Top 10 teams were announced. The Top 10 were required to create presentations to showcase their solutions to the judges in the Final Judging Round.

Lunch was served at 03:30 PM to the shortlisted teams and the organising committee, after which the teams put the final touches on their presentation and speeches. The second judging round began at 05:00 PM. The teams showcased their solutions in our college's Seminar Hall before all the judges and the other teams. The judges reviewed the presentations and deliberated among themselves to decide the winners.

Team giving a final presentation to the panel of judges

*Team Coding Nerds, the winners of CodeShastra 8.0*

Team StackUnderFlow, the first runner-up of CodeShastra 8.0

Team MNRR, the second runner-up of CodeShastra 8.0

CodeShastra 8.0 was a huge success. Being the first in-person event post the pandemic and collaboration between DJCSI and GDSC DJSCE, it came with its challenges but the hard work of the organising committees made it possible. DJCSI looks forward to conducting more such events consistently every year.

Position	Team Name	Team Members	College	Cash Prize
First	Coding Nerds	Jazib Dawre Jay Doshi Jayesh Kavedia Jigar Shah	D J Sanghvi College of Engineering	₹30,000
Second	Stack Underflow	Adnan Ahmed Vidhish Panchal Burhanuddin Savliwala Raj Sanghavi	D J Sanghvi College of Engineering	₹20,000
Third	MNRR	Nishant Kumar Rahul Raheja Rushil Desai Meith Navlakha	D J Sanghvi College of Engineering	₹10,000

The winners were awarded goodies along with cash prizes. The teams who made it to the Top 10 were presented with gift hampers. Participation certificates were handed over to all the teams.

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PROTOCOL CROSSWORD 2022
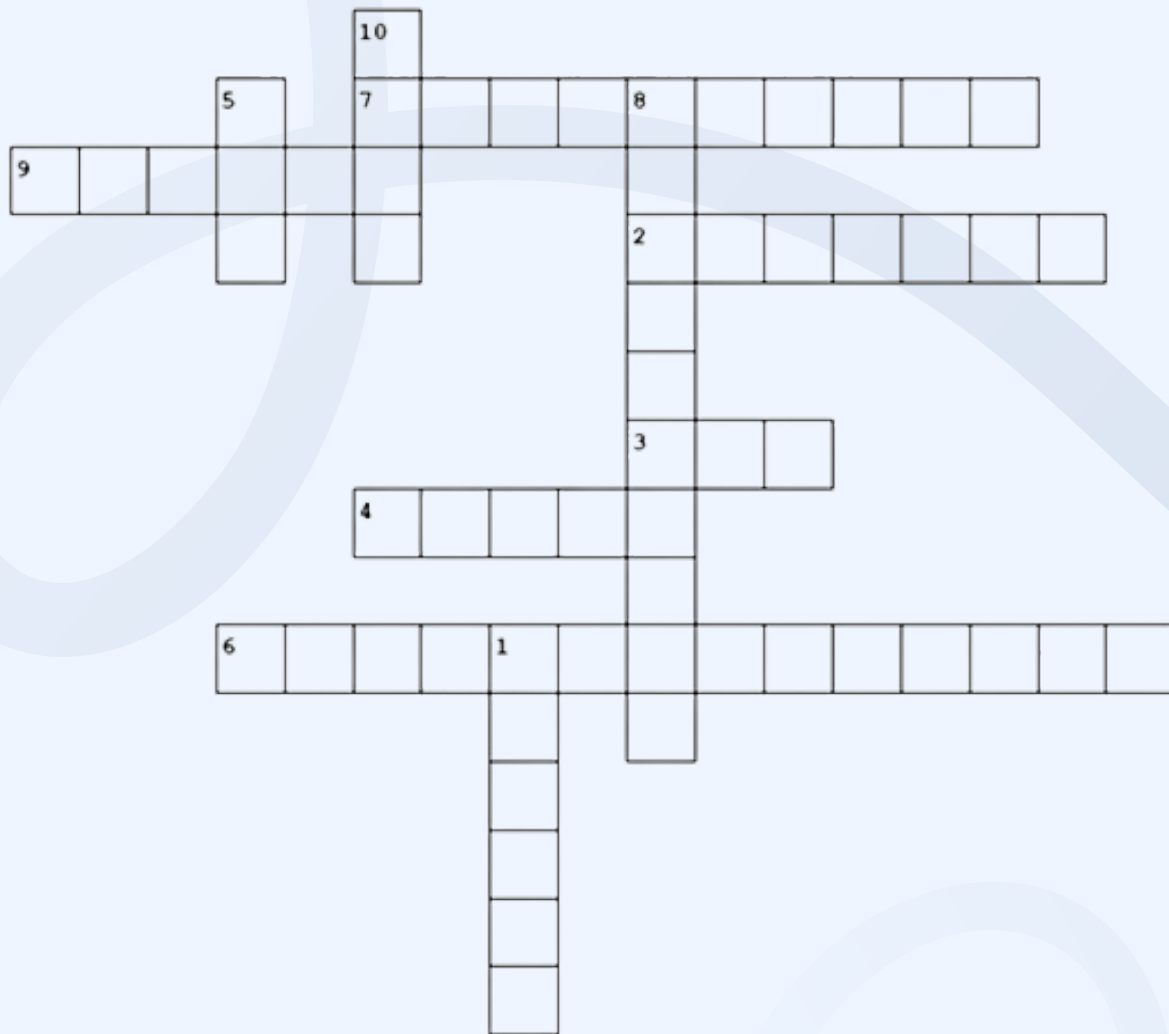
Across

2. The ARM-based system-on-a-chip (SoC) that shook the competition in 2020
3. India's own digital payment system
4. The SolarWinds hack was given this tagline
6. Our article on the future of mobility deals with the solution to this problem
7. The largest open API in the world
9. Quantum Computers use these to run multidimensional quantum algorithms

Down

1. Global partner of F1 working on the Fuel of the Future
5. The telecom operator leading the 5G revolution in India
8. The Father of AI
10. A designing approach to CPU architecture

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WORDSEARCH 2022

10 Important Libraries of Python

```
D O P E N C V A L R G Q S Y B
M R Y T R U P Q E U S Y K I H
P A N D A S M T D E R U L E E
F Z F X C F N P A D L T E M A
V N E A S I F B Y X O L A O Q
G A B Y K O O V Z L K G R Q P
K P A T Y R O J P B T K N X Q
R D S I N O R T E P L H T W R
F N M E B D A K J G N C T R X
H S C L O M E Y B A N D T W M
D V A P C X W J S X L H D C P
G O B R B B Y G R S F U X Z P
X Y X O E G L H R V V B M X Q
V C G W J K G C E E F V N M S
W O L F R O S N E T X X M Y L
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keras matplotlib nltk

numpy opencv pandas

seaborn sklearn tensorflow

tkinter

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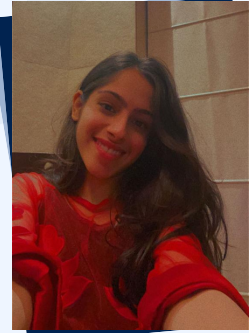CHIEF DESIGNER

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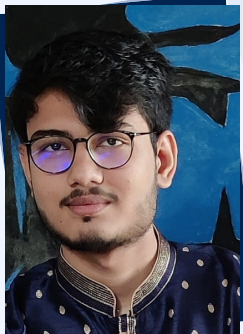
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