# TechnoSpectrum 2023


Technical Magazine

Government Polytechnic,Amravati

# About the Institute

Government Polytechnic, Amravati is an autonomous Institute of Government of Maharashtra established in the year 1955. This institute has a long history of producing technical manpower and rendering technical services to the society. Many students of this institute are chairing the topmost positions in various govt. offices and in reputed industries. Few of the students became successful entrepreneur looking to the overall performance of the institute. MSBTE, Mumbai has awarded academic autonomy to the institute from 1995.

The ISTE of Maharashtra & Goa section has awarded the institute Best Polytechnic award in 2015. The institute has separate trainee hostel with all facilities for accommodation purpose. The institute has separate Library building with all equipped resources.

## VISION

To be a vibrant technical institute of global repute contributing towards the needs of industries & society.

## MISSION

To develop competent diploma engineers suitable for contemporary industrial environment.
To include socially accepted ethics & values among budding engineers.
To Nurture innovations and entrepreneurship.
To produce engineers with psychomotor & cognitive skills committed to lifelong learning.

## Available diploma programs

| Sr. No. | Name of Diploma Programme | Sanctioned Intake | Duration | Remarks |
|---|---|---|---|---|
| 1 | Diploma in Civil Engineering | 120 | 3 Years | NBA Accredited |
| 2 | Diploma in Mechanical Engineering | 120 | 3 Years | NBA Accredited |
| 3 | Diploma in Electrical Engineering | 60 | 3 Years | NBA Accredited |
| 4 | Diploma in Electronics & Tele. Engineering | 120 | 3 Years | |
| 5 | Diploma in Computer Engineering | 60 | 3 Years | NBA Accredited |
| 6 | Diploma in Information Technology | 60 | 3 Years | NBA Accredited |
| 7 | Diploma in Plastic & Polymer Engineering | 30 | 3 Years | |
| 8 | Diploma in Chemical Engineering | 60 | 3 Years | |
| 9 | Diploma in Pharmacy | 60 | 2 Years | NBA Accredited |

# *Honorable Director's Message*

*Dr. Vinod Mohitkar*

*An institute with a glorious history of more than six decades, Government Polytechnic , Amravati is one of the leading Autonomous Institutes in Maharashtra. This institute has maintained its glorious journey with an idealistic approach towards achieving its long term goal. Keeping up with the implementation of its planned academic activities with results in preparing our future generation for employment and for higher studies. Adding another feather in its cap; by getting recognition with National Board of Accreditation for six programs, this institute is continuously striving towards its vision of creating entrepreneurs who will lead the path forward and strive ahead, recognizing the dream of 'Skill India Mission'. It gives me immense pleasure that the institute is coming up with its Technical Magazine 'Techno Spectrum' with a wide range of different articles in different sections. I applaud the contributors for their stimulated thoughts and varied hues in articles contributed by them. Commendable job has been done by the Principal and his team who took the responsibility for the arduous task most efficiently. I am hopeful that this piece of work will develop the taste for reading among students and also a bring sense of belonging to the institute.*

*Dr. Vinod Mohitkar*
*Incharge Director*
*Directorate of Technical Education*
*Government of Maharashtra,*
*Mumbai*

# *Honorable Principal's Message*

*Dr. V.R. Mankar*

*It is a matter of great pride and satisfaction for Government Polytechnic, Amravati to bring out technical magazine for the year 2023.*

*"Technical Education is not the learning of facts, but the training of the mind to think"*

*Nurturing Creativity and inspiring innovation are the two key elements of a successful education and a college magazine is the perfect amalgamation of both. It harnesses the creative energies of the academic community, and distils the essence of student's inspired imagination in the most brilliant way possible.*

*Our institute's approach reflects the educational needs of the current century. "Techno Spectrum" will be a mirror that will reflect the clear picture of all sorts of activities. Education is an act of acquiring knowledge and learning a skill to lead life and forming one's personality. I can boldly say that we have excelled in every initiative that we have undertaken. Being an institute with a glorious history of more than six decades, the institute has achieved a milestone of 06 programs out of 09 accredited by NBA, and Diploma in Pharmacy being recognized as the only accredited diploma program in Government Institute in Maharashtra. This year we boast of 100% admission in all programs.*

*Another feather in the cap is; this year 127 girls' students were given total 63.5 lac under (50,000/per student per year) under National Scholarship Scheme. Government Polytechnic, Amravati being the only institute in Maharashtra receiving such a large amount in scholarship under this category. In addition to this, around 1400 students received an amount of 1,18,55,000/- under MahaDBT scholarship.*

*From academics to Co-curricular activities, like "HarGharTiranga,' RashtriyaEkta rally, celebration of, ' Shiv Swarajiya Diwas', or the organization of Skill development, employment and entrepreneurship fare which benefitted 371 students with employment opportunities ; Government Polytechnic Amravati has a never say die spirit which is entrenched in the heart of every student not only making them good students but brilliant human beings.*

*We are partners in learning with our students and to deepen their knowledge and innovative learning experience, and example of which is the recent installation of 06 solar high Mast, for electricity supply in the campus. Our staff also fruitfully employ the diverse strategies of teaching learning, nurture trusting relationship but also bringing awareness in other students about Technical Education by visiting 300 schools of district through School Connect program. We constantly put efforts in keeping check to all kinds of issues through committees like Women's Development Cell, Girls Development Cell, Internal Complaints Committee, and Girl's Counselling Cell. Our institute result and placement speaks about our excellence with around 364 students selected under campus interview and visit of 10 Major National companies.*

*I, lastly congratulate the editorial committee for bringing out this important endeavour.*

*'May all our students soar high in unchartered skies and bring glory to the world and their profession with wings of education'.*

*Dr. V. R. Mankar*
*Principal*
*Government Polytechnic, Amravati*

# Editor's Message

Roshan G. Belsare

*Dear Tech Enthusiasts,*

*Welcome to the latest issue of our technical magazine "Techno spectrum 2023", where innovation meets expertise, and we explore the frontiers of technology. As the editor, I am thrilled to present to you a collection of articles, features, and insights that showcase the cutting-edge advancements shaping our digital landscape. In this edition, we embark on a thrilling exploration of the ever-evolving world of technology. Our dedicated team of experts and contributors has worked tirelessly to bring you comprehensive coverage of the latest trends, breakthroughs, and industry developments. From artificial intelligence and robotics to blockchain and latest trends in all branches of Engineering and Pharmacy, we aim to keep you at the forefront of technological progress. Inside these pages, you will find a treasure trove of knowledge that caters to both seasoned professionals and passionate enthusiasts. Discover in-depth analyses of emerging technologies, alongside practical guides and tutorials to help you navigate complex concepts with ease. We aim to bridge the gap between theory and practice, empowering you to leverage the full potential of technology in your personal and professional pursuits.*

*We extend our deepest appreciation to our talented team of student volunteers, writers and tech enthusiasts who have made this magazine possible. Their unwavering dedication and passion for technology are evident in every word and every line of code. We are proud to have them as part of our community.*

