

# ENVISAGE 2023

METAVERSE  
EXPLORE THE NEW WORLD

## 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 to you its annual magazine, ENVISAGE' 23.

The internet is one of the greatest inventions ever, we have all the knowledge in the world at our fingertips. But it is not very interactive. Imagine, instead of just scrolling through the internet you can actually enter it and perceive it as your environment! This brings in the concept of the "Metaverse". Unlock the immersive future with ENVISAGE' 23, with this year's theme, "Metaverse: Explore the new world".

This magazine curates for you, the technical knowledge of various fields. It also tries to give you a glimpse of events that ISA-VESIT has conducted during the academic year 2022-23.

-Janhavi Bhutki  
Chief Editor



## EDITORIAL TEAM



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Jr. Editor



**Tanaya Gaikar**  
Jr. Editor



**Nikhil Gore**  
Operations Officer



**Vaibhav Singh**  
Jr. PRO



**Shubham Kumar**  
Jr. PRO



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SE Co-ordinator



**Sania Khan**  
SE Co-ordinator



**Manisha Walunj**  
SE Co-ordinator



**Sharvari Patwardhan**  
SE Co-ordinator



**Shreyas Kale**  
SE Co-ordinator



# President's Note



Dear ISA-VESIT Family,

My journey with ISA-VESIT has been incredible, and I feel a great sense of pride and accomplishment as my tenure comes to a close. Over the past three years, I have faced unique challenges and opportunities that have helped me grow as a leader.

As SE Coordinator, I learned the importance of effective communication and collaboration, while being Executive Officer, I developed a more strategic approach to problem-solving. Finally, as the President, I had the privilege of leading the organization and setting the agenda for the year.

Our technical society has made great strides in recent years. One of the highlights of this year has been the acquisition of a new 3D printer. This state-of-the-art technology has allowed us to explore new dimensions in engineering and design, and has opened up endless possibilities for innovation. Our members have made great use of this resource by creating some truly remarkable 3D models. We have made significant strides in organizing technical events, workshops, and guest lectures that have helped broaden our knowledge base and skill sets. Our collaborations with industry experts and academic institutions have also enabled us to expand our horizons and stay updated with the latest technological advancements.

The guidance of our senior council and the unwavering support of our faculty advisor Mr. N. Gopalakrishnan have contributed to achieve this level of innovation and efficiency. We have put in a lot of efforts to develop ISA-VESIT's proficiency in various domains, and have introduced several new facilities such as a mobile app, web portal, 3D printing portal, Robotics lab, hardware inventory and digital library. Our members have made great use of these facilities, and we appreciate their support and valuable feedback.

The greatest lesson I have learned over the past three years is the importance of teamwork. Each member of the ISA-VESIT family has contributed in their own way, and I am grateful for their support and their commitment to our shared goals. We have achieved so much together, and I am confident that the organization will continue to thrive in the years ahead.

On behalf of the BE council, I wish the junior councils the best of luck and believe that ISA-VESIT's future is in safe hands. As a concluding remark, I would like to say "Enjoy current challenges to leverage future."

Signing off as President, ISA-VESIT 2022-23.

- **Hrutika Pakhale**  
**President**



## Secretary's Note

"The road to success is always under construction". This quote summarises the year for me, it has been a rollercoaster of emotions, challenges, and triumphs. As I come to the end of my tenure, I am filled with a sense of nostalgia and gratitude. It has been an honour and privilege to serve as the secretary for the past year and I am incredibly grateful for the opportunity to have contributed to ISA's achievements.

Throughout the year, we have organized a variety of workshops and events, ranging from community service projects to educational seminars. ISA has always aimed to provide its member with a wide spectrum of domains to explore and provide directions to explore further. Our focus was to enhance the technical skill set of the students, we conducted a plethora of hardware workshops on microcontrollers like ESP32 and software workshops covering various fields like 3D modelling using ThreeJS and Image processing using OpenCV. This year, to help members execute and implement their ideas and designs in real life we have provided them with a new 3D printer. We also hosted several events that allowed our members to connect and have fun, such as our Scavenge to Build and Quadrangle. We have worked tirelessly to bring together like-minded individuals who share a passion for ISA's mission, and it has been a pleasure to see the impact that we have made on our community. One of our key achievements this year was the successful launch of the annual magazine, and through our innovative online workshops, collaborations with prestigious organisations like IIT Bombay Techfest, and engaging social media content on platforms such as Instagram, YouTube, LinkedIn, and Discord, we have created a milieu of learning and growth for our community. Our team's sagacious acumen has also been instrumental in providing easy access to our hardware inventory and initiating features and initiatives that prioritize our members' needs and interests. We are proud to have launched a monthly newsletter and a brand-new App covering the latest news and resources that would be helpful to our members.

Despite the challenges, we have faced this year our team remained hopeful and resilient. We are grateful to our BE Council for their unwavering support throughout this journey. I would like to thank my team and enthusiastic members for your contributions, whether it was through volunteering your time, sharing your expertise, or simply showing up and supporting our events, making this year a great success. Special thanks to our faculty advisor Mr. N. Gopalakrishnan for his constant guidance and ingenious ideas, his wisdom and experience were invaluable in helping us to navigate the challenges and opportunities that we faced.

For me, ISA-VESIT has been the best decision of my engineering life. The personality, confidence, and experiences I have gained through ISA-VESIT are something that I will cherish for life. At last, I would like to thank my fellow SE council members for standing beside me and sharing the same enthusiasm for ISA-VESIT. I wish them all the best in their future endeavours and let's Make It Large.

Signing off as Secretary, ISA-VESIT 2022-2023.

**- Nachiket Suryawanshi**  
**Secretary**

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# ENTER THE METAVERSE

ISA-VESIT

2022-2023



# EVENTS OF THE YEAR



## WEB APPS USING FIREBASE WORKSHOP

ISA-VESIT conducted an extensive workshop on development of web applications using Firebase. Participants were acquainted with Git and GitHub. The fundamentals of HTML, CSS and JavaScript were discussed. The advantages of Tailwind CSS were explained along with Firebase and its various services. A web application was built wherein authentication and login were implemented.

## 8051 EMBEDDED 'C' PROGRAMMING WORKSHOP

ISA-VESIT conducted a 3-day workshop on '8051 Embedded C programming' in August 2022. Participants learned about the fundamentals of embedded systems, MS51 board and its features, LED blinking, and timer and counters of the 8051 board. The workshop provided an opportunity for participants to work on basic projects and implement their newfound skills.



## PCB DESIGN WORKSHOP

A very valuable workshop on PCB designing was conducted by ISA VESIT to assist students with the problems they face during PCB designing. The workshop covered all aspects of the Eagle software. The workshop concluded with the demonstration of various PCB-based projects.

## THREE.JS WORKSHOP

The event covered the fundamentals of CSS, HTML, and JavaScript which are the building blocks of website and application design. Further we moved on to the exhilarating part of creating 3D graphics through Three.js. Through various projects such as the Virtual World, Cyber Ninja 3D, and the Box Animations, Participants learnt to create interactive and engaging experiences for participants.



