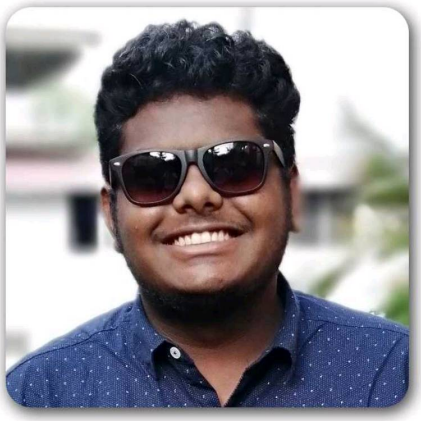
ISA Maharashtra Section

VES Institute of Technology

ENVISAGE 2021

TECH & PANDEMIC

Editor's Note



Dear Reader,
As the year filled with thrilling, technical and fun events has come to an end, the editorial team of ISA VESIT proudly presents you its annual magazine, ENVISAGE' 21.

While this pandemic has brought unprecedented challenges for both people and society, we have seen a wave of inspiring new ideas developed in response. To say that the way society implements technology in day-to-day life has changed over the past year, would be an understatement. To commemorate this determination and strength, we at ISA VESIT are proud to announce this year's theme for ENVISAGE' 21, "Tech and Pandemic"

This magazine curates for you, the technical knowledge of various fields ranging from Cryptography, Facial recognition and Electronic skin. It also tries to give you a glimpse of events that ISA-VESIT has conducted during the academic year 2020-21 through Distance Learning.

Tanmay Pandit
Chief Editor

Editorial Team

Abhijeet Gaonkar
Jr. Editor

Mahek Tardeja
Jr. Editor

Janhavi Bhutki
SE Co-ordinator

Omkar Hirugade
SE Co-ordinator

Nidhi Mundhada
SE Co-ordinator

Hrutika Pakhale
SE Co-ordinator

President's Words

"Cruising through uncharted waters" would prove to be an understatement to describe my ISA-VESIT journey. I say this based on all the experiences, camaraderie, and development I got to experience in the last three years. As I look back, I consider this part of my life to be one of the most important ones both professionally as well as personally, and hence will cherish it all my life. I have always considered everything that ISA-VESIT provides, to be a service to its members and the society. This sense of belief was inculcated in me and my fellow council members through the unparalleled guidance and mentorship of our senior councils to whom I will forever be indebted. Under their leadership, I witnessed the revolutionization of the way ISA-VESIT functioned over the years and this only motivated me to strive harder to scale new heights.

Covid-19 has proven to be a nightmare to the world. Through these testing times, I can rightly say that ISA-VESIT has been resilient and determined to be relevant and true to its aims and motives. I would like to thank our dear faculty advisors Prof. Mr. N. Gopalakrishanan and Prof. Mrs. Jayassre Ramakrishsnan for being nothing less than true visionaries, whose years of experience and guidance complemented our efforts in serving our members.
I thank my dear B.E. Council for standing resolutely with me through all our plans and endeavors which have proven to be successful. I take great pride in saying that I am honored to have led two of the most vibrant junior councils in the history of ISA-VESIT. This year due to the restrictions inflicted by the pandemic we had to revamp our approaches and redefine the way events and workshops were conducted. We as a team have been successful in transforming the adversities into opportunities. Right from delivering IoT Kits to our members to providing expensive components from our hardware inventory, we have ensured that distance and home confinement did not hamper learning. By introducing newer project-oriented formats of workshops, ISA-VESIT has been bold enough to focus on application-based learning over the age-old certificate-oriented rat race.

A society is as good as its members, I will forever be grateful to the hundreds of our members who have not only patronized events but also motivated us to deliver the best. Special thanks to the 820+ YouTube subscriber community for your unwavering support. With this closing note, I would like to extend my gratitude to the torch bearers of ISA-VESIT namely the T.E. and S.E. council. To the T.E council members, you all have groomed yourselves into fine leaders, and have shown uncommon zeal and dedication. To the S.E. council members, I am honestly proud to see the way you all have worked as a team and proved your mettle individually even under challenging circumstances. I am not wrong in saying that the future of ISA-VESIT is indeed promising.

I, on behalf of the entire B.E. council, wish the junior council members the best of luck with their future endeavors.
"Your work makes a difference in the lives of people, so go leaps and bounds to implement what you believe in."

Signing off as President, ISA-VESIT 2020-2021.

Lewin Noronha
President

Secretary's Words

A single decision can change your life. I met a group of total strangers who believed in my work and I was fortunate enough that they considered me to join ISA-VESIT. From the experience of the first-ever interview to some remarkable incidents, my journey at ISA-VESIT started as a SE coordinator. I did not know what to expect or what would be expected from me, but my only intent was to gain some experience, interact with new people and perform well in the assigned work. Little did I know about the path awaiting & that I can get attached to a council to an extent, unfathomable. ISA-VESIT has become an inseparable part of me now.

Circumstances happening in the year 2020 & the Covid crisis have led to many unusual situations. This academic year was indeed a challenge for everyone. With the help of our BE council, my fellow TE council members & SE coordinators, I believe that we have tried our best to tackle the problems & deliver the most beneficial content to our members. From conducting project-oriented workshops on diverse domains like Image Processing and Design Thinking to 'Delivering IoT Kits at Doorstep' initiative & organizing competitions like Elucimate & Hardware Auction, ISA-VESIT makes sure that our members are always engaged in learning. Conducting a whole academic year online was an adventure & we enjoyed it. As a secretary, I am proud of being a part of the council that fought with resilience through thick and thin.

I wasn't always a leader, but ISA-VESIT gave me a chance to discover myself & I am ever grateful for that. I got to learn some intriguing technology stacks. I have gained a lot of confidence in myself and I can say that I have improved my punctuality. Above all, I feel confident in articulating my ideas to people. I look forward to learning even more with this amazing group of people.

ISA-VESIT is growing and with our ambitious & sincere SE Coordinators, it will continue to do so. A leader is nothing without a great team; all the credit goes to my TE Council for always being there. Every successfully executed plan is a mark of that. I sincerely thank our faculty advisors, Mr. N. Gopalakrishnan and Mrs. Jayassre Ramakrishnan, for their guidance and my senior council members for their invaluable advice. I can proudly say that those total strangers have taught me so much, I'll cherish them forever.

Signing off as Secretary, ISA-VESIT 2020-2021.

Raj Rajan Talashilkar
Secretary

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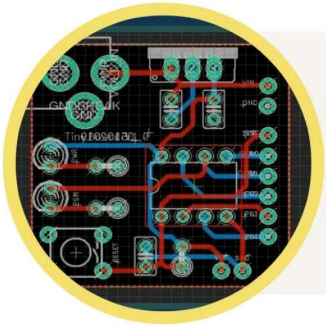
Events of the year

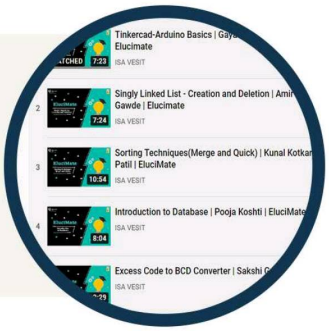


Microcontroller Board Development

Through this workshop the topics covered in this session enriched the theoretical and technical acumen of the participants regarding ATtiny85, Eagle CAD and GIT software. Participants were also taught about creating a schematic from scratch and were briefed about the basics.

Elucimate

ISA-VESIT successfully conducted a video-making competition wherein the participants were asked to create a short video on any topic related to the engineering curriculum. All the videos were then uploaded on our ISA-VESIT's YouTube channel.

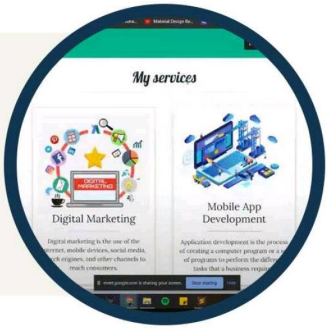


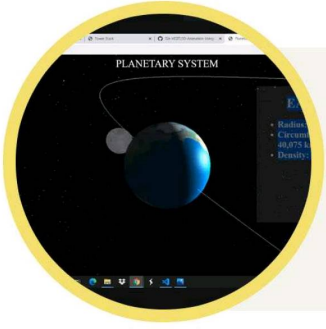
Web Automation

It was a great workshop where the participants were introduced to Selenium and its various applications. The workshop also included the creation of a WhatsApp bot and how to automate the Google Meet sign-in process.

Front End Development

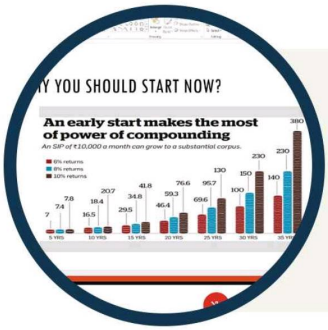
ISA-VESIT conducted its two day online Front End Development Workshop which included basics of HTML, CSS and JavaScript. All the necessary and required concepts of creating a website were elucidated.





3D Animation using Three.js

With the onset of an even semester, ISA-VESIT geared up with enthusiasm, conducted its first workshop on the need-of-the-hour and the future-of-the-internet, 3D Animation using Three.js. The workshop whipped up all attendees to set foot into the field of three dimensional animation using Three.js.



Financial Independence Workshop

ISA-VESIT organized a Finance Workshop exclusively for the TE's and BE's with a vision to help members polish their proficiency in the ever-blooming domain of financial planning and its various aspects. The students were briefed about equity markets and there several investment strategies were discussed upon.

B.E. and Beyond

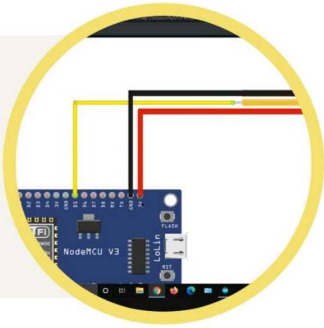
ISA-VESIT conducted 'BE and Beyond' workshop where a diverse set of speakers shared their strategies and experiences with the participants. They provided valuable insights on competitive exams like GRE, TOEFL, IELTS , CAT, GATE and latest trends in the world of MBA while the attendees were made privy to placement rules.

IoT Workshop Mains

ISA-VESIT launched its IoT kit initiative and delivered the hardware components to its members at their doorsteps. This helped the members to get started with working on their hardware projects using various IoT components like NodeMCU boards, MPU sensor, LDR, etc. It also brought in a plethora of opportunities for the participants.

IoT Workshop Advanced

ISA-VESIT conducted "IoT Workshop - Advanced" which focused on amalgamating various IoT components and online IoT services. Various projects using sensors like PIR Sensor, Ultrasonic Sensor and DHT11 module were covered. The output of the sensors were linked with the web based applications.



Article Writing Competition

An Article Writing Competition was conducted by ISA-VESIT wherein the participants had to integrate their literary and technical knowledge. The participants were allowed to choose from a wide range of technical topics and jot them down into words. Articles covering a broad spectrum of topics were submitted by the contestants.

Image Processing Workshop

The workshop covered the basics of Image Processing technology as well as some real hands-on projects. The participants were provided insights on using the image processing libraries like Open-CV and Matplotlib in Python and also developing a ping pong ball game.

Dynamic Web Application Workshop

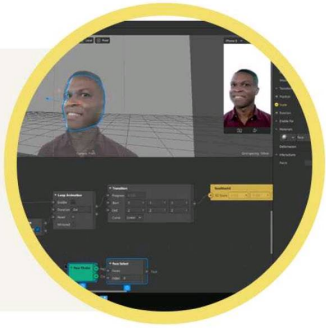
The workshop began with a brief introduction of Web Development. The participants were then introduced to the backend working of a webpage and were acquainted with Django by explaining its benefits. The session covered building of an interesting project, a webpage which displayed the logos of all the IPL teams.

Leaflet.js Workshop

ISA-VESIT conducted a workshop on Leaflet.js during e-Praxis' 21. The participants were introduced to Leaflet.js, fundamentals and various layers in the maps. The outcomes of the session were understanding of JavaScript and features of Leaflet.-js. Participants also developed a game, 'Guess the places'.

Filter it Out

Through the workshop the students were introduced to Spark AR Studio. The participants were taught how to design customized filters to use on various social media platforms. They demonstrated the use of face tracker, face mesh and basic operations of rotation and scaling to make the filter aesthetically appealing.