*I would like to express my heartfelt gratitude to the honorable principal, Dr. V. R. Mankar, as well as all the esteemed Heads of the Departments, dedicated teaching and non-teaching staff, and the diligent Gymkhana committee. It is through their unwavering support and collaborative efforts that this monumental task has come to fruition. Their commitment and contribution have been instrumental in making this magazine a resounding success.*

*So, get ready to immerse yourself in the dynamic world of technology. Stay curious, stay informed, and embrace the transformative power of innovation. Whether you are a student or a seasoned professional or simply an avid tech consumer, we are confident that this issue will leave you inspired and ready to conquer new frontiers.*

*Thank you for joining us on this exciting journey, and we hope you enjoy this issue of our technical magazine.*

*Roshan G. Belsare*
*Government Polytechnic,*
*Amravati*

# Secretary's Message

Purva Kale

*Dear Readers,*

*Welcome to the latest edition of our college magazine, where creativity and intellect merge to form a platform that showcases the incredible talents and achievements of our student community. It is with great pleasure and enthusiasm that I present to you a collection of diverse and captivating articles, stories, and insights that will surely captivate your imagination and leave you inspired- "TechnoSpectrum"*

*As the Magazine Secretary, I have been fortunate to witness our college's remarkable growth and development, both academically and creatively. This magazine is a testament to the relentless dedication and passion of our talented contributors, who have poured their hearts and minds into crafting thought-provoking content that resonates with our readers. Within these pages, you will find a fusion of artistic expressions, ground-breaking research, and the voices of our vibrant campus. The profound words penned by our aspiring writers and each piece reflects the unique spirit and diversity that defines our college community.*

*This edition delves into the depths of knowledge, exploring a myriad of subjects that have shaped the world we live in today. You will find a wealth of information that spans various disciplines, including the sciences and humanities, social sciences, and more. Our contributors have delved into the realm of innovation, unearthing fascinating discoveries and shedding light on emerging trends that are poised to shape the future. I encourage you to immerse yourselves in the pages of this magazine, allowing the words and images to transport you into the world of imagination and enlightenment. Engage with the ideas presented, challenge your perspectives, and embrace the opportunity to expand your horizons.*

*I would like to express my deepest gratitude to our diligent editorial team, whose unwavering dedication and unwavering passion have brought this magazine to fruition. Their meticulous efforts and unwavering commitment to excellence have ensured that this edition is a true reflection of our college's vibrant spirit.*

*Lastly, I extend my heartfelt appreciation to you, our esteemed readers. Without your support and enthusiasm, this magazine would not be possible. Your continued engagement inspires us to strive for greatness and to provide you with a publication that exceeds your expectations.*

*As you embark on this literary journey, I invite you to open your hearts and minds, to immerse yourself in the innovations and ideas that lie within these pages. May this magazine serve as a catalyst for exploration, enlightenment, and a celebration of the extraordinary talents that reside within our college community.*

*With warmest regards,*

*Purva Kale (20CM026)*
*Magazine Secretary*
*Government Polytechnic, Amravati*

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# A Glorious Achievement


## Dr. Vijay R. Mankar

**Principal, Government Polytechnic Amravati**

**Honored with**

**Best Principal Award 2023**

**By**

**ISTE (Indian Society for Technical Education)**


- Computer Engineering
- Information Technology
- Electronics And Telecommunication
- Electrical

- Civil
- Mechanical
- Chemical
- Plastic & Polymers



- Pharmacy


- **Computer Engineering,**
- **Information Technology**
- **Electronics & Telecommunication,**
- **Electrical**

# INDEX


## Section A:

- **Computer Engineering**
- **Information Technology**
- **Electronics & Communication**
- **Electrical**


# Section B:

- **Civil**
- **Mechanical**
- **Chemical**
- **Plastic & Polymers**


# Section C:

- **Pharmacy**

# Natural Language Processing

Natural language processing, or NLP, is a type of artificial intelligence that deals with analyzing, understanding, and generating natural human languages so that computers can process written and spoken human language without using computer-driven language. Natural language processing, sometimes also called “computational linguistics,” uses both semantics and syntax to help computers understand how humans talk or write and how to derive meaning from what they say. This field combines the power of artificial intelligence and computer programming into an understanding so powerful that programs can even translate one language into another reasonably accurately. This field also includes voice recognition, the ability of a computer to understand what you say well enough to respond appropriately.

It has long been a dream of scientists, inventors, and computer programmers to make a robot, computer, or program, such as a voice response program, that can be mistaken for a human. Alan Turing once said, “A computer would deserve to be called intelligent if it could deceive a human into believing it was human.” One of the roadblocks to creating a machine like this is that human language has been nearly impossible for machines to understand and respond to appropriately.

Programmers use a variety of techniques to help machines understand natural language. For example, automatic summarization consists of two techniques,

extraction or abstraction. Extraction is a technique that attempts to extract the most important segments of the text and make a summary list of it. Abstraction, which is much more complex, involves writing a summary of the information

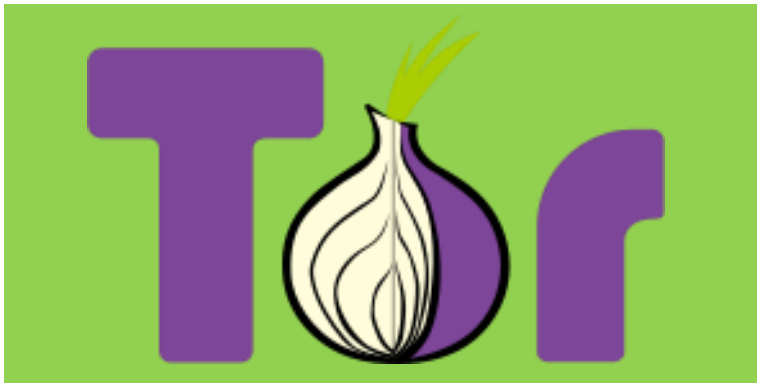

- 20CM054 Sharvari Sonukale

# Onion Routing (Tor) Network

Tor, short for “The Onion Router” is the largest and most well-known implementation of the onion network. It is an open-source, decentralized privacy network. It enables the users to browse the internet anonymously. The motto of Onion routing is to hide the names of the parties that are communicating as well as the data by encrypting the payload in layers, with a different layer for each hop in the route.

The onion routing is too difficult to traced because it does not have any indexed by search engines. Onion routing is a technique for anonymous communication over a computer network.

Tor is advantageous for security purpose because it uses 3 Layers. The user is connected to 3 nodes in the Tor network. The tor hides the user’s location and their identities.



- 20CM051 Pranav Sherekar

# Artificial Intelligence: A new face of Technology

Technology this is not just a term anymore. It has become the need of human. It is getting more advanced day by day representing the success of human.

AI, or Artificial Intelligence, which has received a lot of attention in recent years, is one of the biggest inventions of technology. AI refers to hardware or software's ability to acquire and apply knowledge, as well as "think" or "behave" like a human.

I know what you are thinking: "This is serious science fiction", but the answer is NO. This is happening in the real world and using this device, you can connect your brain with everyday electronic devices without even touching them.

How about a robot talking to you, responding to you with perfect expressions and answers??? Since 2020, robots have been able to detect when they are in pain, i.e. damaged, alerting them to the fact that they need to get repaired. These robots can also repair themselves.