## ROBOTICS WORKSHOP

ISA-VESIT collaborated with Techfest, IIT-B to successfully conduct a workshop on robotics on September 24th, 2022. The workshop started with the basics of TinkerCad to create circuit designs and progressed to cover the fundamental mechanism of a line following robot. The instructors demonstrated a prototype of the robot, and the interactive workshop helped the participants gain in-depth knowledge of robotics.

# EVENTS OF THE YEAR



## OPEN CV WORKSHOP

ISA-VESIT organized a successful two-day workshop on Image Processing and OpenCV library on 29th and 30th December 2022. The workshop covered the fundamentals of image processing and advanced concepts such as contour, shape detection, and HAAR Cascade. Several exciting projects were also covered, including face detection, live sketching, car detection system, and hand cricket game. The participants' enthusiastic participation made the workshop a remarkable success.

## MICROPYTHON ON ESP32 WORKSHOP

ISA-VESIT conducted a workshop on 'Micropython on ESP32' for its SE and TE members on 6th and 7th February 2023. The workshop covered the fundamentals and features of Micropython, ESP32 board and I/O shield. Day 2 was a hands-on session where participants made projects like Weather Station and Whatsapp Bot using ESP32's inbuilt WiFi module.



## BE & BEYOND WORKSHOP

ISA-VESIT organized the 'BE & Beyond' workshop on 19th and 20th February 2022 for SE and TE members to guide them on competitive exams and placement process. The first session featured speakers sharing tips for exams such as GRE, GATE, CAT, and GMAT. The second session focused on the placement process, including tips for securing core placements and entering the IT sector. (The workshop also included an aptitude test and mock interviews to prepare the participants for the interview process.)

## SCAVENGE TO BUILD

ISA-VESIT's trademark 'Scavenge to Build' was successfully conducted, on the occasion of PRAXIS. The event witnessed the participation of 13 super enthusiastic teams this year. The event comprised four rounds, treasure hunt, bidding, bargaining, and building rounds. Along with immaculate planning from the council the enthusiasm from the participants is what made the event truly successful.



# The International Society of Automation

## - Your Connection to Automation

The International Society of Automation is a non-profit 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, as well as 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, 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 professionals.

### ISA's Core Competencies-At a Glance

#### Standards

ISA is recognized globally for the

development of consensus industry standards or 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.

**ISA's Brand Family**

ISA owns Automation.com, a leading online publisher of automation-related content, and is the founding sponsor of The Automation Federation ([www.automationfederation.org](http://www.automationfederation.org)), an association of non-profit organizations serving as "The Voice of Automation."

Through a wholly owned subsidiary, ISA bridges the gap between standards and their implementation with the ISA Security Compliance Institute ([www.isasecure.org](http://www.isasecure.org)) and the ISA Wireless Compliance Institute ([www.isawci.org](http://www.isawci.org)).

**Automation.com**    **ISA Secure**  
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Learn more about ISA's brand family at [brandfamily.isa.org](http://brandfamily.isa.org)

## **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 world-wide

- ◆ 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, & real-world scenarios. with presentations delivered by experts, peers, and industry leaders. ISA's technical Division Symposia include the ISA Analysis Division.

## **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 network and learn from industry leaders.

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





Sumit Jadhav

D19A

## The feeling of love via tech: ultimate utopia or dreadful dystopia

Love is perhaps the most complex, heartfelt, joyful, and enthralling human emotion. The feeling of being in love or being loved is something that every artist in the world wants to encapsulate with his art but still cannot. Countless stories, poems, metaphors, and songs are dedicated to this poignant phenomenon; yet it remains a riveting concept.

But as beautiful as it may sound, the feeling of losing your loved ones or not getting the love you want is gut-wrenching in every aspect. Let's not dive into the mental and physical repercussions of this feeling cause we all know how exhausting those are.

Now, hear me out for once. What if technology comes to the rescue for this? What if the combination of several technologies and machines and algorithms soothes the wound that the soul can't process? What if we can relive the moments even with the people who are not part of this world any

more?

What if the heart can get the ultimate feeling of ecstasy at least in the virtual world? And yes, all of this is possible with the existing technology called MR.

Before diving into a world full of possibilities, let's take a quick overview of the tech terms.

### **Augmented Reality:**

Enhanced view of the real world with the addition of computer-generated information. For example, ruined archaeological sites rebuild with computer graphics.

### **Virtual Reality:**

It completely replaces a user's view, immersing them within a computer-generated virtual environment. For example: instead of adding elements on top of the archaeological site to make a complete structure; in VR the user will get himself immersed in any historical era he wants.



Mixed Reality Spectrum: Pic by Microsoft

## Mixed Reality:

It is a blend of both AR and VR to provide the next level of realistic human-machine interaction.

### Exhibit 1: Are you really there?

Multiple studies show that VR technology can induce the feeling of "being there" or someone's presence. This is made possible with PI (Place Illusion: Strong sense of being at a particular place like a park or museum) and Psi (plausibility illusion: Sense of what is being perceived by the participant). Other critical factors include exteroception and interoception. Exteroception has to deal with external stimuli like providing highly immersive and interactive experiences while interoception deals with emotional arousal of oneself. A higher level of arousal in VR is linked with a more realistic experience of presence.



Sense of Presence feat. VR

Advancements in VR tech already proved to be efficient in therapy and dealing with problems like phobias, schizophrenia, and autism.

There has been a shred of significant evidence that sheds the light on VR evoking emotions, such as anxiety and relaxation, arousal in natural environments, such as parks, and different moods in social environments.

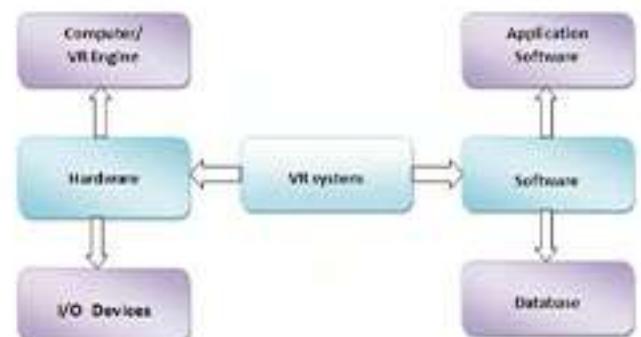
So what's the catch here? The capacity of VR to generate the exact same response as in the real-world scenario is still under scrutiny.

A study suggested that even though virtual reality is able to provide realistic simulation, the reaction of the brain is different for real and virtual scenarios.

### Exhibit 2: Exactly how?

Any virtual environment primarily consists of these four elements: virtual world, immersion, sensory feedback, and interactivity.

The virtual world is generated by computer graphics. With higher pixel capacity and techniques like 3D rendering, more realistic simulations are produced.



Generalized block diagram of VR

Head-mounted displays are a prime example of immersion. The researchers are working on VR contact lenses to provide a better immersive experience. The sensor hardware architecture is responsible for what we feel via our senses.