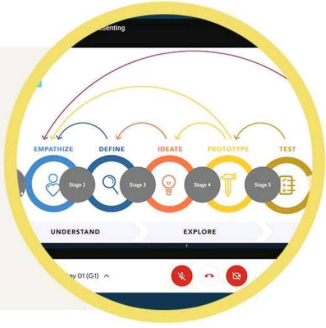


Hardware Auction

ISA-VESIT conducted it's multifaceted event where the participants engaged in three distinct rounds, viz. Bidding, Bargaining and Building through the course of the event. A competitive spirit and fierce attitude to win the contest made this event a great success.

Design Thinking in Engineering

ISA-VESIT organised the Workshop conducted by our distinguished alumnus Mr. Mihir Lele. The participants were exemplified about the concept by the use of case studies of various companies. At the end of the session, some problem statements were handed over so as to work and implement the knowledge they learnt.



The International Society of Automation -Your Connection to Automation

The International Society of Automation is a nonprofit professional association that sets the standard for those who apply engineering and technology to improve the management, safety, and cybersecurity of modern automation and control systems used across industry and critical infrastructure. ISA serves both process manufacturing industries, like chemicals, food and beverage, oil and gas, and pharmaceuticals; and discrete manufacturing industries, like automotive and aerospace.

Founded in 1945, ISA develops widely used global standards; certifies industry professionals; provides education and training; publishes books and technical articles; hosts conferences and exhibits; and provides networking and career development programs for its 40,000 members and 400,000 customers around the world.

How does ISA bring value?

For engineers, technicians, and management engaged in industrial automation, ISA is the trusted provider of standards based foundational technical resources, driving the advancement of individual careers and the overall profession. ISA brings the right people together to create the technologies of the future and share best practices with the next generation of automation professionals.

ISA's Core Competencies—At a Glance

Standards

ISA is recognized globally for the development of consensus industry standards for automation technologies and applications in key areas such as security, safety, batch control, enterprise integration, wireless communications, traditional instrumentation, measurement, and control; and has produced more than 150 standards documents. 4,000+ automation professionals, on 140 committees have been involved in the development of ISA standards.

Certification

ISA certification provides an objective, third-party assessment and confirmation of a person's skills, and gives them the opportunity to stand out from the crowd and be recognized. ISA currently offers two certification programs: Certified Automation Professional® (CAP®) and Certified Control Systems Technician® (CCST®). ISA also provides three certificate programs related to the ANSI/ISA84 safety instrumented systems (SIS) standard and five ISA/ IEC 62443 Cybersecurity Certificates.

Education and Training
ISA is recognized worldwide as a leader in non-biased, vendorneutral education and training programs for automation professionals. More than 100 courses are led by practicing industry experts who offer indepth, real-world coverage of topics critical to automation and control success. ISA offers training in the following diverse formats:

- Instructor-led, classroom courses in several locations in the US and select locations worldwide
- Customized training brought to your location
- Online, instructor-assisted training courses
- Live and recorded webinars
- Online courses
- DVD courses

Publishing
ISA is the authoritative publisher of technical resources covering the automation profession. Written and reviewed by experts, these publications help keep automation professionals fully informed about the latest technical developments, applications, trends, and standards.

Conferences and Exhibits
ISA hosts numerous annual events worldwide that provide quality education, the latest automation developments, and real-world scenarios, with presentations delivered by experts, peers, and industry leaders. ISA's technical Division Symposia include the ISA Analysis Division Symposium, the ISA Food and Pharmaceutical Division Symposium, the ISA International.

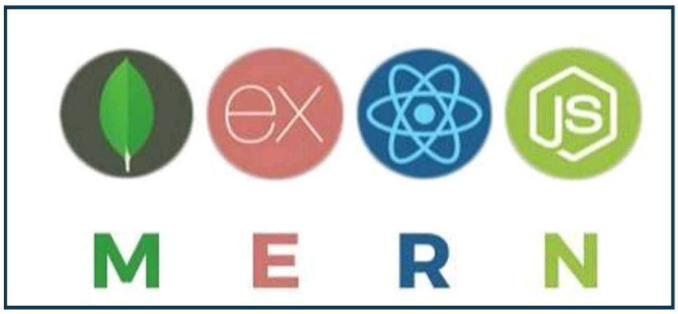
Membership
ISA offers individuals the opportunity to join the Society and gain access to dozens of valuable benefits, including discounts on training, conferences, and professional development resources; free viewing of ISA standards; subscriptions to InTech magazine and other technical publications; free online catalog of technical web seminars; and much more. ISA's 140 geographical Sections, located throughout the world, connect members with technology, expert advice, and world-class programming at the local level, while ISA's technical Divisions feature opportunities to networkand learn from industry leaders.

Hands-on training using authentic equipment is a signature of ISA technical training.

MERN Stack: A path towards successful websites

-Aditi Singh

Technology has new updates every day. A website with mere HTML, javascript, and CSS won't do any good to your website. But hey, here comes MERN stack to your rescue. MERN stack is the best framework for full-stack web development. It comprises four open-source technologies namely MongoDB, Express, Reactjs, and Nodejs. It plays a significant role in the development of web applications.



Let's dig deep into its components. Are you tired of writing tedious queries? How wonderful It would be for a function to do the work of a lengthy nested query! , and that wonderful thing can be done by MongoDB.It is a no-SQL database i.e. it stores data in JSON-like documents. If you want to find records where Technology is "MERN stack", SQL for this will be- `SELECT * FROM table_name where Technology=" MERN stack"`. Now with Mongodb, this can be done with merely 2 or 3 words i.e. findall({Technology:" MERN stack"}).exec(), isn't that great?. It has rich and expressive query language that allows you to filter and sort by any field, no matter how nested it may be within a document.

But you must be wondering that data in tables is quite better than data in JSON(Javascript Object Notation) format. Well, It has a solution for that too. Take a look at MongoDB compass it's GUI will show you data in your preferred format. It makes working with data easier.

Express.js is the fast, unopinionated, minimalist web framework for nodejs. It helps us in writing our server code. It helps us define routes and send data to the backend, fetch data with get, post, put, etc. requests.

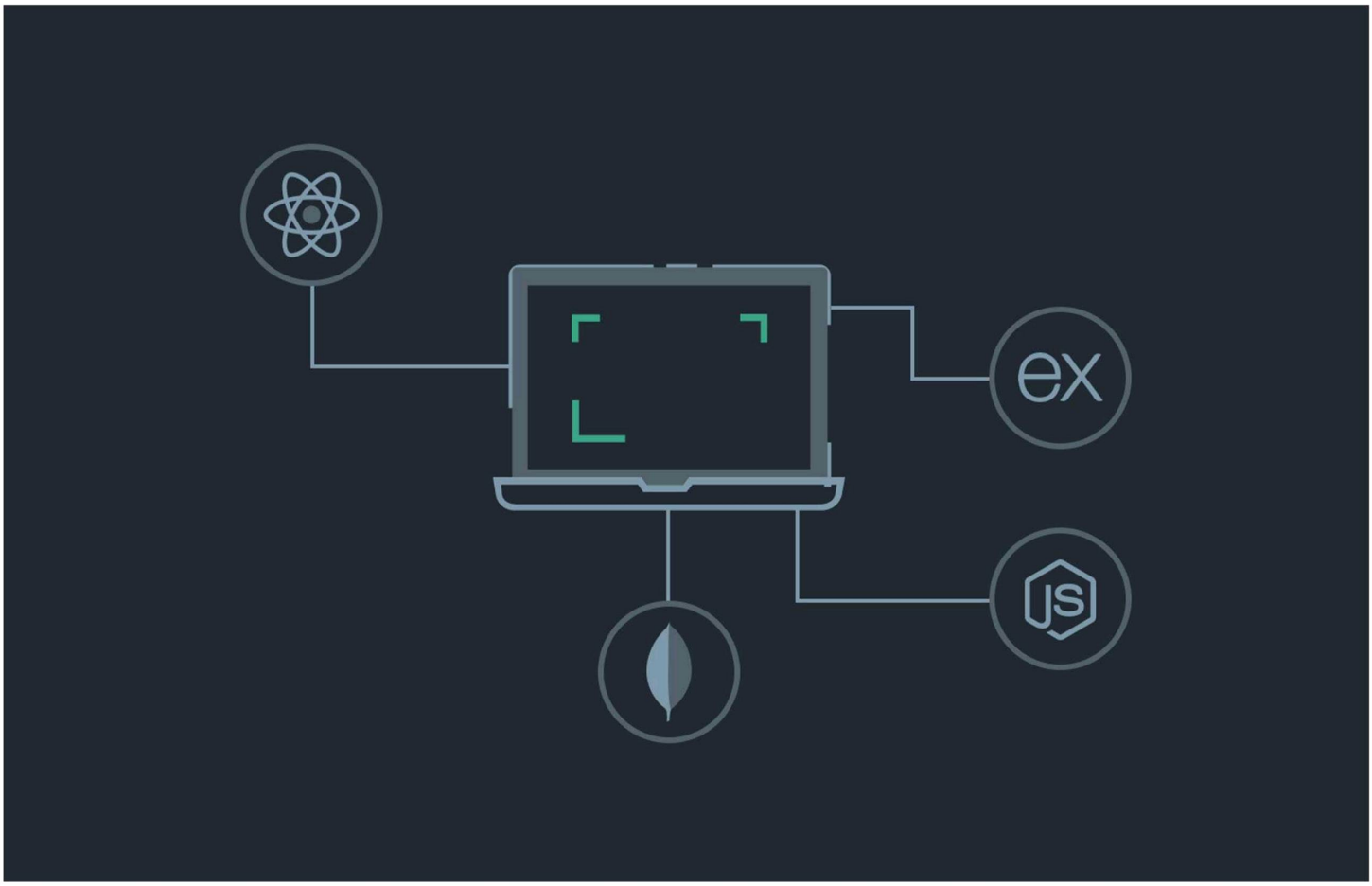
Reactjs is a JavaScript library for building user interfaces. It is declarative. What does it mean to you? For a programmer, your changes will be updated automatcally i.e. React takes care of updating the view as you edit and save your code. Its basic building block is components, which help us to manage the state and create interactive UI components. These components can be stateful i.e. class components as well as stateless which are functional components. You must be wondering how you could use functional components? here goes the answer, react hooks come to your rescue, and believe me they are much better than using class components.

With hooks you have access to your components' latest values and events occurring on them and perform some tasks on them, you can even build custom hooks.

Lastly, we have Nodejs, It is a free, open-sourced, cross-platform JavaScript run-time environment. It uses asynchronous programming which enhances UI and eliminates waiting for a particular task, it switches to the next task in the queue instead of waiting for the previous task to complete. Also, it has many modules to make our work easy, with simple installation steps, which are brought by npm. npm is the package manager of nodejs, you can download third-party packages using the "npm install package_name" command.er at the disaster is minimal.

In a nutshell, MERN is the core of web development. Many successful companies like Netflix, PayPal, LinkedIn all of them have mern included in their tech stack.

So by this you can assume how powerful this technology is!. I hope this motivates you to learn more about this amazing technology, embrace your web development skills and **make a difference!**



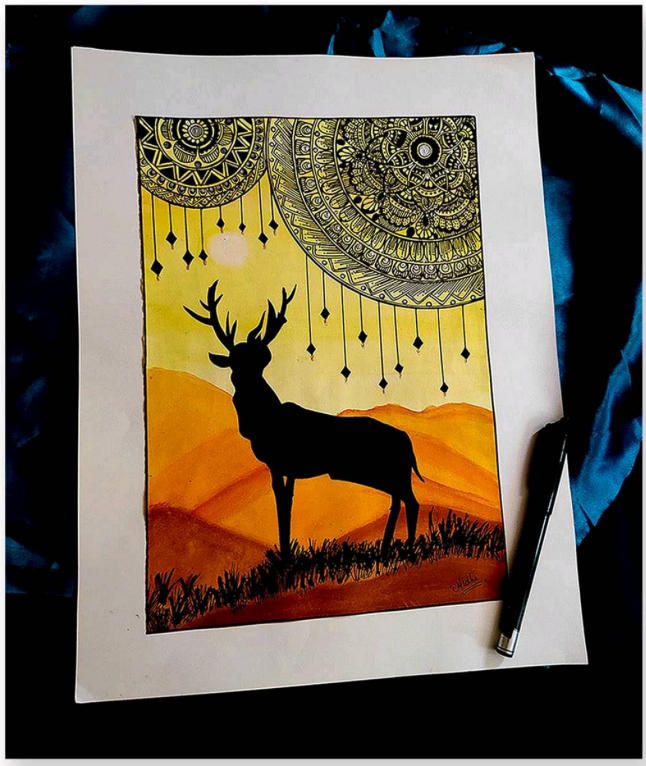
"Kuch Creative Corona 2.0!"