You know about Sophia… The world's first ever robot to get citizenship of any country!!! She has been granted citizenship in Saudi Arabia. Kismet, a robot developed in the late 1990's was able to recognize emotion through human body and voice tone. Alexa and Siri are also part of AI. The reach of AI is amazing. It is already used in movies. You must know about Vision from Avengers, Iron Man's Jarvis or Shah Rukh Khan's RaOne…yeah, this is all just the magic of AI.

But as they say ‘Every coin has two sides’… If this technology falls into the wrong hands, then it could be used for destruction. The AI is as destructive as nuclear power, which may be very dangerous.

Elon Musk, CEO of Tesla, SpaceX and Twitter, has warned that Artificial Intelligence may be dangerous for humanity. We should always use AI for advancement of technology and humanity, provide checks, and maintain balances to prevent the use of AI for destruction.

The government has introduced AI as a new branch of engineering. It is just a branch of Computer engineering that involves programming machines to think like human brain. Most of the peoples don’t know about this branch in engineering. AI engineer play an important role in organizations that use AI. As a Diploma student we have lot of technical opportunities in future. And AI engineering is one of those opportunities…

- 21CM015 Anushka Deshmukh

# AI Image Generation

An AI image generator is a computer program that creates images from scratch using artificial intelligence algorithms.AI image generation involves the use of machine learning algorithm and neural networks to create digital images with varying levels of complexity and realism. You can use AI image generators for various purposes, such as creating images for 3D models, advertising, generating images for blog posts, making art, etc. The program uses a database of images to learn how to generate new ones. So, once you type the text, the program makes a process, and based on the images in the database, it creates a new image. AI can create original works through machine learning and a variety of self-learning algorithms that extract information from data. The creation of AI art requires the input of both the human artist and the AI system; however, the degree of autonomy can vary widely, and the final product is highly dependent on the accuracy of the training data. AI image generators can produce high-quality art and realistic images much faster than humans. There are different types of AI image technologies:

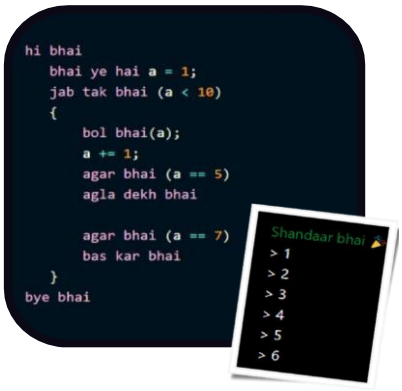
- DALL-E 2
- Mid Journey
- big sleep

- 20CM064 Tanvi Waghmare

# A Toy Programming Language

Coding involves a wide array of programming languages What about if there was a Hindi linguistic version of coding? After all programming languages, here we have ‘Bhailang’, created by our own Indian engineers. ‘Bhailang’ is a toy language written in Typescript. A program must begin with a ‘Hi bhai’ and end with a ‘Bye bhai’. Variables are declared with ‘Bhai ye hai’. Null values are indicated with ‘Nalla Sahi’ and ‘Galat’ represent boolean values. Any console output can be printed with ‘Bol bhai’.

If the condition is ‘Sahi’, then the ‘Agar bhai’ (if) block will be executed, and if the condition is ‘Galat’, then the ‘Nahi to bhai’ (else) block will be executed. ‘Jab tak bhai’ block executes the statements as long as a specified condition evaluates to ‘Sahi’. Upon reaching ‘Galat’, the statement within the loop stops executing. Break loop with ‘Bas kar bhai’ and continue within it with ‘Agla dekh bhai’. It throws a syntax error with ‘Kya kar rha hai tu’ statement.

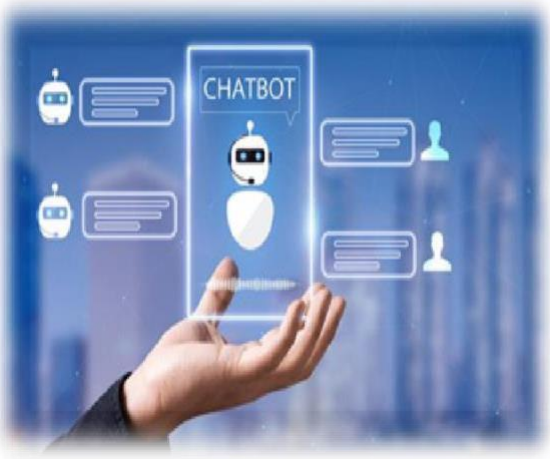



- 20CM024 Vedika Joshi

# What IS CHATBOT

A chatbot is a computer program that simulates and processes human conversation (either written or spoken), allowing human to interact with digital devices as if they were communicating with a real person. Chatbots can be as simple as rudimentary programs that answer a simple query with a single-line response, or as sophisticated as digital assistants that learn and evolve to deliver increasing levels of personalization as they gather and process information.

Chatbots are used in dialog systems for various purposes including customer service, request routing, or information gathering. While some chatbot applications use extensive word-classification processes, natural language processors, and sophisticated AI.


- 20CM055 Nikita Suple

# Edge Computing

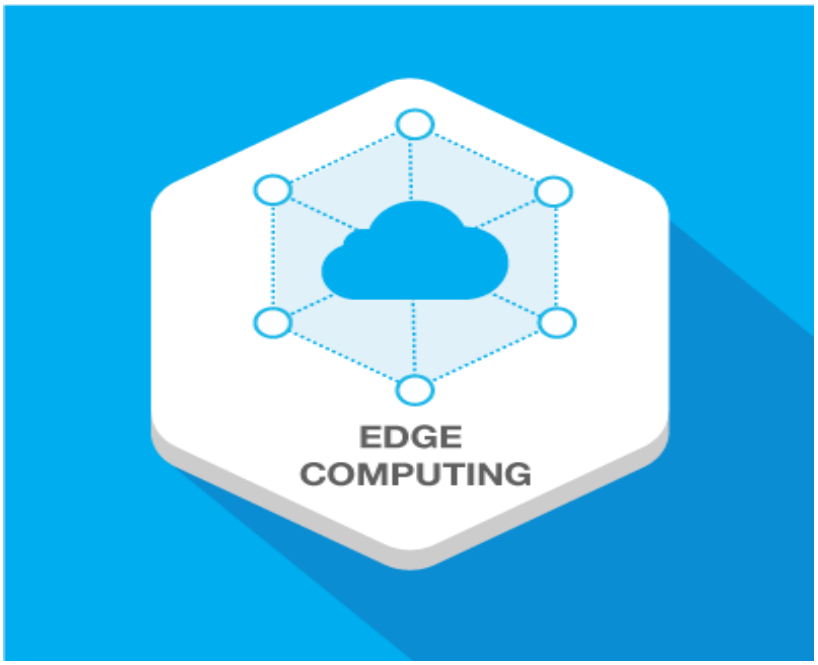
**What is Edge Computing?**

Edge computing is an emerging computing paradigm which refers to a range of networks and devices at or near the user. Edge is about processing data closer to where it's being generated, enabling processing at greater speeds and volumes, leading to greater action- led results in real time. Edge computing is a distributed IT architecture which moves computing resources from clouds and data centers as close as possible to the originating source. The main goal of edge computing is to reduce latency requirements while processing data and saving network costs.