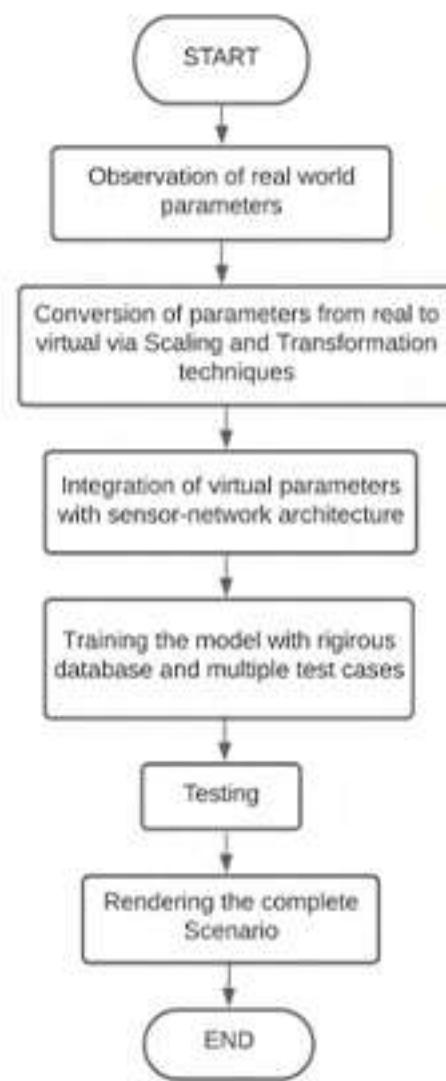
Following is the list of emotions and subsequent sensors:

- Attention and arousal: Electrodes attached to fingers, palms, or soles
- Stress, anxiety, arousal, and valence: Electrodes attached to chest or limbs or optical sensor attached to finger, toe, or

earlobe.

- Motor execution, cognitive task (mental arithmetic), decision-making: Near-infrared light placed on the scalp
- Memory, pain, anxiety, hunger, fear: Magnetic resonance signal.

VR system flow can be summarized as;



With the new updates in technology and the inherently dynamic nature of the world, the XR system will be more and more realistic. With that being said, it'll soon be capable of providing an immersive experience to the users even if it involves the complexity of human emotions.

### Exhibit 3: At what cost?

Yu Chan is a 26-year-old Japanese man who hasn't been out of his room for more than 6 months. He cut all his social ties which require physical presence and he keeps contact with help of social media only. Yu is not suffering from depression or any kind of mental disorder, in fact, he is a highly successful trader who operates from home. He just finds the normal (REAL) life unpleasant and not worthy.



Image for Representational Purpose

This is not just a story of Yu, this is the story of 700,000 Japanese adults with an average age of 31. The phenomenon is known as Hikikomori - the complete withdrawal from the sight of society by someone's own will.

Now, there has been no direct link between technology and Hikikomori; but experts do believe that modern means of communication are a major contributing factor.

With the discussion of virtual reality and how fascinating it is, the phenomenon like Hikikomori serves as a possible cautionary tale about its impact on society. With more and more realistic

experiences without the uncertainty that real life provides, one can become paranoid and obligated to their senses. Complete control over the virtual world at least can induce a higher level of narcissism, paranoia, social anxiety, apathy, and hatred. Lack of monitoring might become a breeding ground for people with ill motives and predators, while the quest for love in the virtual arena might become the prime obstacle for its pursuit in the real world.

### **The dilemma: To opt or not to opt?**

Technology perceives the ability to make things happen, even the most surreal and outlandish ones. With the dynamic world of the metaverse and extended reality, humans now possess the ability to experience a world full of possibilities even with the same emotional intensity. The concept of "Maybe in another lifetime" can be stretched to "In the virtual world at least" and instead of finding our lost one on the horizon full of stars, we might find them in the bunch of devices at least. Lastly, in the virtual world, you will have control over things and you will have the option to not let your heart sink into an utter state of despair of not getting love.

But at what cost? Should you let the technology manipulate into something that is NOT REAL in its core essence? Should we allow ourselves to be such emotionally vulnerable that only simulation will be our last solace? Do we really need to find the eternal comfort of love in devices with a limited-time period warranty? Doesn't all this sound like a perfect recipe for the

comfort of love in devices with a limited-time period warranty? Doesn't all this sound like a perfect recipe for the emotional collapse of society which already serves as a major threat cause of current tech?

What are your thoughts?

**क्या रहना चाहें इंसान को उस आभास के शीश महल में**

**या सेह लेनी चाहें वास्तविकता के पत्थरों की ठोकर ?**





Himanshu Prasad  
D19A

# Progressive Web Apps

Have you ever visited a website on your phone, only to be frustrated by slow load times and unresponsive buttons?



Progressive Web Apps (PWAs) aim to solve that problem by providing a mobile-friendly experience that feels like a native app, without the need to download anything from an app store. Progressive web apps can be thought of as normal websites loaded with features of an app. Like a website, it's accessible via a URL and can be accessed from any device with an internet connection. But like a mobile app, it can provide features like push notifications and offline capabilities. PWAs are lightweight, easily accessible, installable and can be used with little or no internet connectivity. Though native apps give the best UX/UI experience and are more integrated with the hardware, sometimes due to the inclusion of a large number of features and options, these

native apps feel sluggish on low-end devices. There are many cases where the adoption of PWAs has increased user time on websites. One such example is Flipkart, where the introduction of Flipkart Lite(P-WA) tripled the time spent on site, increased re-engagement by 40% and reduced data usage by a factor of 3. One more thing to notice is that earlier users with a 2G connection were not able to access or properly use Flipkart's website but now it was possible for them to use it. Let's now have a look at some of the distinguished features of PWAs:-

1. **Installability**:- Users can install PWAs and can easily access them from icons on their home screen.
2. **Linkability**:- PWAs are linked to a specific URL and there is no need to find them on app stores and go through a complex installation process.
3. **Network independence**:- As mentioned earlier, PWAs can work with little or no network connection.
4. **Progressive enhancement support**:- Depending on the browser's capability, PWAs can provide a first-class experience to fully capable browsers and a decent experience to browsers with limited capabilities.
5. **Notifications**:- Just like native apps, PWAs can also send notifications while they are not being used to notify users

about any new content or updates. This is made possible with Web push API and Notifications API, we will talk about them in detail later in this tutorial.

Having said about the features, let's now talk about the different technologies that make PWAs a better alternative.

### **Service Workers:**

The service worker acts as an intermediary between the browser and the network. It enables the PWA to work offline by properly caching request/response pairs. The service workers follow an 'offline-first' or 'cache-first' policy. Whenever a resource is requested, the service worker first looks for its offline availability. If available, it stops downloading and shows the cached file and if any update is available to the cached file, the service worker will only download the difference between the two, the entire file won't be downloaded again.

Service workers are also capable of handling notifications, performing heavy calculations on a separate thread, etc. They can take control over network requests, modify them, serve custom responses retrieved from the cache or synthesize new responses.

Nowadays, almost all browsers support service workers.