Featured Artworks

By Vashudha Sasikumar (D9A)

By Kedar Deshpande (D11B)

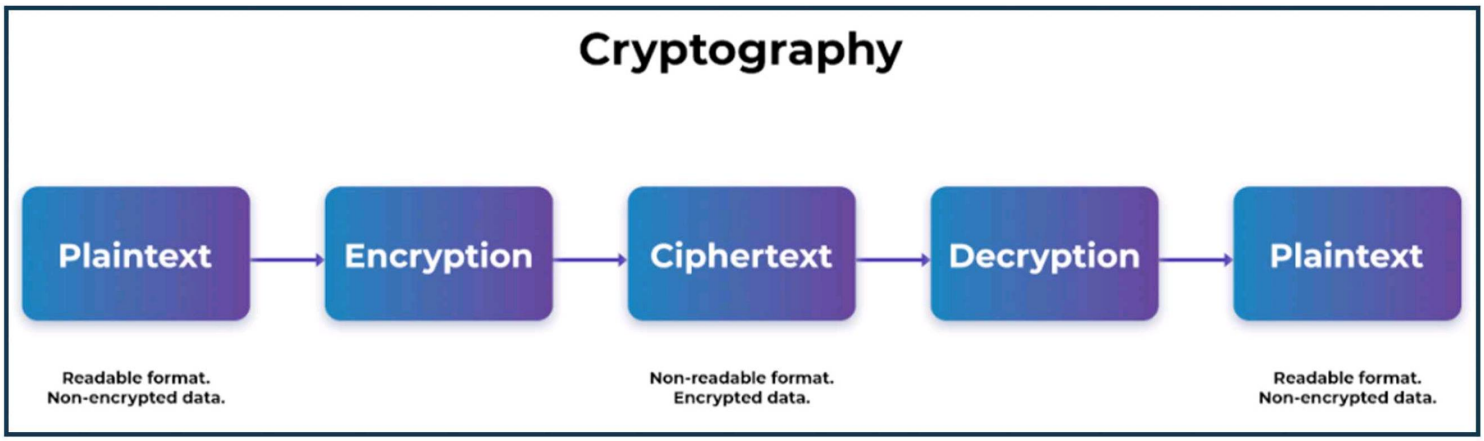
By Hrutika Pakhale (D8)



By Nidhi Mundhada (D9B)

Cryptography: The Knight in Shining Armour or A Damsel in Distress

-Kartik Avhad



Cryptography is a mechanism of protecting data and communications through mathematical and computational techniques of encoding and decoding data in the presence of adversaries. The word crypto is derived from the Greek word 'kruptos' which means hidden or concealed and the suffix 'graphy' refers to writing. This modern-day technique can be thought of as the intersection of Computational Science, Mathematics, Communications engineering, Computer Science and Modern Physics. Its application includes chip-based cards (Visa, Mastercard, RuPay, American Express and Europay), e-commerce transactions, confidential communication, digital currencies.

Modern-day Cryptography narrows down aspects like (i)Confidentiality: Information will only be transmitted to the concerned or addressed person,

(ii)Integrity: Information or data cannot be modified in the process of storage or transit and this modification being notified as an error,

(iii)Non-repudiation: The source/dispatcher cannot deny at a later stage about the transmission and origin,

(iv)Authentication: The recipient's and the sender's identity is confirmed before the information is transmitted.

Prior to the 1990s, the words Cryptography was often used as an alternative for Encryption. Encryption is the method of converting information from an understandable state to some codes. Decryption i.e conversion of codes again to a readable form can be only done by the recipient of the message as assigned by the sender. This turned out to be a huge step for two or more people to have a secure conversation without the fear of being watched.

Another major application is Cryptocurrencies like Bitcoin and Ethereum, which have gained a lot of attraction in the past few years especially because of their anonymous nature. Bitcoin, Ethereum and other blockchains- based currencies are heavily dependent upon cryptographic methods for securing the transactions. It does not require the authorization of the Central Authority like The Reserve Bank and the concerned government. Bitcoin drew a lot of popularity on social media because of its high value in the current day.

But everything is not what it seems, various messaging apps which guarantee end-to-end encryption have been used for illicit activities to bypass the police force. In the recent attacks in Jammu and Kashmir and terrorist attacks in Paris and London that the attackers were being contacted through such apps. The situation in India is much worse as the proper legal framework is missing and the Information Technology Act was actually majorly amended in 2008. Therefore, there are not many legal provisions available. Even the cryptocurrencies which were mostly banned in the country until the Supreme Court overturned RBI's circular, are said to have a negative impact on the financial stability of the country's economy. Also, due to the missing of any central authority, it has been seen that it does not leave a trail and thereforeit is very difficult to track the anonymous sender. The money has been used to purchase illegal items in the past, present and might continue to do so.

The system is not that perfect and many loopholes are being exploited by miscreants today. So there has to be a balance between our rights, our freedom and the nation's integrity, sovereignty and security which cannot be undermined. Therefore, it is the responsibility of the authorities and the general public to come together and put forward a legislation that will keep our country intact with the people reaping the benefits of the applications of modern-day technologies like Cryptography.

Facial Recognition and the sacrifice we made for it

- Nidhi Nair

To increase my knowledge in the tech space, I attended the Image Processing workshop organized by ISA. It blew my mind how easy it was for the computer to detect human faces, regardless of how diverse we look, only with a few lines of simple code. This is a paragon of how far we've come in terms of innovation. With a mere tweaking and higher-level algorithms, anyone can collect and create databases of different human faces.

In the year 1964, a group from Panoramic Research became the first to pioneer the wave of research towards facial recognition. However, it would take until the 1970s for us to finally see notable published work in this field. And 50 years since then, we have come to the age where facial recognition is deeply embedded into our day to day lives.

Facial recognition works much like our human brain; we see through our eyes, the human mind makes sense of what we see and our memory tells us who we are looking at. The eyes for this system are digital cameras. The algorithm makes sense of the image by finding patterns and measuring distances between notable facial features. The system then looks for similar patterns in the database of already available faces and then helps to identify the person.

Now the internet has become the eyes for this system. As soon as we started uploading our pictures online it had become the place for many algorithms to learn and recognize all sorts of faces. If the system only had a collection of faces of predominantly white descent, now it has the knowledge of all face shapes and features. We also helped in creating even bigger databases by giving our name and personal information. If we do a reverse image search on search engines like Yandex it can also give the name and personal information of the face. These search engines have turned on facial recognition and thus anyone can simply take unsolicited pictures and find out the name or personal information of the person.

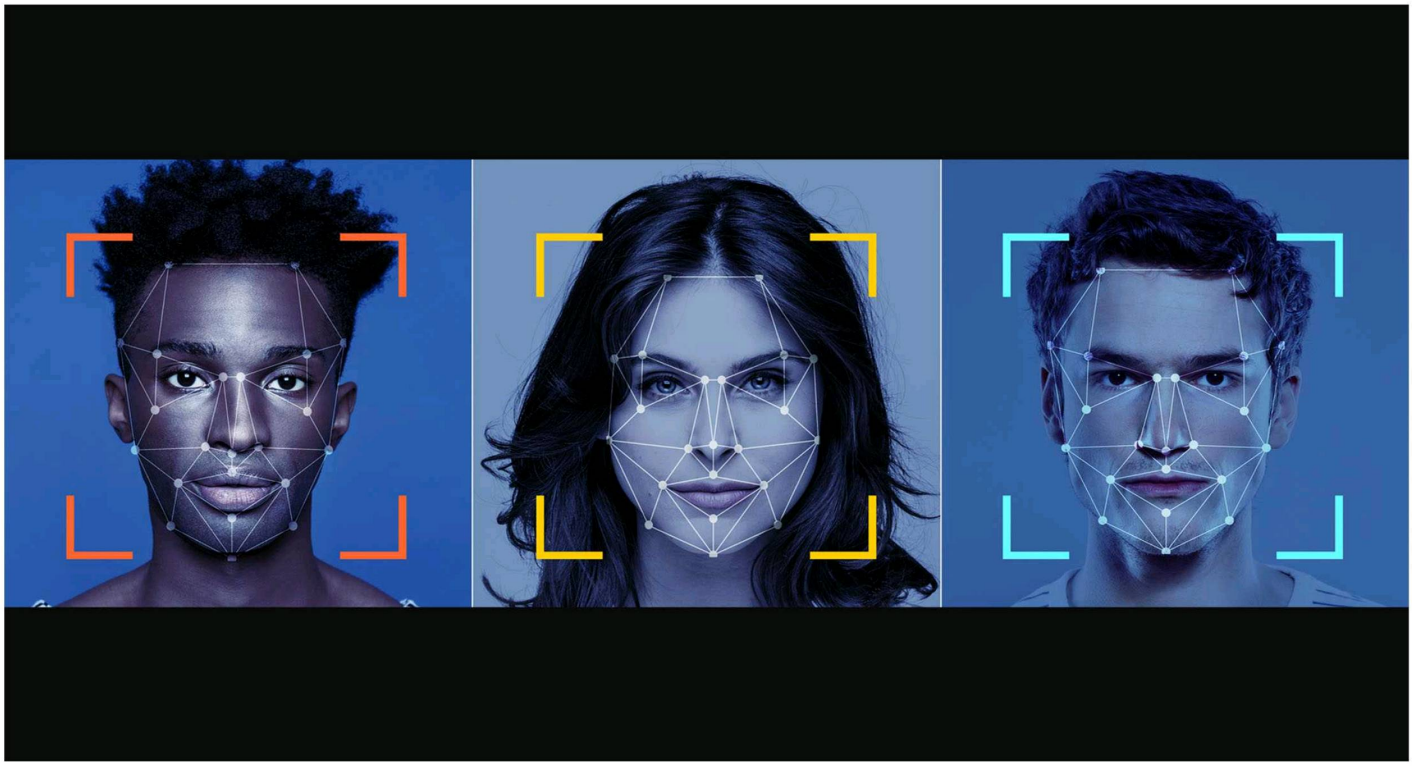
Privacy and anonymity have become a huge issue due to this technology. The biggest registry of faces and names is available to the government. This provides the state with immense power. We have seen the destructive side of this power as many have first hand witnessed the injustice subjected by the law enforcement in America during the Black Lives Matter protests. Police have used footage of peaceful protests available online to identify participants.

Facial recognition also has helped us in many ways, especially in the criminal justice system. Many wanted criminals have been caught with the help of facial recognition on CCTV footage. But this technology has also done a major disservice to people of colour, as the algorithms are made have also used outdated stereotypes on people with similar facial features. Many have ruled out people with darker skin tones as more likely to commit heinous crimes. Even in developed countries where most defence departments use this system, prejudiced biases have been put into algorithms and this has unjustly persecuted darker skin people for longer sentences compared to their lighter skinned counterparts.

Racial fuelled biases can also be seen in many social media platforms. We see many examples of this every time we surf online. It is well known that algorithms on Instagram and TikTok push people with Eurocentric features into higher popularity. They use facial recognition to identify faces that match a set beauty standard and then push these creators higher into the popularity algorithm. A viral experiment on Twitter also exposed that faces that have white features are most likely to be focused on in the image tweeted.

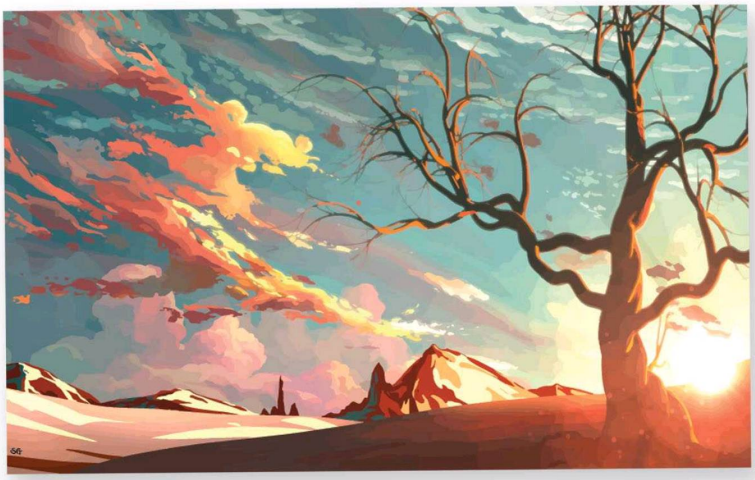
Facial Recognition without doubt is one of the most amazing feats in technology; we can unlock our phones with a simple glance, rely on it for banking verification and much more.But regardless of all these positives, the negatives of this technology will outweigh them as long as it infringes on our human rights and safety. We can always improve algorithms to be more inclusive and to diversify our social media platforms but only if the people who are responsible for it take up themselves.