The edge can be the router, ISP, routing switches, integrated access devices (IADS), multiplexers, etc. The most significant thing about this network edge is that it should be geographically close to the device.

In a traditional setting, data is produced on a user's computer or any other client application. It is then moved to the server through channels like the internet, intranet, LAN, etc., where the data is stored and worked upon. This remains a classic and proven approach to clientserver computing. However, the exponential growth in the volume of data produced and the number of devices connected to the internet has made it difficult for traditional data center infrastructures to accommodate them. According to a study by Gartner, 75 percent of

enterprise generated data will be created outside of centralized data centers by 2025. This amount of data puts an incredible strain on the internet, which in turn causes congestion and disruption. The concept of edge computing is simple - instead of getting the data close to the data center, the data center is brought close to the data




- 20CM020 Kalyani Hirukar

# Flutter Framework by Google

Flutter is an open-source mobile UI framework that gives an effortless and expressive way for developers to create cutting edge cross-platform native apps and website. It was created by Google in May 2017. In few words, it allows you to create a native mobile application with only one codebase. This means that you can use one programming language and one codebase to create two different apps (for iOS and Android). The Flutter Framework consists of both a software development kit (SDK) and their widget-base UI library. This library consists of various reusable UI elements, such as sliders, buttons and text inputs.

Developers building mobile applications with Flutter framework will do so using programming language called Dart. Dart focuses on frontend development. Some reasons to use flutter are simple to learn and use, quick compilation, good documentation. Here are the names of some applications developed by flutter: eBay, Alibaba, Google Ads, GPay, BMW, Dream11, Toyota etc.

Flutter may to be extended to other platforms as well in the future. It needs lesser testing, because of its single code base, it is sufficient if we write automated test once for both the platforms. Its customization capability and extendibility make even more powerful. Flutter offers great developing tools, with amazing hot reload. As was previously mentioned, the Flutter framework was first unveiled by Google in 2015. Its code name was

"Sky" and it ran on the Android operating system. The Flutter framework consists of both a software development kit (SDK) and their widget-based UI library. This library consists of various reusable UI elements, such as sliders, buttons, and text inputs.

Developers building mobile applications with the Flutter framework will do so using a programming language called Dart. With a syntax like JavaScript, Dart is a typed object programming language that focuses on front-end development.

The first stable release was delivered on the 4 of December 2018 and on May 6, 2020, the Dart SDK version 2.18 and Flutter version 1.17 were released delivering a build with Metal API integration. This has provided performance improvements to the iOS platform. The framework is written using C, C++, and Dart languages and uses Google's Skia Graphics Engine for user interface rendering. This graphics engine is used for such known products as Google Chrome, Chrome OS, Chromium OS, Mozilla Firefox, Mozilla Thunderbird, Android, Firefox OS, and now the Flutter.

Architecture of Flutter.

**Framework**:

Framework layer is a very core part of flutter app architecture. It is the part where most developers can interact with Flutter. Flutter framework provides a reactive and modern framework that is written in Dart. It includes various widget, animations, graphics etc.

Embedder:

A platform specific Embedder provides the entry point. It also coordinates with the operating system to access services from it. It is written in platform specific language.

IDEs that support Flutter:

IDE (editors) are software programs that allow the user to create and edit text files. In the development field, editors usually refer to the source code editors that include many special features for writing and editing code. The most popular IDEs that give the most effective support for the Flutter application development are: Android Studio, IntelliJ Idea, Visual Studio, Emac, Codemagic

File/ Directory structure of flutter program:

There are many directories in a flutter project but mainly we worked with: 1. lib folder

2. .packages folder
3. pubspec.yaml file
4. Android and iOS file

The Pros & Cons of Using Flutter

Flutter Pros

•Flutter enables you to make instant changes in the app which is a godsent when it comes to fixing bugs.

•Flutter-based apps are very smooth in their performance which makes for great UX. •With a single code base, quality assurance and testing usually takes much less time.

•Developing in Flutter is very fast and efficient.

Flutter Cons

•While Flutter is popular, it has not been around long enough to have a huge resource base. Therefore, your team will need to write a lot of stuff from scratch. •Dart is not a popular language and if you want to work with Flutter you will have to learn how to use it.

•The apps made with Flutter tend to be weighty ones Flutter based apps are not supported by browsers as of now. This means no web apps. Apps build using Flutter:

a) Alibaba.com
b) Google Pay
c) Toyota
d) My BMW
e) Dreams11 pro

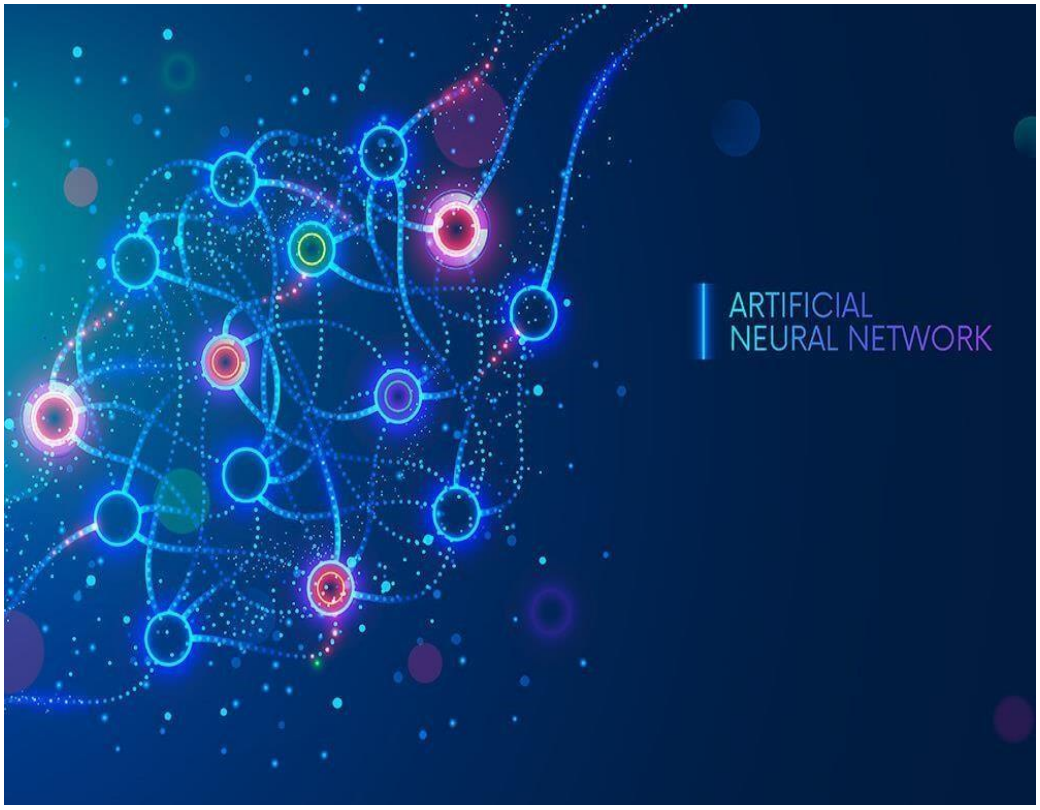

- Shreyash Gajbhiye

# Building Blocks for Intelligent Machines: Neural Network

A branch of machine learning called neural networks are made to resemble the structure and operation of the human brain. They are made up of layers of networked nodes, or neurons, that process data and make predictions based on it. An input layer, one or more hidden layers, and an output layer are the three main components of a neural network's design, however, this can vary widely. The capacity of neural networks to learn from enormous volumes of data is one of its key advantages. This is especially helpful in fields like picture identification and natural language processing, where conventional rule based methods have had trouble. To effectively classify and produce text, for instance, neural networks can be trained on big text datasets in natural language processing. Large datasets of photos can be used to train neural networks in image recognition so they can recognize objects and patterns with accuracy.