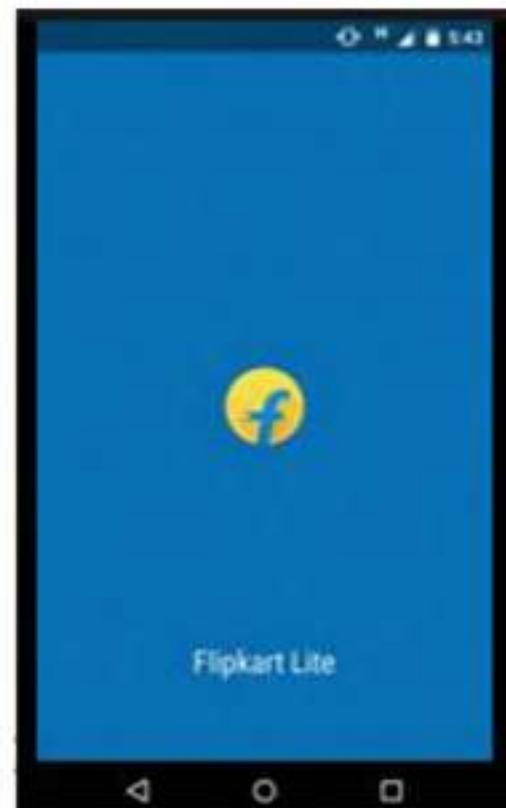
### **Web Manifest:**

It is very important for businesses to have app icons that are attractive, noticeable and appealing for them to flourish. App icons are equally important for native apps and PWAs. The design of app icons and how they are represented in different sections of the OS greatly affects the user-engagement, and becomes even more important for PWAs

as users may find it irritating to visit the URL and this is where Web manifests comes into play.

The web manifest is a file written in JSON format containing all information about the web app. It basically decides the appearance and behaviour of the progressive web app on your home screen and other sections of the OS based on the properties included in it.

A few examples of such properties include name, short\_name, start\_url, display, background\_color, description and many more. Inclusion of these properties vary depending on specific edition of the app, for example many PWAs have a splash screen while the app is loading and it mainly consists of three members - name, background\_color and icons.



### **Push API and Notifications API:**

#### Notifications API:

The Notification API is used to display the system notifications when the app is in use.

#### Push API:

The Push API in combination with the service worker is used to send notifications when the app is not in use. The service worker will keep on listening for notifications from the server when a notification is received from the server; the service worker will push this notification to the user whether the app is currently in use or not. Push API will only work when the app has background access to the device and uses a browser that supports Push API. Push notifications are most commonly used by apps related to News, E-commerce, and Entertainment.

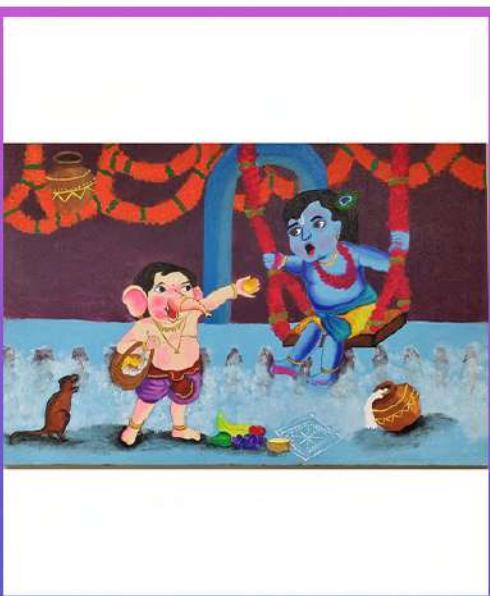
#### **Conclusion:**

There's no doubt that native apps provide a seamless app experience and are available with a lot of features and customization, but it is to be kept in mind that native apps can sometimes behave sluggishly on low-end devices or in places with limited internet connectivity. Native apps also consume a lot of memory space. On the other hand, PWAs perform well with both low-end and high-end devices, consume very little space, and can work with low internet connectivity. Though the user experience of a PWA is not up to the level of native apps, but it is acceptable and adequate. In this way, PWAs can be a better alternative for many users.



# **SKETCH IT OUT**

## **FEATURED ARTWORKS**



**Khushi Sharma**  
(D1EC)



**Sakshi Rane**  
(D12B)



**Swaraj Patil**  
(D11)



**Anish Mayekar**  
(D10B)



Anjali Punsi

D15B

# Robots- Yesterday, Today and Tomorrow

**R**obots have come a long way since they were first introduced in the 1950s. Initially used for manufacturing purposes, they have since become integral parts of a wide range of industries, including healthcare, agriculture, and transportation. Today, robots are more advanced than ever, with cutting-edge technology enabling them to perform tasks that were previously thought impossible.

## Yesterday

The first industrial robots were introduced in the 1950s, and they were used primarily in manufacturing plants to help with tasks such as welding and painting. These early robots were simple machines that followed a set of pre-programmed instructions. They were also large, expensive, and not very flexible. As technology improved, so did robots. In the 1980s, a new type of robot was introduced – the articulated robot. This type of robot had joints that allowed it to move in a more human-like manner, making it more versatile and useful. By the 1990s, robots were being used in a wide range of industries, including healthcare, agriculture, and transportation.

## Today

Today's robots are more advanced than ever. They are equipped with a wide range of sensors that allow them to perceive the world around them and react accordingly. This makes them more flexible and adaptable than ever before. For example, robots are being used in healthcare to perform surgeries and assist with patient care. They are also being used in agriculture to help with tasks such as planting and harvesting crops. One of the most exciting developments in robotics in recent years has been the rise of collaborative robots or cobots. These robots are designed to work alongside humans, performing tasks that are either too dangerous or too repetitive for humans to do. Cobots are also more affordable than traditional robots, making them accessible to small and medium-sized businesses.



## **Tomorrow**

The future of robotics is full of exciting possibilities. As technology continues to improve, robots will become even more advanced and versatile. For example, researchers are currently working on developing robots that can learn from their environment and adapt to new situations on the fly. Another area of research is soft robotics. Soft robots are made from materials that are more similar to those found in living organisms, which makes them more flexible and adaptable than traditional robots. Soft robots can be used in a wide range of applications, from healthcare to disaster relief. The use of artificial intelligence (AI) in robotics is also set to increase. AI algorithms can help robots make decisions based on the data they collect, allowing them to become more autonomous and capable of performing complex tasks.

AI algorithms can help robots make decisions based on the data they collect, allowing them to become more autonomous and capable of performing complex tasks.

## **Conclusion**

Robots have come a long way since they were first introduced in the 1950s. Today's robots are more advanced than ever, with cutting-edge technology enabling them to perform tasks that were previously thought to be impossible. The future of robotics is full of exciting possibilities, with researchers working on developing robots that can learn from their environment, soft robots that are more flexible and adaptable, and robots that use AI to make decisions based on the data they collect. As robots become more versatile and accessible, they are sure to play an increasingly important role in our lives.





Binayak Bhattacharjee

D1EC

## From Science Fiction to Reality: Exploring the Cyberpunk Future

**Have you ever imagined, a life in future, where people are cyborgs, technology has taken over almost everything and humanitarian values are diminished?**

If yes, then you must have thought of a cyberpunk reality. The idea of a cyberpunk society has fascinated science fiction enthusiasts for decades. With films like Blade Runner, books like Neuromancer, and video games like Deus Ex, the concept of a world where technology and society have blended in unexpected and sometimes dangerous ways has captured the imagination of many.

**But is such a society ever possible in reality?**

The answer may be both affirmative and negative. While a complete and total cyberpunk society may never fully come to fruition, many of the elements of such a society already exist or are in development. The interconnectedness of technology, the prevalence of artificial intelligence, and the rise of corporate power; all echo elements of a cyberpunk world. One of the key features of a cyberpunk society is the integration of technology into everyday life. In many ways, this is already happening.