“It's not a faith in technology. It's faith in people.” Just as Steve Jobs had said, the good that comes out of the technology is all dependent on the one who uses it.



"Kuch Creative Corona 2.0!"

Featured Artworks



By Srushti Gharat (D8)

By Janhavi Bhutki (D9B)

By Mahek Tardeja (D14A)

By Esha Chavan (D9A)

Electronic Skin: Is it the future of revolutionary human mimicking devices?

-Rudrakshi Deshpande

What exactly is 'Electronic Skin'?

Well, electronic skin is a device with stretchability, flexibility, high mechanical strength and self-healing properties as its main features to be able to mimic the functionalities of human skin. To implement electronic skin, we need a strong and robust combination of electronic embedded systems, sensors along with the advances in chemical properties of a material. This ultra-thin layer of tactile sensory material is spread over a large area mimicking the properties of skin such as thvat of responding to the external pressure, heat, sense of pain and a lot more. Its complex structure, delicate task performance and wide functionalities make it pretty difficult challenge to develop an electronic skin. However, researchers have successfully developed a malleable, self-healing to a very high extent.

But the main question is how is electronic skin built?

Currently, these electronic skins are made of polymer-based materials, micro-structured nickel particles in polymer networks with a combination of conductive materials yet there are several advances for better flexibility and conductivity of these network with the help of silicon which gives a texture close to that of the skin and better mobility materials with a combination of nanoelectronics, photovoltaics (PVs) and programmable materials.

A team led by KAUST Postdoc Yichen Cai and Jie Shen have developed a durable e-skin using a hydrogel reinforced with silica nanoparticles for strength, and can be stretched up to 28 times of its original size, along with 2D titanium carbide MXene for sensing, bound together with highly conductive nanowires is said to having a sense of an object from about 20 centimeters and respond to stimuli in barely 1/10th of a second!

Commercial PVDF (polyvinylidene difluoride) sheets are used as they could be stretched and poled below polymer melting point and very high electric fields. skins are developed.

Piezoelectric field and active nanomaterials are integrated with the skin, along with this thin-film transistors and ultra-thin ICs can be a breakthrough to how electronic skins are developed.

That being said, how does an electronic skin work?

In simple words, these are wearable devices and are supposed to adhere well to the skin (something like a tattoo) so they don't slip off during any movement, next they require tactile on-chip sensors integrated for a quick sense of any physical changes to the external environment along with artificial intelligence to respond to the stimuli and subject to any changes in external pressure. These devices finally need to be powered through a power supply.

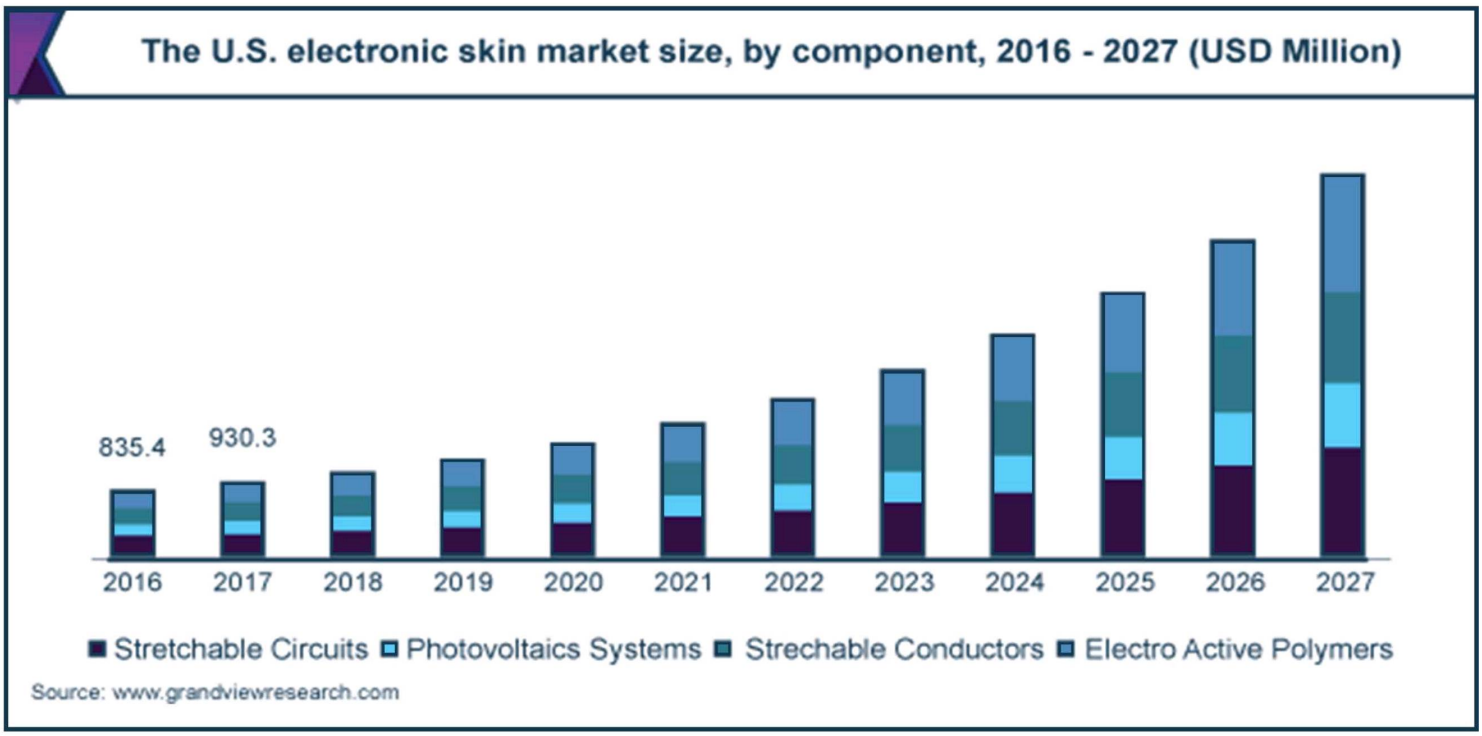
This complex circuitry thus makes it pretty difficult for the electronic skin to be implemented on a wide scale, however, scientists have already started working on developing self-powered electronic skin. Just as that of other wearable devices, the electronic skin is also capable of monitoring health, can focus on the vital signs, detect brain waves, give feedback to the user and is capable of detecting acceleration and trajectory.

Are there any issues with electronic skin?

The most important issue which is addressed is the implementation of ultra-thin material with complex circuitry. Such a high density of components used in sensing and processing of data need to be integrated efficiently within a short width of the material. Next, comes the issue of conductivity for the networks in combination with highly malleable and flexible structures, although there has been some success, the use of semiconductor, photovoltaics, electrodes for conduction does come with some amount of rigidity. With a combination of flexible material, sensors and transistors lose some amount of conductivity and are susceptible to low mobility. Due to such high functionality, there is a possibility of the battery getting drained out. Finally, the initial cost for designing and developing an electronic skin is tremendously high.

The future prospect of electronic skin.

Electronic skin is still said to be in its initial stage but looking at the advancements we can say that it has a huge potential to bring a change in the existing health system and might act as a ray of hope for several people. With the shift in focus towards better health monitoring systems, better health facilities and easy usage along with high durability, electronic skin can be breakthrough technology going forwards. They can potentially play an important part in next-generation prosthetics, robotics and artificial intelligence in the biotechnology world. With a much larger focus on nanotechnology, the possibility of electronic skin seems to be coming closer day by day. Going forward e-skin might also help those with disabilities and thus become a revolutionary human mimicking device.



Data Visualization: Storytelling with Purpose

- Saritha Tharakan

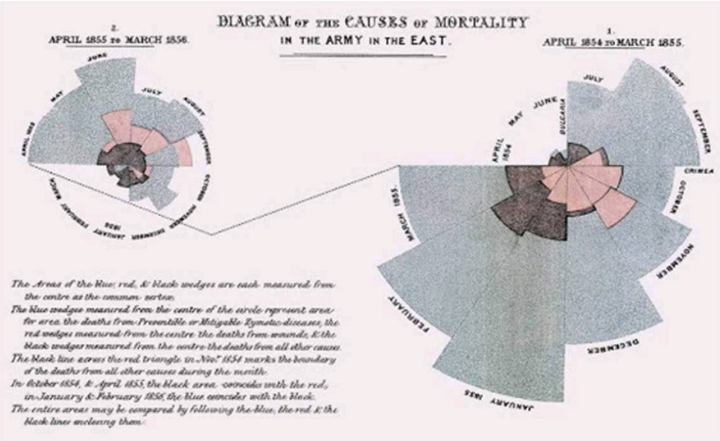
During the COVID period the newspapers and media hav been filled with different visualizations depicting the increase in COVID-19 cases, recovery and so on. All of this can be termed as 'Data visualization'.

The first picture that we associate with Data visualization would be a pie chart or bar graph in a project presentation. But a simple chart is just the tip of the iceberg.

It's not simply as easy as just dressing up a graph to make it look better or slapping on the "info" part of an infographic. Effective data visualization is a delicate balancing act between form and function. The plainest graph could be too boring to catch any notice or it makes tell a powerful point; There's an art to combining great analysis with great storytelling.Infact in today's data driven world visualizations are not just a complement to a written story but could be a mainstream story in itself.

The Art of Storytelling:

Storytelling has been a skill that humankind has successfully utilized and improved over the years as an effective means to pass on information.



When combined with visualizations stories can persuade twice as much as hard data. In the era of social media, where we are exposed to a lot of visual content day to day, storytelling gives us a competitive edge to attract attention in an easier way and get the message across.

The key elements in effective storytelling are:
1. Relevant data
2. Visual appeal
3. Engaging narratives

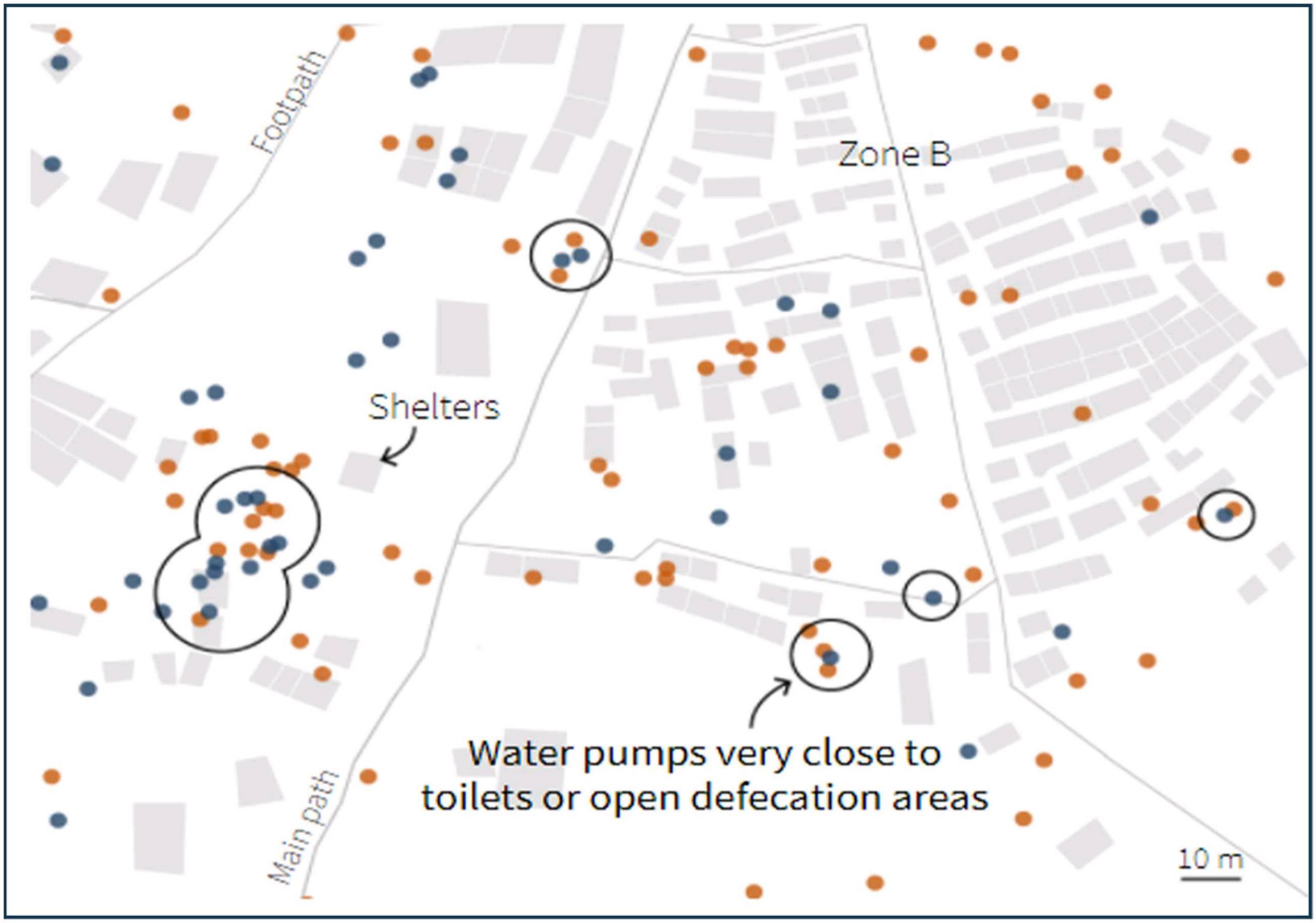
A clear idea about the audience and the purpose along with these 3 key elements ensure that we help people to connect dots and give a new meaning to the data.