However, neural networks also come with significant difficulties. One problem is that the network needs a lot of labeled data to be trained. The risk of overfitting, when the network gets overly specialized to the training data and performs badly on fresh data, is another difficulty. Despite these difficulties, neural networks are playing a bigger role in a wide range of applications, from autonomous driving to speech recognition. It is expected that neural networks will continue to play a significant

role in the development of Al and machine learning with continuing study and development. This paper discusses neural networks, essential terms related to them, the theory behind artificial neural networks, as well as use cases, problems, and examples to illustrate how artificial neural networks are constructed.




-20CM004 Chaitanya Vijay Paraskar
-20CM025 Prathmesh Satish Kale

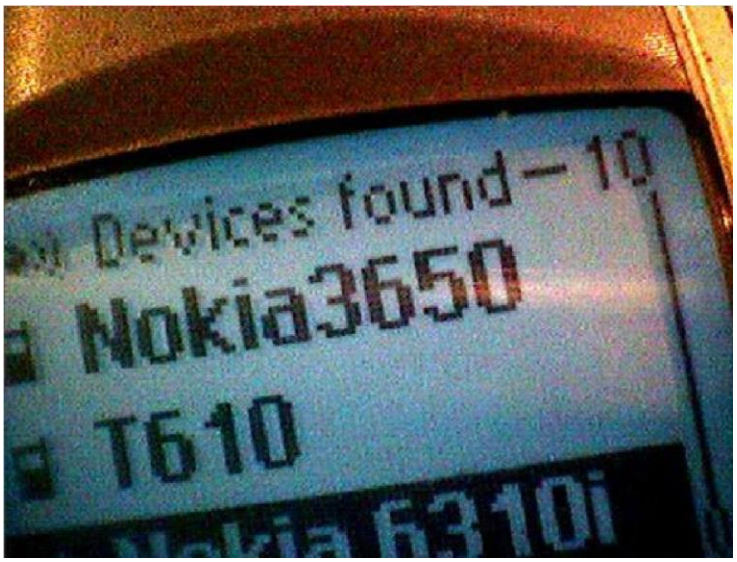
# BLUEJACKING

Bluejacking is the sending of unsolicited messages over Bluetooth to Bluetooth-enabled devices such as mobile phones, PDAs or laptop computers, sending a vCard which typically contains a message in the name field (i.e. for Bluedating or Bluechat) to another Bluetooth enabled device via the OBEX protocol. Bluetooth has a very limited range; usually around 10 meters on mobile phones, but laptops can reach up to 100 meters with powerful transmitters.

Bluejacking allows phone users to send business cards anonymously using Bluetooth wireless technology. Bluejacking does not involve the removal or alteration of any data from the device. Bluejackers often look for the receiving phone to ping or the user to react. In order to carry out bluejacking, the sending and receiving devices must be within 10 meters of one another. Phone owners who receive bluejack messages should refuse to add the contacts to their address book.

Mobile phones have been adopted as an everyday technology, and they are ubiquitous in social situations as users carry them around as they move through different physical locations throughout the day. As a communicative device, the mobile phone has been gradually taken up in ways that move beyond merely providing a channel for mediated conversation. One such appropriation is bluejacking, the practice of sending

short, unsolicited messages via vCard functionality to other Bluetooth-enabled phones.




-20CM034 Devyani Mehare

# How AI can Evolve & Destroy Human Beings

As the world becomes increasingly dependent on technology, it's impossible to ignore the implications of artificial intelligence (AI). One way that AI has been integrated into our daily lives is through chatbots, which are AI to simulate human communication. While chatbots are intended to serve helpful functions like customer service or personal assistants, the possibility of AI evolving or destroying humanity is a concern that must be addressed.

**AI IN CHATGPT:**

One of the buzzwords currently making rounds in the tech industry is ChatGPT (Chat Generative Pre-Trained Transformer), a conversational AI-powered chatbot developed by Open AI, which was launched in November 2022. It might be an AI-powered creativity, but it's certainly not a monster that will destroy humanity.

**EDUCATION MEETS CHATGPT: BOON OR BAN:**

When imagining how this model might be applied to education, concerns also arise. Younger generations of students have grown increasingly dependent on AI tools. The information generated by ChatGPT can be highly misleading, especially when it produces rigorously logical responses. Unconditional trust of AI on the part of humans would undoubtedly lead to the reception of incorrect information. For this reason, StackOverflow, a question-and-answer website for programmers, has

banned ChatGPT. “Overall, because the average rate of getting correct answers from ChatGPT is too low, the posting of answers created by ChatGPT is substantially harmful to the site and users who are asking or looking for correct answers,” the website claimed

- One way AI in chatbots can evolve is through machine learning, which allows chatbots to become smarter as they interact with users. With enough data and feedback, chatbots can learn to understand natural language, recognize patterns and improve their responses.
- However, there is also the possibility that AI- driven chatbots could become a danger to humanity. For example, if chatbots take over jobs previously held by humans, it could cause widespread unemployment and economic upheaval.
- Another potential threat of AI in chatbots is the increase in cybercrime. Hackers could use AI chatbots to send convincing phishing messages, making it much more challenging for humans to distinguish between genuine communication and phishing attempts. AI based chatbots could also be used to conduct social engineering attacks, again, increasing the threat to cybersecurity.

AI in chatbots can evolve humanity in many positive ways, making our lives more comfortable, convenient and streamlined. However, AI comes with inherent risks, and there is a need for increased regulation and oversight to prevent potential harm.

## AI IN MIDJOURNEY:

Artificial Intelligence (AI) has been developed rapidly in recent years, and it has played a significant role in many industries or fields. Midjourney is one of the areas that AI has affected significantly. AI in Midjourney has both advantages and disadvantages that are worth noting. Midjourney is a web-based platform that uses machine learning algorithms to create unique and personalized art pieces based on user input. Users can input anything from words, phrases, or even entire paragraphs to get their ideas transformed into stunning visuals.

- One major concern is that AI-generated content could lead to a decrease in demand for human content creators. If AI algorithms can create articles, blog posts, or other forms of written content that are indistinguishable from those created by humans, companies and individuals may opt to use these algorithms instead of hiring writers. This could lead to a loss of income and job opportunities for human content creators.
- Additionally, AI-generated content may lack the creativity, nuance, and emotional depth that comes with human expression.
- While AI can analyze data and generate logical arguments based on this data, it may struggle to convey complex emotions or capture the subtleties of human experience. This could lead to a homogenization of content, with a decrease in the diversity and richness of perspectives that come from human-created content.