From smartphones and smart homes to wearable devices, the average person is surrounded by devices that are constantly collecting and transmitting data. Another aspect of a cyberpunk society is the prevalence of artificial intelligence. Be it ‘online recommendations’ or ‘self-driving’ cars, AI and machine learning have been a part of our lives.



The rise of corporate power is also a hallmark of a cyberpunk society, and this too is becoming a reality. Large tech companies like Google, Facebook, and Amazon have immense power over our lives, from the way we consume media to the products we buy. As some would say, **‘Data is the new currency’**. In a cyberpunk society, corporations often hold more power than governments, and we may be seeing the early stages of this shift.

We will enter a whole new era if people used cybernetic implants to enhance their bodily function. Some of them are already used in today's life, eg., pacemakers, cochlear implants and deep brain simulators. If we look back on the technological developments since the past century, the rate of growth has been unparalleled. Science will surely amass a huge growth in the next 200-300 years. If the growth of technology has no barriers, some people will surely go on an unnatural route to outgrow themselves from the rest.

This will surely create some social and ethical threats, if not used properly. In conclusion, while a complete cyberpunk society may never come to reality, many of the elements of such a society already exist or are in development. From the integration of technology into everyday life to the rise of corporate power, we are seeing glimpses of a world that may one day resemble the cyberpunk dystopias of science fiction. It is up to us to shape the future and ensure that we use technology in a way that benefits us all.

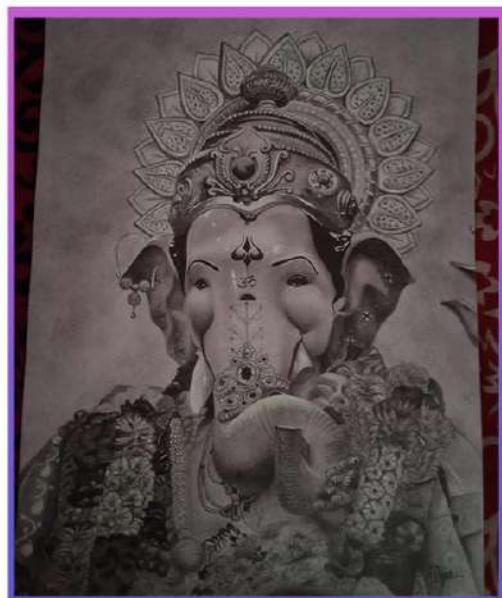


# **SKETCH IT OUT**

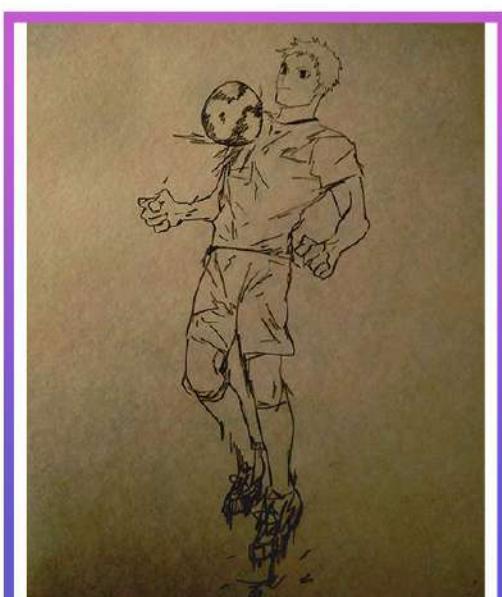
## **FEATURED ARTWORKS**



**Swaraj Patil**  
(D1EC)



**Tejas Dabholkar**  
(D6)



**Aarya Lotke**  
(D12C)



**Vinayak Panchal**  
(D1EC)



Shrey Panchamia

D12A

# The Role of Artificial Intelligence in Cybersecurity: Opportunities and Challenges

The domain of cybersecurity could be advanced by Artificial intelligence (AI). By leveraging AI technologies, organizations can improve their ability to detect and respond to cyber threats, reduce the time between detection and response, and enhance their overall security posture. In this article, we will explore the role of AI in cybersecurity, its benefits, and its potential challenges.

Cybersecurity represents one of the many areas in which AI has transformed. By automating threat detection and response, facilitating quicker and more accurate incident response, and enhancing overall security posture, AI has the potential to improve cybersecurity. The use of AI in cybersecurity is not without its difficulties; however, by including issues with data privacy, algorithmic bias, and the potential for hackers to weaponize AI technologies, this article will help you to understand both sides of this coin. So without wasting any more time, let's dive deep into all of it, one by one.

## **Deploying AI to identify and respond to threats:**

Threat detection and response automation are one of AI's most important benefits in cybersecurity.

Real-time analysis of massive data sets by AI systems can find patterns that are suggestive of cyberattacks. This makes it possible for businesses to identify hazards immediately and take action before they can do much harm.

### **Predictive Analytics with AI:**

The capacity of AI to undertake predictive analytics is another benefit of cybersecurity. Future risks can be predicted using past data analysis performed by AI algorithms. This lowers the overall risk of an effective assault by enabling organizations to take preventative action before a cyberattack takes place.

### **Behavioral Analysis Using AI:**

AI can also be used to analyze behavior. AI systems can identify unusual activity that might be a sign of a cyber attack by observing user behavior. This shortens the time between detection and reaction by allowing organizations to detect threats in real time.

### **Using AI to Automate Improved Security:**

Ultimately, security automation can be improved by AI. Organizations can lessen the stress on cybersecurity specialists by

automating rote security chores like software patching or user access management. They can now concentrate on harder jobs like threat hunting and incident response.

Now that you have the knowledge, let's go head-on with the challenges and opportunities.

### Possible AI-related Cybersecurity challenges

While AI has numerous potential advantages for cybersecurity, there are a number of difficulties that businesses must take into account. Many of these difficulties include:

**Data security:** For AI algorithms to work effectively, a lot of data is needed. Sensitive information such as user activity or system logs, may be present in this data. For the purpose of preventing unwanted access to this data, organizations must make sure that they have appropriate data privacy rules in place.

**Algorithmic Bias:** The data that AI systems are educated on determines how accurate they are. If the data is biased, the algorithm might be prejudiced as well, which could result in inaccurate findings and have serious repercussions.

**Need for expertise:** The implementation and upkeep of AI require specific expertise. Many businesses lack the internal skills required to deploy AI for cybersecurity effectively.

Cybercriminals may utilize AI to create more complex and targeted assaults, making it more challenging for businesses to protect against them.

### Possible opportunities for AI in Cybersecurity

**Threat Detection and Response:** AI may be used to instantly evaluate vast volumes of data and spot trends that point to cyberattacks. This can assist businesses in promptly identifying dangers and taking action against them before they have a chance to do serious harm.

**Predictive Analytics:** AI can study historical data and do predictive analytics to identify potential hazards in the future. This lowers the overall risk of an effective assault by enabling organizations to take preventative action before a cyberattack takes place.

**Analysis of User Behavior:** AI can be used to track user behavior and spot unusual behavior that might be a sign of a cyberattack. This shortens the time between detection and reaction by allowing organizations to detect threats in real time.

Automating typical security operations, like software patching or user access management, can be done with AI to improve security. This enables cybersecurity experts to concentrate on harder tasks like threat hunting and incident response.