The purpose and impact:
One of the earliest examples, is the data visualization used by Florence Nightingale to depict the causes of mortality of soldiers in Crimean wars.

Nightingale was horrified by the unsanitary hospital conditions during the war period and more so after the mortality rate at the military hospital she worked at spiked to a 42 percent. She gathered data and kept a record of how the soldiers had died- battle wounds, contagious diseases and other causes. She then started a campaign to improve the conditions. To gain support from England she arranged all the collected data into different graphical devices like bar charts, scatter plots, line charts and so on.The polar-area diagram accompanied by efficient color-coding being one of the most popular among them. Nightingale's recommended reforms for battlefield hospital camps were embraced and helped to save countless lives.

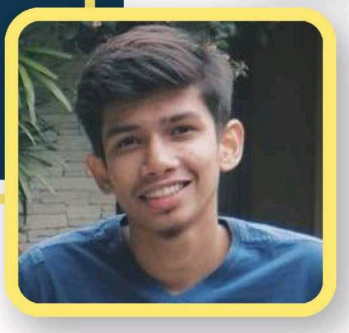
One of the best examples in the present age, is the 'Life in Camps' by Reuter Graphics. It is a visualization of the poor living conditions-high density settlements, overcrowded and shallow latrines and so on in the Kutupalong refugee camp near the southern tip of Bangladesh, home to nearly 600,000 Rohingya Muslims living in Bangladeshi refugee camps that have fled ethnic cleansing in Myanmar. In a corporate setup, data visualization can identify areas that need attention or improvement.

Clarify which factors influence customer behaviour. help you understand which products to place where .and predict sales volumes.All in all, data visualizations with a compelling story about your brand or product is a powerful marketing technique to be used.Whether one wants to leverage data for brand promotion or convince the public and authorities to take action, visual storytelling becomes a key part of the strategy.



Map that shows a number of latrines with tube wells nearby in northern part of Kutupalong settlement(Left) and Map showing Structures at risk of landslide(Right)

AI to the rescue in preventing Wildfires

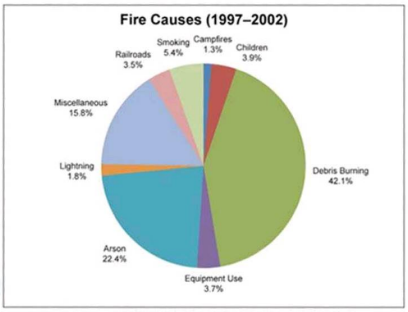


-Varijaksh Katti

"One Tree can make a million matches, but one match can destroy a million Trees"

The first chapter of any student's life describes the importance of a plant in the Ecosystem. Old is gold, but ancient is diamond when it comes to Forests!!

Globally, forests are facing growing challenges from the natural disasters, which continue to strike unabated without notice and are perceived to be on the increase in their magnitude, frequency and economic impact. The most common hazard is the forest fires including the very recent Amazon's rainforest wildfires and Australian bushfires! These pose a menace not only to the forest wealth but also to the Flora and Fauna. Employing drones and AI systems to predict, contain it and extinguish the blaze then and there can help put out the fire quickly and cut down the loss.



The 2019 Amazon rainforest wildfires season saw a year-to-year surge in fires occurring in the Amazon forests and Amazon Biome within Brazil. NASA's AIRS published maps of increased carbon monoxide and carbon dioxide resulting from Brazil's wildfires on the same day.

Using a fleet of surveillance drones, equipped with special infrared cameras, or satellite imaging, fires can be spotted during the earliest moments of an uncontrollable disaster. Quicker is the detection, faster can be the resolving action. These specialised drones can not only detect it but can also be used to put out the fire.

Using a fleet of surveillance drones, equipped with special infrared cameras, or satellite imaging, fires can be spotted during the earliest moments of an uncontrollable disaster. Quicker is the detection, faster can be the resolving action. These specialised drones can not only detect it but can also be used to put out the fire.

The technical specifications of such drones are: fitted with Infrared cameras, range covered is 7000 metres, loaded with mono-ammonium phosphate bombs, can carry a payload of 3 kgs, total flight time of 40 minutes every full charge, charging time of 60 minutes, number of drones in for periodic surveillance.

Unextinguished campfires, lit cigarette butts, improperly burned debris, and arson are responsible for 84% of wildfires started. Man-made wildfires have tripled the fire season from 46 days to 154 days with a staggering cost of $2 billion. Once considered a natural phenomenon sparked by lighting, wildfires are now being recognized as the result of human error.

Drones that are equipped with infrared cameras can peer through smoke, while using sensors for wind direction and other weather variables to better anticipate how wildfires will spread. Tiny drones can whip through canyons and other confined spaces whereas helicopters often can't fly low enough to capture the necessary high-resolution footage.

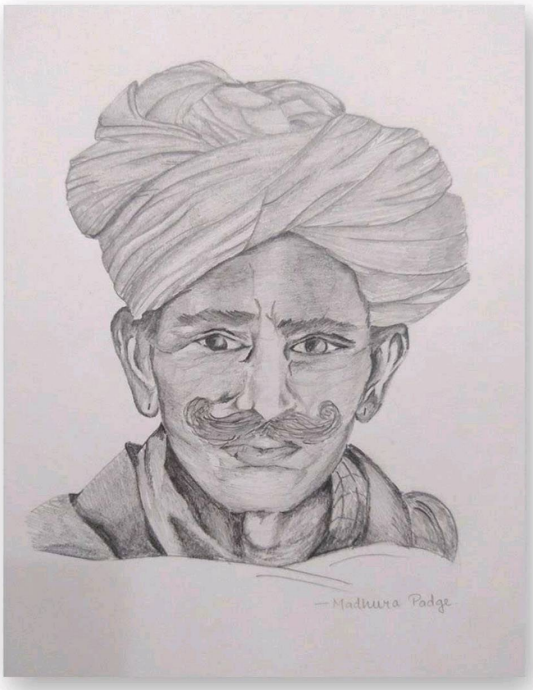
Talking about its action, every checkpoint will act as a charging point for the drone and when one drone is charging, the other drone is deployed for rounds and this goes on periodically. The drones will analyse the checkpoints and collect the data. These drones can detect even small fires in the bushes.

Drones give firefighters a bird's-eye view of the terrain and even help them determine where a fire will move next, so they can make swift decisions about where fire crews should go and which residents need to be evacuated. Making use of AI systems to predict the pattern of growth of fire and employ enough drones to put off the heat. The biggest pro of this solution is its cost effectiveness and collection of more precise data and the loss of human life employed for rescue is also reduced as the required manual power at the disaster is minimal. With costs exceeding $2.4 billion, the 2017 fire season was the most expensive ever. The cumulative costs of wildland fire suppression activities, once again, exceed the funding available. India is spending at least ₹ 1,100 crore due to forest fires every year, says a new World Bank report.

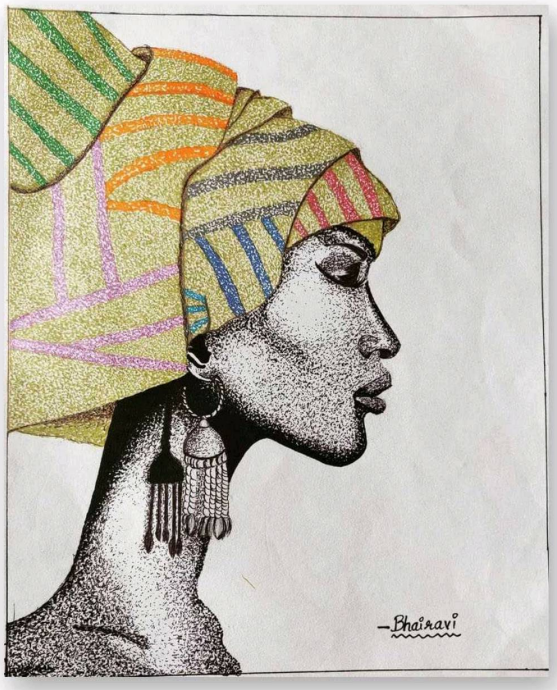
So basically, we will reduce the expenditure in resolving a forest fire by using drones and fire extinguisher bombs in place of Helicopters and human power. Piloting an aircraft over a raging fire puts both pilots and crew at risk. Plane and helicopter crashes accounted for 24% of deaths attributed to firefighting between 2006 and 2016, according to the U.S. Forest Service.
Someday, swarms of firefighting drones may be launched over wildfires. These would be programmed to fly autonomously, controlled and directed by human intelligence from miles apart, no need for drone pilots on the ground below, comparatively lesser damage caused to wildlife and property, an aid to cut down the costs involved in the process of fighting a wildfire! The world is full of ideas and opportunities and as rightly said by Albert Einstein, "Necessity is the mother of inventions", we shall learn about the urge of employing better technology in nature to help preserve its pristine form soon!

"Kuch Creative Corona 2.0!"

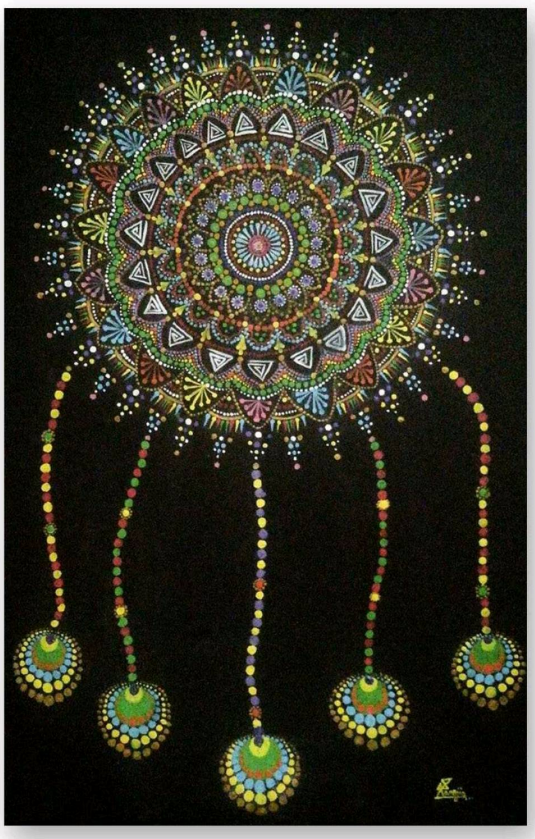
Featured Artworks



By Madhura Padge (D8)



By Bhairavi Chavan (D11B)



By Samita Kanojia (D7B)

By Shikha Negi (D8)

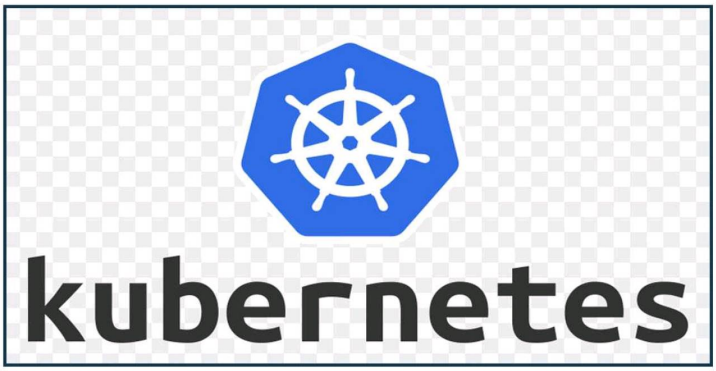
Kubernetes, The Future!