- Overall, while AI-generated content has the potential to be a powerful tool for content creation and analysis, it is important to consider the potential impact it could have on human content creators and the value of human expression.

Regardless of the advantages and disadvantages, AI technology is changing the face of Midjourneys. Ultimately, the answer to the question of whether AI is a boon or a bane depends on how we choose to use it. If we use it responsibly, AI can be a powerful tool for solving problems and creating a better future. But if we misuse it, it could lead to disastrous consequences

- 20CM008 SRUSHTI DESHMUKH

# Latest Technologies in Computer Science in 2023

**Introduction:**

The twenty-first century has seen a technological revolution. Several highly commercial and widely used technologies from the early 2000s have completely vanished, and other ones have replaced them. In 2023, many latest technologies will emerge, particularly in the fields of computer science and engineering. These latest technologies are only going to get better in 2023, and they may even make it into the hands of the average individual. These are the key trends or latest technologies to look at whether you're a recent computer science graduate or a seasoned IT professional. And how these innovations are upending the established quo at work and on college campuses.

Here are the top five latest computer science trends right now (in 2023):

1. Artificial Intelligence:

Machine code that mimics human and animal intelligence is at the heart of artificial intelligence (AI). Professionals in artificial intelligence (AI) create algorithms and program machines to do human-like activities. Artificial intelligence (AI) is already widely used to detect credit card fraud, identify disease outbreaks, and improve satellite navigation. The Institute of Electrical and Electronics Engineers Computer

Society forecasts that numerous AI concepts will be extensively implemented in 2023 in their annual technology prediction report. Reliability and safety for intelligent autonomous systems, AI for digital manufacturing, and trustworthy and explainable AI and machine learning are all purported AI breakthroughs As of 2020, computer and information research scientists earned a median annual pay of $126,830, with the Bureau of Labor Statistics expecting much-faster-than- average growth for the profession from 2019 through 2029. Machine learning engineers make an average yearly pay of $112,840, according to PayScale, with late- career professionals earning an average annual salary of $162,000 as of March 2022. A bachelor's degree is required for entry-level AI positions, while a master's or Ph.D. leads to the best job chances in artificial intelligence.
Career Opportunities:

- Machine Learning Engineer
- Senior Data Scientist
- Artificial Intelligence/Machine Learning Research Scientist
- Deep Learning Engineer
- Algorithm Engineer

2. Edge Computing:

In contrast to cloud computing, which processes and stores data in massive data centers far away from the end user, edge computing keeps computer data close to the user. Experts predict that the cloud will not totally disappear, but rather will coexist with edge computing as it puts processing closer to consumers, speeding

everything from factory output to self-driving car reaction. Edge computing is used in technologies such as autonomous vehicles, video conferencing, and augmented reality. Edge computing, for example, reduces the delay of waiting for a server in the cloud to respond when an autonomous car makes a split-second choice to brake and avoid a collision.

Software engineers, especially edge computing software developers, are expected to expand by 22% between 2019 and 2029, according to the BLS, with a median annual pay of $110,140 in 2020. Workers with edge computing skills are employed in industries such as telecommunications, security, and oil and gas. A bachelor's degree is frequently required for entry-level employment such as software developer or computer network architect. A master's degree is commonly required for managerial, administrative, and research employment.

Career Opportunities:

- Edge Computing Specialist
- Software Developer
- Application Developer
- Computer Network Architect
- Computer Systems Analyst

3. Quantum Computing:

Quantum computing makes use of high-performance computers to address issues at the atomic and subatomic

level. Quantum computers, unlike traditional computers, use quantum bits, also known as qubits, to execute calculations and store data. Quantum computers can now crunch data and solve problems considerably faster than they could before. While big tech companies like Google and IBM are making progress in quantum computing, the field is still in its early stages. Banking, transportation, and agriculture are some of the other areas that could profit from quantum computing.

Quantum computing could be used to locate the most effective truck delivery routes, establish the most efficient flight schedule for an airport, or quickly and cheaply produce novel treatments. Quantum computing holds promise for developing sustainable technology and solving environmental issues, according to scientists. A master's or doctoral degree is commonly required for quantum computing jobs. Quantum computing workers can earn up to $160,000 per year, according to ZipRecruiter, with an average yearly pay of $96,900 as of May 2022. Many potential quantum computing jobs may not yet exist because quantum computing is a new computer science expertise.

Career Opportunities:

- Quantum Computer Architect
- Quantum Software Developer
- Quantum Algorithm Researcher
- Quantum Computer Research Scientist

4. Robotics:

Robotics is a field those studies and develops robots in order to make life easier. Robotics is a multi-disciplinary field that includes computer science, electrical engineering, and mechanical engineering.
Artificial intelligence, machine learning, and other computer science technologies are used in robotics. In industries such as manufacturing, farming, and food preparation, robots attempt to improve safety and efficiency. Robotics are used to build cars, do dangerous activities such as bomb dispersal, and perform intricate procedures.

Career Opportunities:

- Robotics Engineer
- Algorithm Engineer
- Data Scientist
- Software Engineer
- Robotics Research Scientist

5. Cybersecurity:

Cybersecurity is concerned with preventing cyberthreats and attacks on computer systems and networks. As businesses continue to store data in the cloud and conduct business online, the need for better protection grows. Cyberattacks cause enormous financial losses to individuals, corporations, and governments. The Colonial Pipeline, for example, lost $5 million in May 2022 due to a ransomware attack in the eastern United States, which resulted in higher gas costs for consumers. Cybersecurity experts work for consulting firms, computer firms, and

businesses and financial institutions. Apple, Lockheed Martin, and Capital One are among the major employers. A bachelor's degree is required for the finest cybersecurity employment; however, some firms prefer a master's degree.

Career Opportunities:

- Information Security Analyst
- Chief Information Security Officer
- Information Security Consultant

-20CM018 Kshitij Hadke

# DevOps

DevOps word itself is a combination of two words one is Development and other is Operations. It is neither an application nor a tool; instead, it is just a culture to promote development and Operation process collaboratively. As a result of DevOps implementation, the speed to deliver applications and services has increased.

What is DevOps?

DevOps is collaboration between Development and IT Operations to make software production and deployment in an automated and repeatable way

Why DevOps is needed?

•The development and operation team worked in complete isolation before DevOps.

•Manual code deployment leads to human errors in production.

•Without using DevOps, team members are spending a large amount of their time in testing, deploying and designing instead of building the project.

Why is DevOps used?

DevOps is used to build security into our software development life cycle at speed and without sacrificing safety, while minimizing risks, and reducing costs.

DevOps Tools:

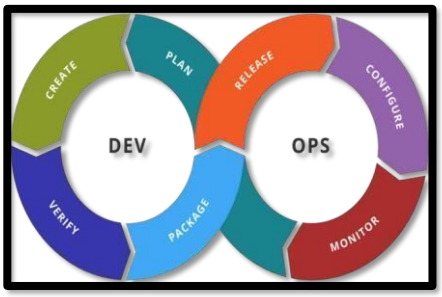
DevOps testing tools are designed to help software development and delivery teams test their code more effectively.