**Fraud Detection:** By analyzing vast volumes of data and spotting unusual behavior, AI can be used to identify and stop illegal actions like credit card fraud.

**Malware detection:** By examining code and seeing patterns that are a sign of dangerous software, AI can be used to identify and stop malware attacks.

**Security of the network:** AI can be used to examine network traffic and find anomalies that might be signs of cyberattacks. This can assist businesses in identifying and minimizing possible hazards before they really harm them.

**Vulnerability management:** AI can be used to discover and prioritize infrastructure vulnerabilities in a company, allowing cybersecurity experts to concentrate on the most important ones first.

**Threat Intelligence:** AI can examine threat intelligence streams to spot new dangers before they spread widely. This enables businesses to prevent cyberattacks before they happen by taking pre-emptive measures.

**User and Entity Behavior Analytics (UEBA):** AI can be used to study user activity and find anomalies that can be signs of insider threats using UEBA. This makes it possible for businesses to identify and counteract potential risks before they have a chance to do serious harm.

As we can see, the coin has both sides, but does it mean that with AI in Cybersecurity, we can do more or do you think it'll do more harm than good?

## Conclusion

In this article, we have covered in depth the role of AI in Cybersecurity and furthermore the opportunities and challenges too. We can now say that AI has the potential to significantly improve the field of cybersecurity. It can automate threat detection and response, perform predictive analytics, conduct behavioral analysis, and enhance security automation.

However, organizations must be aware of the potential challenges associated with the use of AI in cybersecurity, such as data privacy, algorithmic bias, lack of expertise, and the potential for cybercriminal use. By addressing these challenges, organizations can effectively leverage AI to improve their overall security posture and reduce the risk of cyber attacks.





Prachit Paralikar

D10A

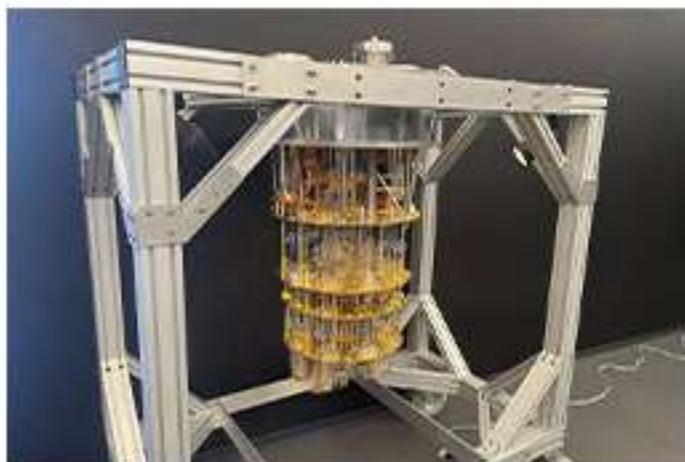
# Quantum Computing- A Decisive Technology of Future

Imagine you are in Goa and you decide to play a casino on one of the casino's computer. It starts with showing heads and the computer gets to play first. The computer can choose to flip the coin or not but you don't get to see the outcome. This continues until three rounds and after it, the coin is revealed, and if it is heads the computer wins, and if tails you win. Then you get a chance to flip the coin and the game proceeds. If played fairly, you and the computer have a 50-50% chance of winning the game. Now, let's play the same game on a quantum computer. The chances of a human winning the game reduce to a mere 3%. This beautiful analogy given by Dr. Shalini Ghosh clearly gives an account of the power of quantum computers and the magic of quantum computing.

## So, what's a quantum computer?

Is it a supercomputer having the power to predict the results? A smarter version of a computer that is more intelligent than an ordinary human? Anyone can get astonished after listening to the miracles that quantum computing has done. So, what is it? IBM, a leading name in the world of quantum computing, defines it as a rapidly-emerging technology that harnesses the laws of quantum mechanics to solve problems too complex for classical computers. Before getting down into more technical details and definitions, it becomes necessary for me to explain why the quantum computer has a high probability of winning the game.

The answer is simple, quantum physics. A classical computer stimulates heads or tails as a bit, 0 or 1, or a current flipping on and off. A quantum computer is completely different. A qubit has a more fluid non-binary identity. It can exist as a superposition or a combination of zero and one. Its identity is on a spectrum. During the game, the quantum computer creates a fluid combination of heads and tails. So, no matter what the player does, superposition remains intact. But, in the



final move, this computer can unmix the 0 and 1, recovering heads, so every time you lose.

Now, let's peep into history a bit. Yuri Manin proposed the idea of quantum computing in 1980 and Richard Feynmann presented a logical quantum computer model a year later. Early prototypes of quantum computers consisted of test tubes. The scientist made use of nuclear magnetic resonance to create the first quantum computer model. This model consisted of chloroform particles placed in a magnetic field. By studying the variations in the spin of chloroform particles, this model successfully found the element in 4 set of data.

The roots of quantum computing lie in the concepts of superposition and entanglement of quantum physics. So it becomes necessary to shed some light on these concepts before continuing. Classical computers use a binary system, meaning each processing unit, or bit, is either a 1 or a 0 whereas Quantum Computers use qubits which can be either 1 or 0 or both at the same time; this is termed as superposition. When a group of particles share propinquity such that the particles are connected, even if they are separated by large distances, this condition is called Quantum Entanglement.

A variety of logic gates function inside a classical computer. The quantum computer also has its own set of gates, called 'qubit gates' which helps it

to function. To name a few, Pauli Gate, Hadamard Gate, P Gate, S Gate, etc.; each of these gates in itself is a separate topic of discussion. Let's keep it aside for some other day and now quickly skim the three fundamentals algorithms of Quantum Computing. First is the Shor's Algorithm. The existing data security systems are grounded on the supposition that factoring integers with a thousand or further integers is pragmatically impossible. But then, Peter Shor in 1995 proposed an algorithm in which he demonstrated that quantum mechanics allows factorization to be performed. Next is Grover's Algorithm. Its primary use is to accelerate unstructured search problems quadratically, but it also serves as a valuable tool or subroutine to improvise quadratic runtime for many other algorithms. And the last one is the Deutsch–Jozsa Algorithm. This algorithm is designed to solve the 'Deutsch-Jozsa problem'. This problem involves determining whether a given Boolean function is constant or balanced.



## **Why do these principles and complex algorithms of Quantum Computing make it so special? Is there any practical use for it? Or are they just boring theoretical concepts?**

Now, let's see if they are of any use. It is very important to have a common synchronised clock to keep things like GPS and stock markets in line. An Entangled atomic system would measure the passage of time effectively, bringing all timepieces together as a single pendulum rather than being preoccupied with local time differences. Quantum Computing finds usage in cryptography. It can be used to create private keys for encrypting messages sent from one location to another so that hackers could not copy the key exactly by the virtue of quantum entanglement. This quantum encryption finds usage in voting systems and banks.

There are countless applications of quantum computing. But, there are even more scientific limitations like decoherence which makes it difficult to dive deeper into the world of quantum computing. A quantum computer is not a powerful version of our current computers; just like a light bulb is not a powerful candle. Redesigning candles can't make better bulbs; bulbs are a completely new technology as quantum computers. Slowly and gradually quantum computers will take over the classical ones.