-Kalpesh Bhole

What is Kubernetes?

Kubernetes (k8s or 'kube') is an open-source container orchestration platform that automates many of the manual processes involved in deploying, managing and scaling containerized applications.
Sounds like some alien definition right. Let's break it down and understand what exactly it is.

Orchestration is the automated configuration, management, and coordination of computer systems, applications, and services. Orchestration helps IT to more easily manage complex tasks and workflows. Tools are used to achieve this orchestration. Ever heard of Docker, it is also one of the orchestration tools. Kubernetes is also one such tool which is widely used by the IT industry.



[Fun fact: The 7 spokes in the Kubernetes logo refer to the project's original name, "Project Seven of Nine."]

Some History:

The history here is that Google originally created the [Kubernetes open-source] project back in 2014. The company brought in developers from other companies – Red Hat, IBM(IBM), Huawei and others. They wanted to get more adoption. So they said, who can we transfer the trademark to to ensure that there would be neutral governance around this project and there'd be a fair way of deciding to use it for other sorts of things.

So they came to the Linux Foundation and the Linux Foundation set up CNCF.

The Cloud Native Computing Foundation (CNCF) is the non-profit foundation that owns the Kubernetes trademark and hosts the Kubernetes open source project. CNCF is a subsidiary of the Linux Foundation, which supports the open-source Linux operating system used in PCs, enterprise servers, and in the cloud.

Google long ago developed software called Borg to orchestrate its in-house containers for apps like Gmail and Google Maps, spinning them up and down as needed. In 2014, the search giant opted to make a version of Borg open source, calling it Kubernetes.

[Fact: Google generates more than 2 billion container deployments a week, all powered by its internal platform, Borg.]

There's 35,000 individual contributors, over 2,000 companies, and 1.1 million contributions. We list the top eight contributor companies –- Google, Red Hat, VMware (VMW), Huawei, Microsoft, IBM, Fujitsu and a startup called Weaveworks.

Note: Kubernetes is open-source, so anyone can use it for free without being a CNCF member.

Getting into it!

The idea behind Kubernetes is to leverage the last decade of innovation. This is where the term container comes in -- the idea that you wrapped each of your microservices into its container.
A container image is a ready-to-run software package, containing everything needed to run an application: the code and any runtime it requires, application and system libraries, and default values for any essential settings.

By design, a container is immutable: you cannot change the code of a container that is already running. If you have a containerized application and want to make changes, you need to build a new image that includes the change, then recreate the container to start from the updated image.

Containers are similar to VMs, but they have relaxed isolation properties to share the Operating System (OS) among the applications. Therefore, containers are considered lightweight. Similar to a VM, a container has its own filesystem, share of CPU, memory, process space, and more. As they are decoupled from the underlying infrastructure, they are portable across clouds and OS distributions.

Containers are a good way to bundle and run your applications. In a production environment, you need to manage the containers that run the applications and ensure that there is no downtime. For example, if a container goes down, another container needs to start. Wouldn't it be easier if this behavior was handled by a system?

VM, a container has its own filesystem, share of CPU, memory, process space, and more. As they are decoupled from the underlying infrastructure, they are portable across clouds and OS distributions.

That's how Kubernetes comes to the rescue! Kubernetes provides you with a framework to run distributed systems resiliently. It takes care of scaling and failover for your application, provides deployment patterns, and more.

For example, Kubernetes can easily manage a canary deployment for your system.

Kubernetes provides you with:
> Service discovery and load balancing
> Storage orchestration
> Automated rollouts and rollbacks
> Automatic bin packing
> Self-healing
> Secret and configuration management

Instead of hiring a team of system administrators -- dozens or hundreds of people whose job it is to keep track and to make sure that all of those things are running within the rules -- you program that into software. And then Kubernetes is the platform -- the term is orchestration engine. It is the orchestrator that is making sure that all of your software is running the way it's supposed to.

Google and IBM have bet on Kubernetes to deliver hybrid cloud capabilities to enterprises. Google Anthos and IBM Cloud Private are built on Kubernetes as hybrid cloud computing platforms.

Most of the people from the Doker world work only with containers. They try to transfer their knowledge and experience about using containers and Docker Swarm with Kubernetes. But it's an effort that totally goes into the wrong direction as it doesn't operate like this. You need to be aware of this Kubernetes fact to gain maximum benefit from it. The control unit in Kubernetes ideally is pod and not the container.

If you want to know what a pod is, then it's a group of containers performing the same task. They are useful in a single application. Kubernetes, on the other hand, manages scales, pods, and monitors their state.

In Kubernetes, the application scales not by the number of containers but by the sequence of pods. Most often, there is one single container in one pod, but there might be even many of them which might fix rigidly.

Advantages:

There are three big advantages.

1. The first one is resource efficiency, and this is the idea that by breaking up your application into lots of different pieces, running just the way they need to, you can run the same workloads on a smaller number of servers.

2. Number two is a higher development velocity. When you have one big monolith, it's extremely difficult to make changes to it. But when you can break it up into microservices, each team can be responsible for its part and can have it improve at its rate. And that allows the whole system to improve much faster.

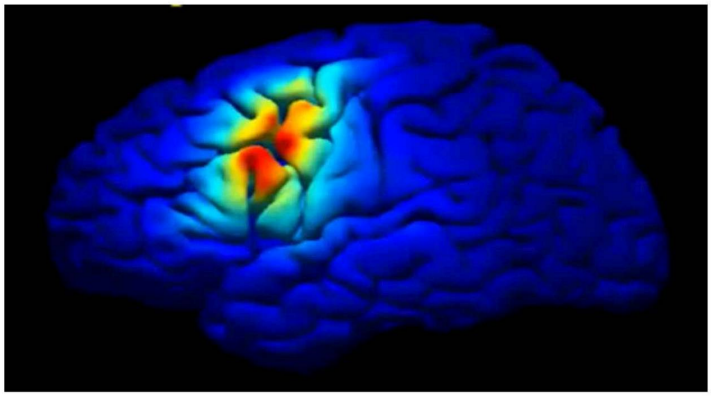
3. Third one is about portability in hybrid cloud -- being able to move your workloads and not being locked into a single provider or a single vendor. Also one of the huge strengths of open source is that you ultimately have control over the technology your businesses rely on.

Final Verdict -

Kubernetes has not only helped in the vertical and horizontal scaling of containers but have turned the tables for innovative engineering expectations. It has been succeeded in deployment for an initial estimate of servers. Also, it has gained so much popularity in a short span of time.

Neuro-electronic systems can be a cure for all diseases

-Chirag Jain



Brain-to-Brain interface may enable us to transfer immunological response from contaminated patient to healthy uncontaminated person and bring about immunity to the virus or bacteria even before contracting them. This immunological memory may be summoned by immune system when antigens invade the body.

Researchers at the University of Washington in their paper titled 'A Direct Brain-to-Brain Interface in Humans' successfully established a Brain-to-Brain connection over internet.

In their experiment they combined transcranial magnetic stimulation (TMS), stimulation of neurons using magnetic field, along with electroencephalogram both of which are noninvasive techniques and can be used to establish neuro-motor coordination between two humans.

The two subjects played a game where in they were required to destroy rockets. The interesting thing was that one subject could see the game but not control the keyboard and other subject sitting at different part of the University of Washington campus could control the keyboard but not see the game. Both the subjects needed to collaborate in order to win the game. So, the first subject would imagine moving his hands so that the computer could extract information from his brain (using EEG), decode it, and send it via internet to another subject where information is transferred into brain of another subject (using TMS) which would make his hand move on the keyboard and finally, destroy the rocket!

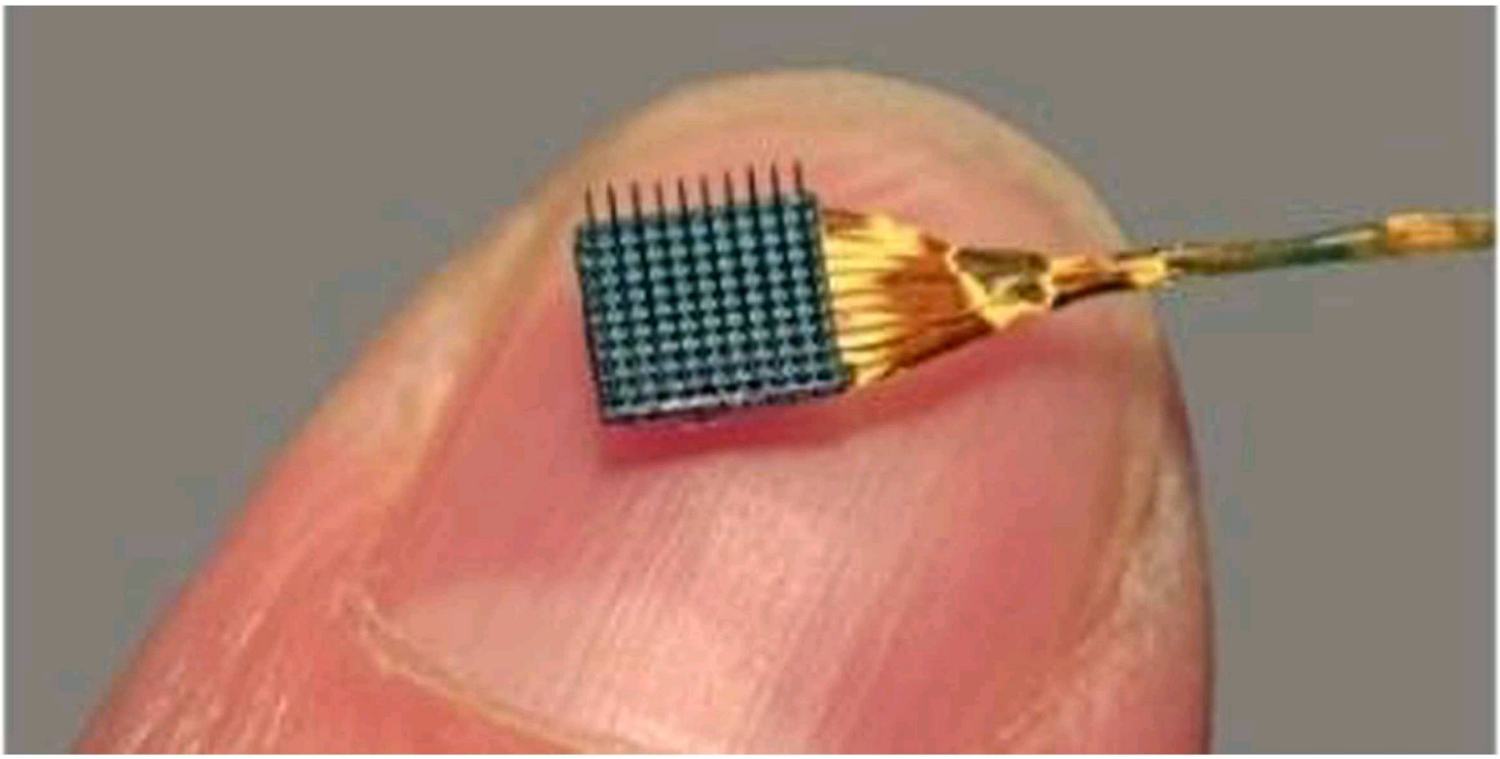
How do we model the same brain to brain connection only this time we send immunological stimulus in place of motor stimulus?

Stanford immunologist Lawrence Steinman in his paper 'Elaborate Interactions Between the Immune and Nervous System' wrote that 'The immune system and nervous system maintain extensive communication including hardwiring of sympathetic and parasympathetic to lymphoid organs. Neurotransmitters such as acetylcholine and histamine modulate the immunity.'