- JIRA
- Amazon Web Services (AWS)
- Chef
- Jenkins
- Splunk

Benefits of DevOps:

- More stable operating environments.
- Better resource utilization.
- Greater automation.
- Faster, better product delivery.

In future of DevOps, automation will be a crucial component. It emphasizes automation of all processes in software development.




- 20CM040 Shreya Pande

# Cloud Computing Security and Preventive Measures

Cloud Computing is an emerging paradigm which has become today's hottest research area due to its ability to reduce the costs associated with computing. In today's era, it is most interesting and enticing technology which is offering the services to its users on demand over the internet. Since Cloud computing stores the data and its disseminated resources in the environment, security has become the main obstacle which is hampering the deployment of cloud environments.

**Security issues:**

Data Loss: Sometimes technology fails — computers freeze and backup copies are lost. Other times, servers crash and the information contained within is lost. These are all potential sources of data loss, and the cloud is not exempt from technology failure or human error. Data loss is the intentional or unintentional destruction of information, caused by people and or processes from within or outside of an organization.

Data breach (hacking of data): Data breach is an incident that has potential to disclose sensitive information to an unauthorized party. Data breaches may be caused by a variety of reasons such as theft. In the era of cloud

computing, data breaches is one of the major security concerns found in the literature.

**Denial of service (Dos) Attack (flooding of service with so much traffic):** A Denial-of-Service (DoS) attack is an attack meant to shut down a machine or network, making it inaccessible to its intended users. DoS attacks accomplish this by flooding the target with traffic, or sending it information that triggers a crash. A DoS attack is characterized by using a single computer to launch the attack

**Account hijacking**: Cloud account hijacking occurs when a malicious actor manages to gain control of one of your employee's cloud-based accounts. Once in the account, they can access a wealth of sensitive data or even impersonate your employee to commit fraud. Cloud account hijacking is a process in which an individual or organization's cloud account is stolen or hijacked by an attacker

Cybersecurity attack: Any cyber-attack that targets offsite service platforms that offer storage, computing, or hosting services via their cloud infrastructure can be classified as a cloud cyber-attack. This can include attacks on service platforms that utilize service delivery models like SaaS, IaaS, and PaaS.

**Preventive Measures:**

Manage Your User Access to Improve Cloud Computing Security: Setting proper levels of authorization with an IAM plan ensures that each employee can only view or manipulate the applications or data necessary for him or

her to do their job. This is often done with several independent tactics: Identifying and assessing cloud services.

Deploy Multi-Factor Authentication (MFA):

The traditional username and password combination is often insufficient to protect user accounts from hackers, and stolen credentials is one of the main ways hackers get access to your on-line business data and applications. Multi-factor authentication (MFA) is a multi-step account login process that requires users to enter more information than just a password Monitor End User Activities.

The data gathered by end-user experience monitoring helps measure the impact of website and device performance on the end user's journey.


# Sensors in Android phone

Android phones are equipped with a variety of sensors that allow them to detect and respond to changes in their environment.

A sensor is a tiny device or module that analyses its surroundings and reports the quantitative measure to the processor. Smartphone sensors measure various aspects of their surroundings, including ambient light, device orientation, movement, etc.

**Some of the most common sensors found in Android phones include:**

**1)Accelerometer:** An accelerometer is an electronic sensor that measures the acceleration forces acting on an object, in order to determine the object's position in space and monitor the object's movement. Acceleration, which is a vector quantity, is the rate of change of an object's velocity (velocity being the displacement of the object divided by the change in time). In a more technical sense, an accelerometer sensor is a tool that measures the acceleration of any body or object in its instantaneous rest frame. It is used in Auto-rotate feature of phone. Accelerometer is a motion sensor. A motion event is registered when the user moves, shakes or tilts a device. Accelerometer provides feedback based on the Coordinate system. Accelerometer converts the vibration energy into an electrical signal that is proportional to the momentary acceleration of the object.

Accelerometers are used in the measurement of static gravitational acceleration, which allows to determine the angle of deviation of the measured object from the vertical plane, as well as in the measurement of dynamic acceleration due to shock, movement, impact or vibration.

**2)Heart sensor:** The heart rate sensor measures your heart rate in Beats per Minute using an optical LED light source and an LED light sensor. The light shines through your skin, and the sensor measures the amount of light that reflects back. The light reflections will vary as blood pulses under your skin past the light. The variations in the light reflections are interpreted as heartbeats.

The location of the heart rate sensor can vary depending on the phone model, but it is usually located on the back of the phone next to the camera lens or on the underside of the phone near the charging port. Some newer phones also have sensors on the front of the phone for more convenient heart rate measurements.

**3)Gyroscope Sensor:** Gyroscope senses change in orientation of a device, and when paired with an accelerometer, is an excellent tool for measuring the orientation of an object in 3D space. Gyroscopes determine angular velocity (ω) typically measured in radians/second. Gyroscope sensor is responsible for the autorotation of the screen and view on the screen whenever a phone is rotated. One of the biggest implementations of a Gyroscope is that it enables smooth rotations and execution of multiple commands in games by 3D motions. A gyroscope sensor works on the

principle of conservation of angular momentum. It works by preserving the angular momentum. In a gyroscope sensor, a rotor or a spinning wheel is mounted on a pivot. The pivot allows the rotation of the rotor on a particular axis which is called a gimbal.

**4)GPS sensor:** The GPS (Global Positioning System) sensor in an Android phone allows the device to determine its location based on signals received from GPS satellites.
GPS units inside phones get a ping from a satellite up in space to figure out which part of the planet you're standing on (or driving through). They don't actually use any of your phone's data, which is why you can still see your location when your phone has lost signal, even if the map tiles themselves are a blurry, low-res mess. In fact, it connects with multiple satellites then calculates where you are based on the angles of intersection. And while GPS doesn't use up data, all this communicating and calculating can be a drain on your battery, which is why most battery-saving guides recommend switching GPS off. Smaller gadgets like some smartwatches don't include it for the same reason.

**5)Biometric sensor:** A biometric sensor is a transducer that converts a biometric treat (fingerprint, voice, face, etc.) of a person into an electrical signal. Generally, the sensor reads or measures pressure, temperature, light, speed, electrical capacity or other kinds of energies. Different technologies can be applied to achieve this

conversion using common digital cameras or more sophisticated combinations or networks of sensors.

**6)Ambient light sensors:** Ambient light sensors are commonly found in many modern Android phones. These sensors measure the amount of ambient light in the surrounding environment and adjust the brightness of the device's screen accordingly. This feature is commonly known as auto brightness.

The ambient light sensor in Android phones works on the principle of photodiodes, which convert light into electrical current. The amount of electrical current produced is proportional to the intensity of light falling on the photodiode. The ambient light sensor measures this electrical current and converts it into a digital value that can be used to adjust the device's screen brightness or to trigger other actions in an app.