**It's the era of the dawn of quantum computing. Let's update ourselves and contribute to this new technology, for a better and promising future.**



# **SKETCH IT OUT**

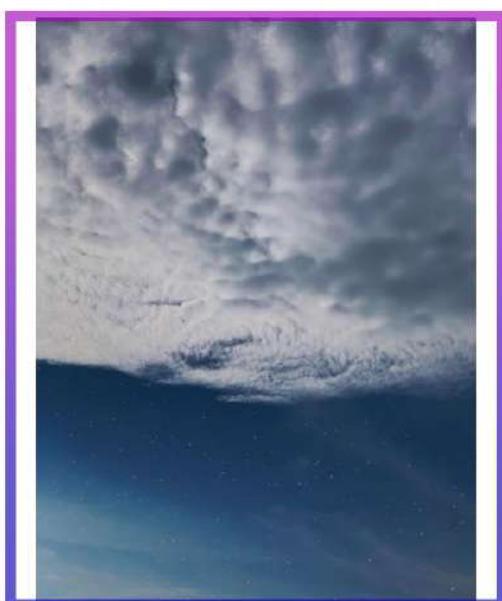
## **FEATURED ARTWORKS**



**Shreya Kamble**  
(D13)



**Bhuvan Patil**  
(D1ADA)



**Musa Malik**  
(D4A)



**Tejas Dabholkar**  
(D6)



Pooja Narayanan

D14A

# Dall-E

Imagine a situation where teddy bears are working on new AI research on the moon in the 1980s. Finding it a bit difficult to visualise? You probably have not yet checked out Dall-E then!



## Life imitates art, or does art imitate life?

With OpenAI's DALL-E 2, art can imitate just anything. OpenAI, the company behind ChatGPT, has an art platform called DALL-E 2. DALL-E, a 12-billion parameter version of GPT (Generative Pre-trained Transformer) - 3 is a generative AI model developed by Open AI that can produce artwork from a simple text query, using a dataset of text-image pairs. To put it another way, DALL-E can produce an image for you

statement that precisely describes what you want to see. It is capable of a wide range of tasks, such as anthropomorphizing objects and animals, integrating seemingly unrelated ideas, generating texts and altering already existing visuals. In short, it's a generative AI model that can create images that never existed before.

The name DALL-E is a blend of Salvador Dali, the famous artist and Pixar's WALL-E robot. The name certainly gives an idea about how the company is aiming to combine art and AI technology. After its initial release in January 2021, DALL-E has undergone major improvements, resulting in DALL-E 2. When the DALL-E 2 sequel was released, it rapidly rose to prominence.

It was one of a small number of AI art generators that gained enormous popularity for their knack for creating stunning visuals and artwork from scratch. It was difficult to determine that the photographs were artificially created because they were of such excellent quality and production value. Since one only needed to write a few descriptive words to generate an image, it attracts many non-artists who find the tool

## How Does DALL-E Work?

GPT-3 was built to produce words, but OpenAI tweaked a version using a technique called diffusion modelling.

Diffusion models carry out two separate tasks in succession. They ruin images, then they try to rebuild them. Programmers provide the system with real visuals that have human-assigned interpretations, such as a dog, an oil painting, a banana, the sky, a 1960s sofa, etc. They are dissipated, or moved, by the model through a long cycle of coordinated actions. In the ruining stage, each step slightly alters the image handed to it by the previous step, adding random noise in the form of scattershot meaningless pixels & then handing it off to the next step. When this is done repeatedly, the original image gradually turns into static and loses its meaning.

After the completion of this process, the model then reverses the direction of this process. Starting with the nearly meaningless noise, it pushes the image back through the set of successive stages, this time attempting to reduce noise and bring back meaning. By changing a multitude of parameters, the model is eventually trained. By repeatedly running this procedure on a large number of images and adjusting the model parameters each time, the model may be tuned to take a meaningless image and evolve it through a series of steps into an image that resembles the original input image.

For example, a user could prompt to create a picture of a fox with three hands reading a Harry Potter book – and it would quickly oblige.

If a user prompts DALL-E to create a picture of ‘A photo of an astronaut riding a horse,’ then it would display the following picture:

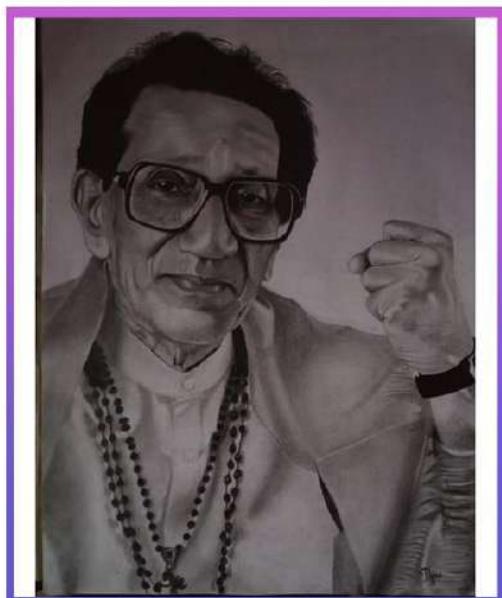


This horse, this astronaut, and these stars do not exist in the real world. All are the creation of the computer model built by OpenAI. In this case, based on its knowledge of the meanings of ‘astronaut’, ‘riding’ and ‘horse’, DALL-E 2 will produce an image. Based on its capability to correlate relevant concepts, it will even fill in details. Astronauts, for example, frequently appear against a background of stars. Whether you find it wondrous or horrifying, it appears that we have just entered an age in which computers can generate convincing fake images and sentences. It’s bizarre that mathematical operations on almost meaningless statistical noise can result in a picture that a person can understand. The processes are lifeless, yet the outcome appears to be something more. But it is indeed up to a person’s creativity because the final art is what matters!

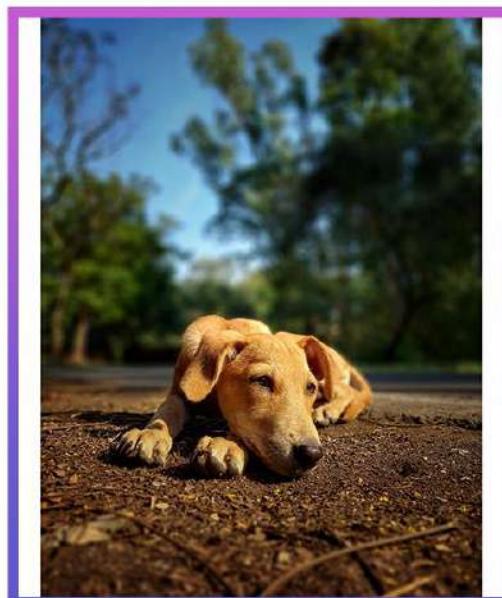
***“Art is not what you see, But what you make others see..”***  
*-Edgar Degas*