This suggests that immune system just has every other organ system is subject to stimulus received from brain. So, the solutions to problems we so about might be to record all the electrical activities going on in the neuro-immune interface using micro-electrodes. Microelectrodes are electrodes used for recording neural signals.

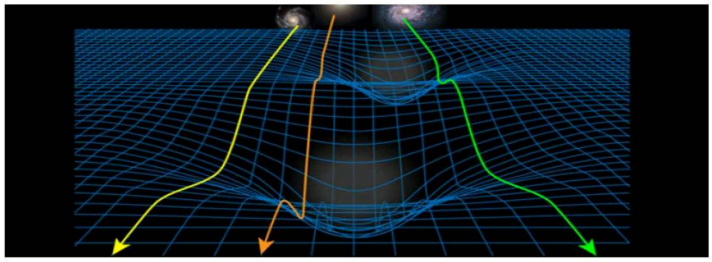
These microelectrodes can be used to perform an intensive scan on recovering COVID-19 (say) patients and distinguish the brain areas which do maximum work in order to generate immunological response against virus and thus identify regions of neuro-immune interface along with the series of neural responses which eventually, by stimulating immune system, tackles the virus.

After recording the signals they need to be decoded using various mathematical abstractions and then we will be equipped with neuro-immune information to affect that specific virus. This recorded information can then be transferred into the neuro-immune interface and achieve immunity to virus even without getting contaminated by it. Similarly many other diseases can be treated beforehand. Variety of fictional superpowers like uploading into brain all the knowledge available to humans, learning skills like Kung-Fu within a matter of seconds can all be achieved as further applications of such kind of technology. Future is filled with a completely new world!



Time as a Physical Dimension?

-Gaurav Govilkar



I'm sure that most of you must have seen the Christopher Nolan classic, Interstellar. The scene where the protagonist is inside the 'tesseract' is a perfect example of how 'Time' can be interpreted as a physical dimension or rather three-dimensional representation of five-dimensional space.

To put it across in simple words, we live in a three-dimensional space. So, that means we can manoeuvre along 3 dimensions; viz; x, y, and z. The intuition behind time being a physical dimension is in the experience of being able to "travel" through it. Now imagine, if we could move along the axis of time!! This would make time travel like falling off a log. It would mean that we could travel in the past and future just as we walk from east to west!!

But can 'Time' be described as a physical dimension?

Einstein's take

Einstein's General Theory of Relativity shows how gravity bends space-time around itself. When a light ray travels through this space-time, it follows its curvature which results in bending. This bending of light is called Gravitational Lensing. Einstein, in 1915, described Time as a physical dimension that can be bent like any other physical dimension but no one has ever witnessed such a feat.

Was he right? Is time a physical dimension?

Time Travel gets me to another fascinating concept of **'Wormholes'!**

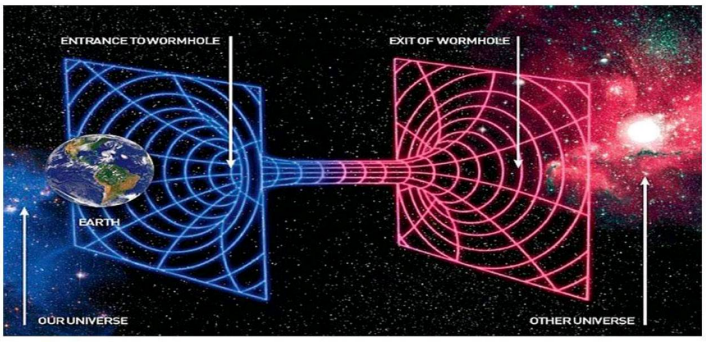
Wormholes

Albert Einstein's General Theory of Relativity left us with some of the mysteries that remain unsolved to date. One was black holes, which were only unequivocally detected over the past few years. Another was "wormholes" – bridges connecting different points in spacetime, in theory providing shortcuts for space travellers. A wormhole also called Einstein–Rosen bridge or Einstein–Rosen wormhole can be visualized as a tunnel with two ends at separate points in spacetime.

Now, wormholes are generally associated with space travel, but they can resort to time travel as well. Like the one from Netflix's Sci-Fi thriller 'Dark'. So, inside a wormhole, time acts as a physical dimension.
Though we have the proof for the occurrence of a 'Black Hole', Wormholes remain an enigma to the modern sciences.

To counter the physicality of time as a dimension, time, across how much every universe we know, is just a measurement. It doesn't directly affect a quantity under measurement the way gravity, position, force, etc do.

So, how plausible is it to think of time as a physical dimension? Or is it just a perception of our mind?



Multiverse Theory

In 1952, Erwin Schrödinger gave a lecture about how his equations describe different histories of a single event. These histories were not alternatives but all would happen simultaneously. According to Feynman, an event has not just one history but every possible history, and the present state of the event is the superposition of all these possible histories.
There are two types of approaches to explaining the present state of our Universe.

Bottom-Up Approach:

One of the approaches is the Bottom-up approach where the initial conditions of a certain model are known and a set of events is assumed which led to the current state of our model. Most models of the universe are bottom-up i.e., you take the initial conditions present at the time of Big-Bang and work forward to explain the current state of the universe. However, this method is flawed because we don't (and can't) know the initial conditions present at the time of the Big-Bang.

Therefore, Hawking and Hertog proposed a new approach: The top-down approach.

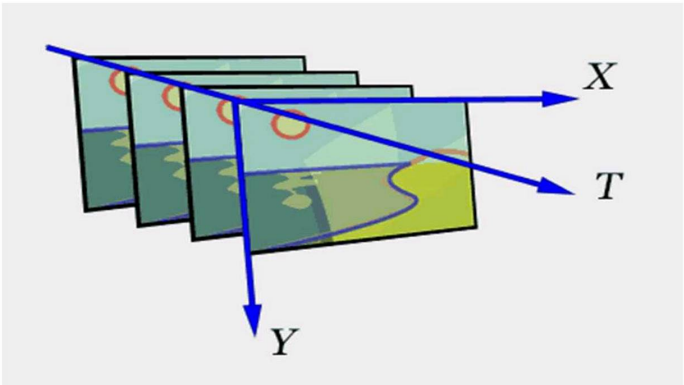
In this approach, you take the present conditions and go back in time to determine the initial conditions. This new approach gives rise to different possible histories of our universe and their corresponding different sets of events to describe the current state of the universe. These different 'histories' might be different universes in other dimensions which exist parallelly.

Constants and Time:

All these different universes have different sets of events and different constant values (like Planck constant, cosmological constant) which led to their current state. The top-down approach shows why these constants are finely tuned for life to exist and evolve. For example, the positive value of the cosmological constant shows that the universe is expanding at a finite rate, and the negative value shows that it is contracting. If the value were any bigger or smaller, then life might not exist today. Some universes quickly faded away at the beginning because of their 'finely tuned' parameters and some might continue to exist longer than ours in other dimensions.

A Stitch of Time

So, is time as real as Einstein described? Or is it just merely a perception?
Someday, mankind would surely leap traveling in time as it did in outer space! Until then, we can cherish the past, hope for the future, and live in the moment!!



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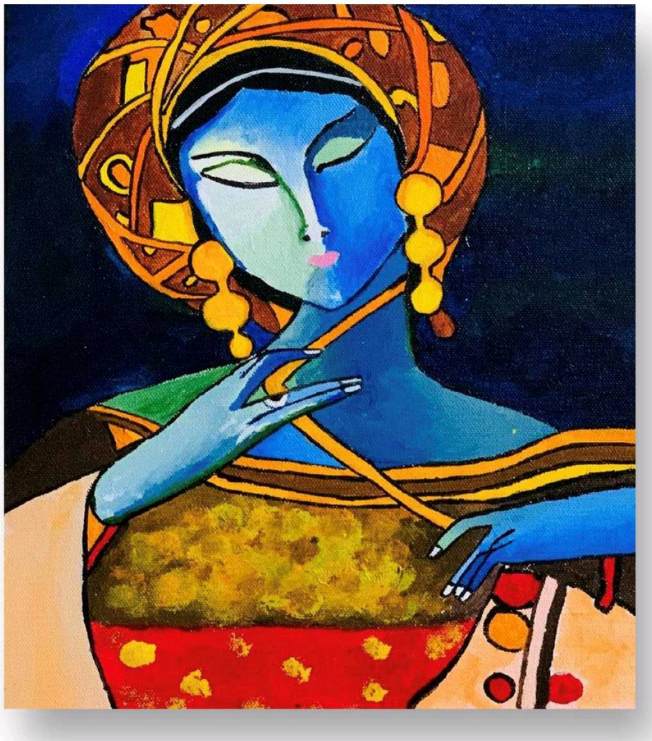
Featured Artworks

By Shruti Parab (D11A)

By Palak Garg (D7B)

By Nidhi Mundhada (D9B)



By Dhruvisha Mondhe (D7B)

Should we fear Artificial Superintelligence?

-Janhavi Bhutki

We heard the warnings...
But we didn't listen.
Now we live in a world controlled by
Artificial Intelligence.
How did we let this happen?
Will we be able to survive?
And is this the End of the world?
But wait, how exactly did we get here?

We invented the very first digital computer in 1937 as a way to help humanity. And mostly, computers and AI have given us a lot of good! But as we continue to improve Artificial Intelligence, AI may become smart enough to run itself.

If we don't slow down AI now, Technology will become so advanced that humans won't need to operate it anymore, and the AI might become uncontrollable. The AI will continue to improve itself, becoming more advanced with every passing second and thereby, outsmarting humans. And when this happens, we will enter the era of Artificial Superintelligence.

Artificial Superintelligence (ASI) refers to a state when the cognitive abilities of computers will have surpassed that of humans in all respects.

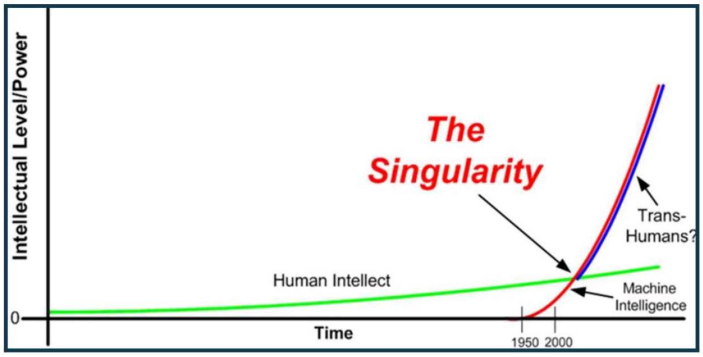
"Success in creating effective AI could be the biggest event in the history of our civilization. Or the worst. We just don't know"
- Physicist Stephen Hawking.

Consider this, I am writing this article in Grammarly, which is an AI-Powered application. It checks all my spellings and grammar, and gives various suitable suggestions and alternatives. So if you think about it, isn't it doing most of my job? And wait. I am writing about AI in an AI-Powered software in which AI is helping me to write, so it's AI who is indirectly writing this article about itself!

Mind blown? Same here :)

Now let us understand what Technological Singularity is.

Technological Singularity is a hypothetical point in time at which technological growth becomes uncontrollable and irreversible, resulting in unforeseeable changes to human civilization.



Technological singularity may allow AI to do almost anything, even physically, such as robots taking over our manufacturing machines. With this, they can create their own machines!

Is such a scenario too far-fetched? Not if Hollywood was your only reference. Indeed, the notions of intelligent machines taking over the world, or variants thereof, have repeatedly graced the silver screen through such blockbuster films as *The Terminator* and *The Matrix*, both of which envision an apocalyptic, doomsday scenario brought about by machines surpassing human intelligence. And while movies are rarely accurate depictions of real life, a growing number of the world's thought leaders have begun to sound the alarm bells in recent years.

One of the leading philosophers on this issue is Nick Bostrom, an Oxford University professor whose book *Superintelligence: Paths, Dangers, Strategies* discusses a multitude of scenarios in which the superiority of machines could threaten humanity. The book focuses on the stage at which AI achieves an intelligence explosion. *"How could we engineer a controlled detonation that would protect human values from being overwritten by the arbitrary values of a misbegotten artificial superintelligence?"* he posited.

Yeah, I know this is just too much to digest, So some good news for you guys...