# **SKETCH IT OUT**

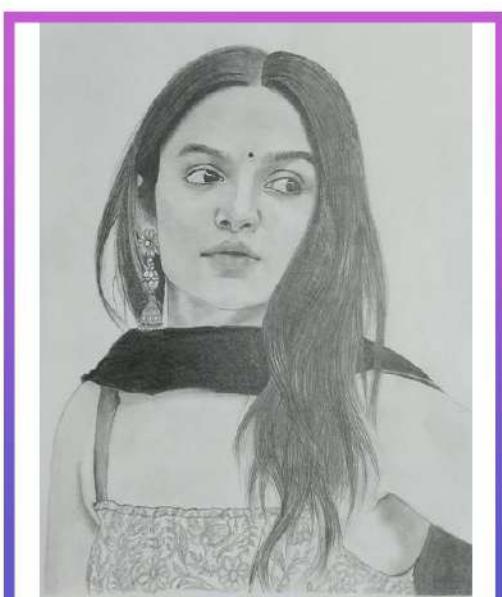
## **FEATURED ARTWORKS**



**Tejas Dabholkar**  
(D6)



**Raunik Kumbhare**  
(D13)



**Jayesh Vishwakarma**  
(D8)



**Bhuvan Patil**  
(D1ADA)



Atharva Dabhade

D8

## Augmented Reality: Blurring the Lines Between Reality and Digital Imagination

Augmented Reality has been one of the most fascinating technologies gaining traction over the recent years. This revolutionary technology has the potential to blend the immersive experience of digital technology into real world environment with the advantage of having limitless possibilities. AR blurs the lines between reality and digital imagination by creating a seamless integration of the two. It has also seen a gradual increase in its applications across diverse domains which include entertainment, gaming, education, healthcare etc. Pokémon Go, a game with augmented reality features, hit the internet in 2016 and garnered an incredible response from users worldwide. Many people envisioned that AR would be the future in Gaming and entertainment.

In healthcare, AR can help doctors visualize medical data and perform surgeries with greater precision. It can also be used to simulate medical procedures, allowing doctors to practice without the risk of harming patients.

Since research has shown that use of audio-visual aids makes the students to remember the concept for longer period of time. AR has been the preferred technology for simulating real-world scenarios and providing practical experience to learners.

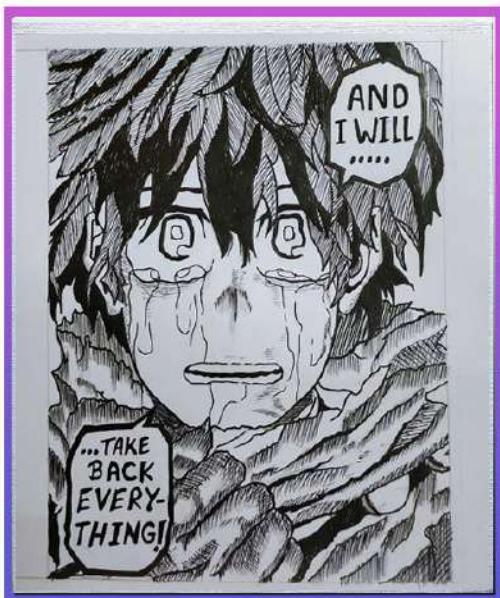


As technology continues to advance, we can expect to see even more innovative and exciting applications of this technology. However, it is expensive to develop the AR technology based projects and to maintain it. Moreover, production of AR based devices is costly. There is also a potential of misuse of AR by creating deepfakes and manipulating information. Therefore, like any other technologies we should gauge its impact on the society keeping its advantages, disadvantages and limitations in our mind. Nonetheless, the potential benefits of AR are vast, and its ability to enhance our experiences makes it a technology worth exploring and developing further.

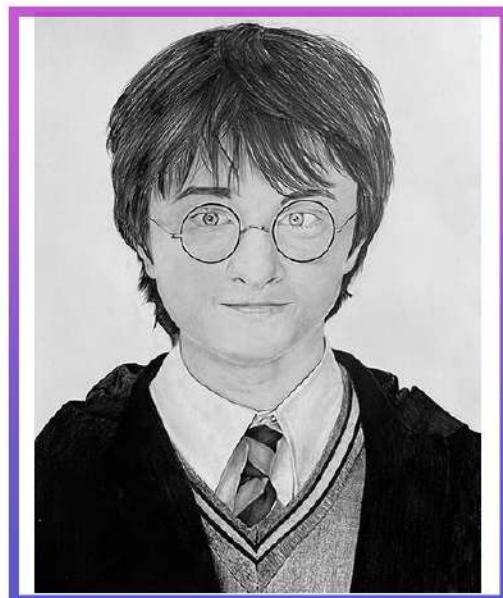
As we continue to explore and innovate in the realm of AR, it is clear that AR is here to stay and blur the lines between reality and digital imagination.

# **SKETCH IT OUT**

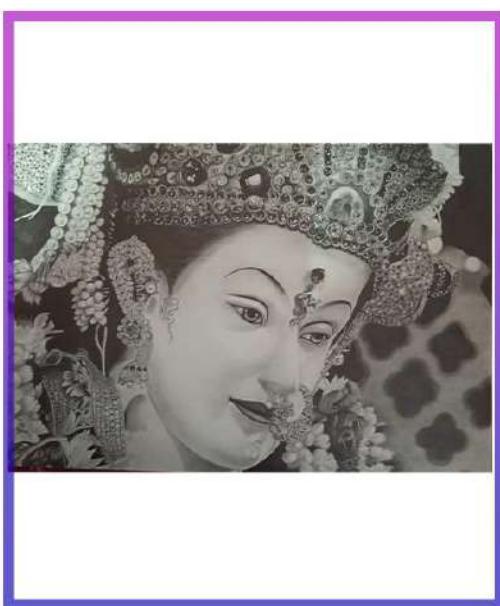
## **FEATURED ARTWORKS**



**Shreya Kamble**  
(D13)



**Bhuvan Patil**  
(D1ADA)



**Tejas Dabholkar**  
(D6)



**M Kaif A Ranjan Qureshi**  
(D7A)

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**1<sup>st</sup> PRIZE**

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Siddhesh Kakde

Shreya Kate

**2<sup>nd</sup> PRIZE**

**TEAM NOVA**

Abhishek Kakkad

Vineet Gupta

Nimesh Kshirsagar

Om Mandhane

**Congratulations!**

# WINNERS OF PRAXIS SCAVENGE TO BUILD



3<sup>rd</sup> PRIZE

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Anurag Shirsekar

Nidhi Nayak

Siddhi Bhogale

Shivani Nikam

SPECIAL MENTION

**TEAM SECRET NINJAS**

Mayuresh Pednekar

Abujad Ansari

Mitesh Dalvi

Congratulations!

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**TEAM SILVER**

Reshma Dhendhe



**2<sup>nd</sup> PRIZE**

**TEAM RIGHT**

Shreyas Dhasade

Shreya Gharat

Soham Hajare

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3<sup>rd</sup> PRIZE

**TEAM DEFULTER**

Rishabh Karavde

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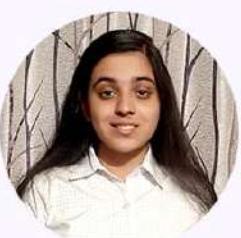
Karan Shah



Rashid Sarang



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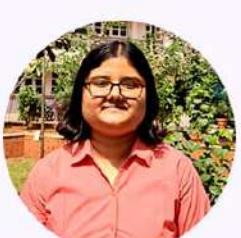
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