One way we could actually compete with this kind of technology is if we allow the human race a different kind of evolution. That is why we're researching brain-machine interfaces. As Elon Musk says, *"If you can't beat them, join them".*

But not every forecast is necessarily as pessimistic, however. Some are keen to emphasize that at this stage, there is no evidence that Superintelligent robots are about to wipe out the human race. In reality, AI is already changing our daily lives, almost entirely in ways that improve human health, safety, and productivity. So, let's all be optimistic and believe that ASI will operate to enhance humanity rather than destroy it!

The potential of ASI is undoubtedly immense, so here's hoping we can harness its exceptional power for the safest possible outcomes.

State of the Art: Process Instrumentation Laboratory

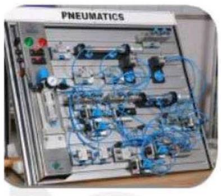
-Prof. Prasad K. Godse

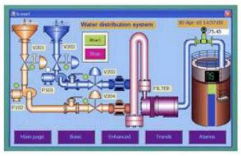
Dear students,

I'm very happy to explore the state of the Art Process instrumentation laboratory in the instrumentation department @ VES Institute of Technology, chembur.

Process Instrumentation Laboratory is a state of the Art Experimental facility with 14 pilot plant set ups and has been designed and developed in the year 2010 in new campus of VESIT.




SIEMENS

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FESTO

The purpose of the facility is:

>> To identify the instruments & Control systems.
>> To demonstrate working instruments to the students.
>> To study and understand various types of Processes and instrumentation involved in the same.
>> To provide Hands on Exposure to the students of Instrumentation Engineering.
>> To facilitate students to perform various activities like instrument mounting and Installation, Loop wiring, Loop checking, configuration & Tuning, calibration, Trouble shooting, Hydro and seat Leakage Testing, cable Laying etc.
>> To create an Industrial Environment for the students to grow them with the Instrumentation utilization.
>> To facilitate students to learn/practice on various control panels and Automation Tools and study software / GUI features to make them comfortable and answerable for their campus preparation.
>> To cater the need of the Employer.
>> To achieve Overall Development of the students to bridge the Gap between Institution & Industry.
>> To improve/ maintain the Placement of the students.

Pilot plant set ups has following objectives:

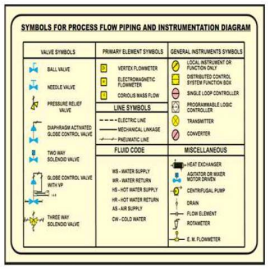
>> Familiarization and identification of instruments and their Location
>> Study Measurement / Monitoring Instruments.
>> Study control and communication facility
>> To create the disturbance and study the effect of disturbance
>> Study instruments performance.
>> To learn instrument specifications

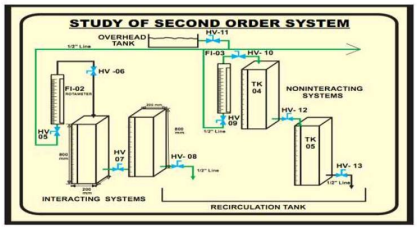
This laboratory is a real field environment for undergraduates. Graduates as well as post graduate students learning instrumentation engineering. Primary objective of lab development is to provide Hands on Exposure to all learning Engineers & improve Technical skillsets based on instrumentation syllabus of Mumbai university.

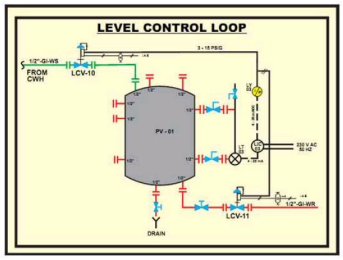
Lab consists of Various pilot plant setups using small capacity process equipment's (storage /recirculation tanks. Shell & tube heat exchangers, batch reactors etc.) & industrial grade instrumentation

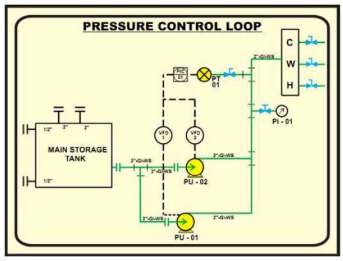
>> Hydraulic skid set up. (Manually operated)
>> CWH Pressure Control system set up.(using single loop PID controller)
>> Tank Level Control system set up.(using single loop PID controller)
>> PLC based Ratio Control system set up.
>> PLC based Split Range control set up.
>> PLC based Temperature Control system using Shell and Tube Heat Exchanger.
>> PLC based Temperature control system using Batch Reactor
>> DCS based Mass Flow Measurement set up.
>> DCS based Pump characteristics set up.
>> CS based Temperature Control system using Shell and Tube Heat Exchanger.
>> DCS based Temperature control system using Batch Reactor
>> Control Valve characteristics & Cv sizing set up.
>> Temperature control system set up. (using single Loop PID controller)
>> Pressure Measurement Test set up.

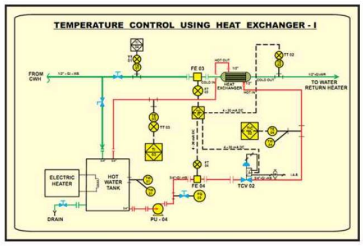
Laboratory pilot plant set ups MIMICs:











Following is the List of field instruments available in the Lab:

>> RTD- PT 100 / Thermocouple
>> Pressure Gauges
>> Rota meters
>> Temperature Gauges
>> Tubular Level Gauge
>> Pressure Transmitter(HART/FF)
>> DP Transmitter (HART)
>> Temp Transmitter (HART /FF)
>> Industrial switches
>> Magnetic Flow meters
>> Vortex Flow meter
>> Coriolis Mass Flow meter
>> Current to Pressure Converter
>> Electro-pneumatic Positioner
>> Control Valves & Accessories (AFR/PVP /ENVP /FFVP)
>> Solenoid valves AUTO / Manual station for Pumps (Contactor / switches / Relay)
>> SMART Positioner

List of Panel instruments are:

>> Power flex 40 VFD (Allen Bradley)
>> ON-OFF Controller (Radix / Nippon / itherm)
>> PID Controller (FUJI / Radix / Nippon)
>> Alarm Annunciator
>> PLC-MicroLogix 1400
>> PLC-CompactLogix
>> SCADA software (Allen Bradley-Factory TalkView)

Process Lab provide following facilities and activities for the students:

1. Measurements of Process Variables

Lab provides measurement of Air & water pressure, differential pressure, level, flow, temperature etc. Using sensors and industrial transmitters, (field instrumentation) like PT, FT, LT, DPT, TT.
It also facilitates point or discrete measurements & safety warning using industrial switches in terms of Alarm Annunciation.

2. Process Control Activities

By using on/off switching as well as regulating control valves or throttling pump speed using VFDs in Auto/Manual Mode.
Students can configure & use various controllers to automatically regulate & switching of FCE to throttle variables like Air & water

3. Precommissioning Check/Activities

Final year students can perform various precommissioning activities like powering instruments through local / remote facilities, Hydro test & seat leakage test for knowing valve performance using Cv set up. Experimental Cv calculation ,Cold & Hot Loop checking for various open & close loops, field calibration / reranging, programming using calibrator & HART communicator.
Simulation of Logic using PLC configuration

Simulation of Logic using PLC configuration and performance testing of controller . Panel wiring check to familiar control panel engineering installation, mounting of field as well as panel instrumentation.

4. Study of Basic & Detailed Engineering

Lab plant set ups are designed based on Lab plan / equipments layout & piping layout. Students can learn documentation including
Development of P&ID, instrumentation index, Development of specification / data sheets using ISA specification forms & lab process data. Hookup drawings & BOM. Loop wiring drawings various schedule documents like AH / cable/JB.

5. Understanding Control Panel Types & Testing

6. Familiarize need of various Auxiliary equipment's & erection material commonly required in manufacturing facility.

7. Study of basic ON OFF / PID controller & analysis of Process control loop like pressure loop, Level Loop, Flow control loop, temperature control Loop.

8. Detail study of types of control valves, actuators, positioners, accessories & their operation.

9. Advanced instrumentation study

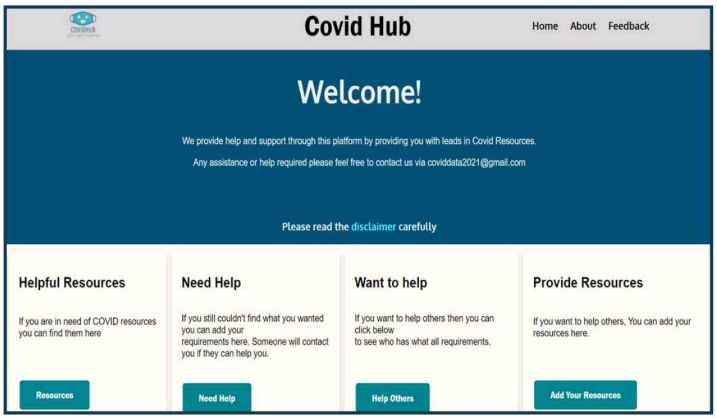
10. PLC Panel Testing

Ladder programming & implementation using simulator & PLC based Process control loops GUI Development using SCADA software.

11. Overview of DeltaV DCS and Hardware

Engineering workstation Features FBD programming Configuration of DCS based control loops Concept of DCS

COVIDHUB
-LET'S FIGHT TOGETHER



The Covid Hub Website provides an overview of our country-level and regional COVID-19 resources as well as other pertinent epidemiological information concerning the COVID-19 pandemic.

The basic motive of this project is to help people in this pandemic situation. People affected due to Covid are in need and are not able to reach out for help easily in our country in these tough times. Aditya Ganesh (BE student at VESIT and the Chief Technical Officer at ISA-VESIT) came up with an idea to create a central hub. He then searched for volunteers who were ready to help him out in collecting and verifying authentic data. And eventually they formed a group wherein they used to find well grounded resources for emergency cases and also verified the data. Once the website was ready, it became the central hub for all the updates.

Covid Hub website contains four sections:

1. Helpful resources: If someone is in need of COVID resources they can find the same on the website.

2. Need Help: If one still fails to find what he/she wanted then that person can add his/her requirements in this section. Someone will contact that person if they can help.

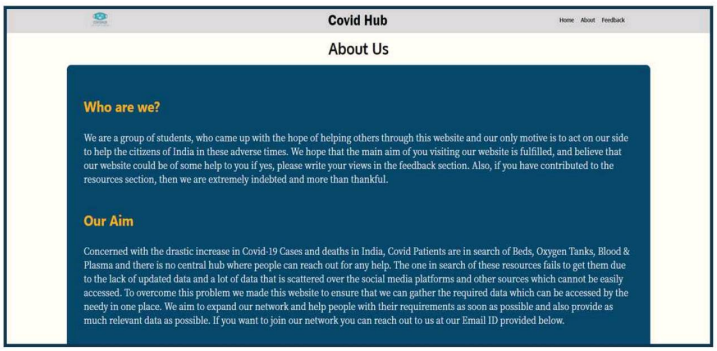
3. Want to Help: If one wants to help others, he/she can volunteer.

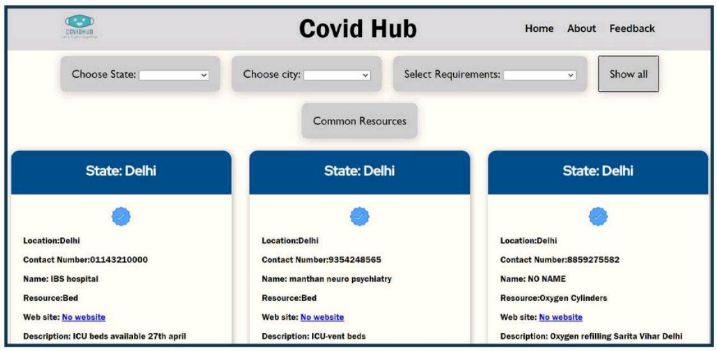
4. Provide Resources: If one wants to help others by providing trustworthy resources, he/she can do the same in this section.

UI Team - Jatin Dandelia (TE student at VESIT and the Technical Officer at ISA-VESIT) and Raj Talashilkar (TE student at VESIT and the Secretary at ISA-VESIT)

Backend Team - Hrishikesh Sawant (BE student at VIT) and Omkar Mangalpalli (TE student at VESIT and the Web Editor at ISA-VESIT)

Hosting - Raghav Potdar (BE student at VESIT and the Chief Operations Officer at ISA-VESIT)





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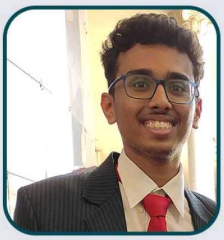

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