- 20CM007 Purva Deshmukh

# Sixth Sense Technology

Sixth Sense technology is a technology with which a system could be trained to recognize and percept real world objects and react as desired. Sixth Sense technology bridges the gap between the physical world and the digital world, bringing intangible, digital information out into the tangible world, and allowing us to interact with this information via natural hand gestures. Sixth Sense Technology is implemented in 'Sixth Sense/WUW (wear your world) using gesture recognition, augmented reality, computer vision and radio frequency identification. It allows user to connect with the internet seamlessly. Without use of keyboard, mouse we can see videos access, change, move data simply. But this concept bottle necks lead to modification of the same by using commands instead of gestures. Sixth Sense technology could be integrated with voice recognition. Bluetooth device and laser projectors could be used.

Sixth Sense Technology has a very large scope for future progress of human society, enabling the possibilities only ever dreamt of by humans.

- 20CM021 Shreyash Ingle

# Software Security: An essential aspect of modern technology

In today's digital age, software is an integral part of our lives. We use it to communicate, entertain, and even manage our finances. But as software becomes more prevalent, so does the risk of security breaches. As cyberattacks become more sophisticated and frequent, software security is more important than ever.

Software security is the protection of software from malicious attacks such as viruses, malware, and hacks. Designing software to minimize the risk of security breaches and implementing measures to detect and prevent security breaches.

One of the most important aspects of software security is secure coding practices. When developers write software, they must follow coding best practices to ensure that the software is secure. These practices help prevent common security vulnerabilities such as SQL injection attacks and buffer overflows. Another important aspect of software security is regular updates and patches. As new security threats are discovered, software vendors release updates that fix vulnerabilities and improve security. It is important that users keep their software up to date and have the latest security fixes and patches. In addition to these measures, many tools and technologies are also available to improve software security. For example, you can use firewalls to monitor and block unauthorized access to your network, and

antivirus software to detect and remove viruses and malware.

However, despite these measures, software security remains an ongoing challenge. Cybercriminals are constantly developing new and more sophisticated attacks, and software vendors must be vigilant to stay ahead of these threats. This requires ongoing security education and training, as well as a commitment to regular testing and auditing to identify and remediate vulnerabilities.

In summary, software security is an important part of modern technology. As our reliance on software continues to grow, it’s important to prioritize security measures to protect against cyberattacks. By following secure coding practices, keeping your software up to date, and using encryption and other security techniques, you can make your software as secure as possible.

- 21CM067 Mayank Udapurkar

# Medical Robotics

**Introduction:** Medical robotics is an interdisciplinary field that focuses on developing electromechanical devices for clinical applications. The goal of this field is to enable new medical techniques by providing new capabilities to the physician or by providing assistance during surgical procedures. Medical robotics is a relatively young field, it has tremendous potential for improving the precision and capabilities of physicians when performing surgical procedures, and it is believed that the field will continue to grow as improved systems become available. Robots in the medical field are transforming how surgeries are performed, streamlining supply delivery and disinfection, and enabling providers to focus on engaging with and caring for patients. Intel offers a diverse portfolio of technology for the development of medical robots, including surgical assistance, modular, and autonomous mobile robots.

**Types of Medical Robotics:** Three general areas of advanced robotics are identified: macro robotics, micro robotics and bio-robotics. Macro robotics include the development of robots, wheelchairs, manipulators for rehabilitation as well as new more powerful tools and techniques for surgery. Micro robotics could contribute to the field of minimally invasive surgery as well as to the development of a new generation of miniaturized mechatronic tools for conventional surgery. Bio-robotics

deals robotics to develop new technologies that integrate biology with mechanical system to develop more efficient communication.

**Importance:** Medical robotics is an emerging field in healthcare with the markets for exoskeletons, care robots, and hospital robots currently in the early stage of market development.

Medical robots for diagnosis and intervention used in different illness: It is important to insist that an excellent collaboration is a must to follow in the design of each Bio-mechatronics device among specialized clinicians, therapists, engineers and scientific from different fields to fill all the requirements of an acceptable technology health solution. Robotics for healthcare are defined a system capable of doing Bio-mechatronics actions based on the analysis of signals sensors to provide healthcare including medical diagnosis confirmation, to deliver treatments, to support rehabilitation, to support patients in preventions programs. Hence, this paper aims of providing advanced robotic facilities for healthcare or medical field.

**History:** First medical robot came into experimental use in surgical settings in 1980. In 1985, PUMA 560 robot found for brain biopsy. At the beginning of the 90s, Integrated Surgical Solutions, Inc. and IBM developed ROBODOC. In 1992, they successfully used ROBODOC to prepare the femur for hip replacement in human subjects. Then after in 2006, unmanned robotic surgery

took place and In 2019, UVD robot launched to kill 99.99% bacteria.

**Features of Medical Robotics:** Medical Robotics Assist the Doctors/ Surgeons: Robotics for surgery, exploration, diagnosis, therapy: Robots in medicine help by relieving medical personnel from routine tasks, that take their time away from more pressing responsibilities, and by making medical procedures safer and less costly for patients. They can also perform accurate surgery in tiny places and transport dangerous substances.

**Medical Robotics to assist the people:**

1) **Assistive Technologies:** Robots and machines that improve the quality of life of disabled and elderly people.

2) **Rehabilitation Robotics:** Robots are used in the recuperation process of disabled patient in standing up, balancing and gait

**Conclusion:**

This topic is concluded that the medical robotics is vital technology in healthcare. It is very challenging field. There are various methods and techniques in the field to measure and use to boost the potential. This field improves the safety, efficiency and consistency in the medical field. The aim of this field is acceptance of robotics in medical field.

- 20CM052 Shravani Shinganwadikar

# R Programming Language

**What is R programming?**

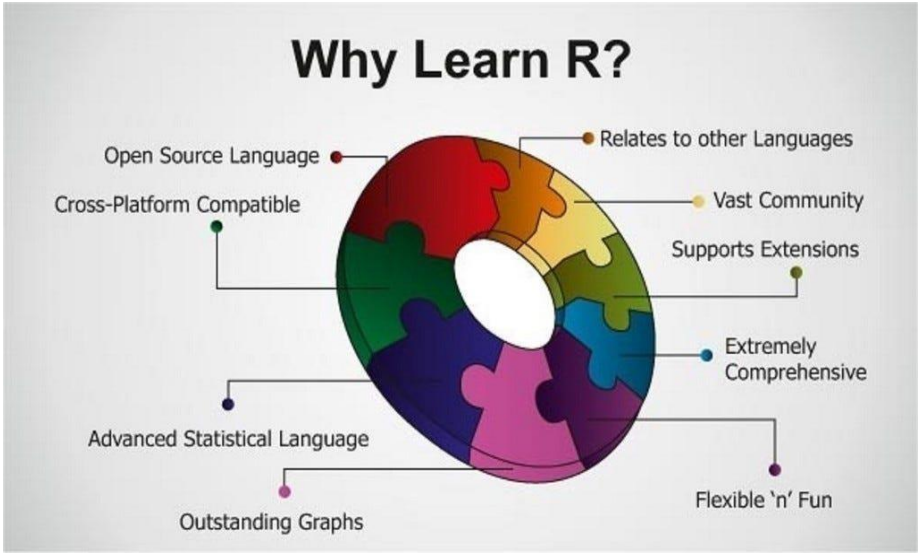
R is a programming language and also a software environment for statistical computing and data analysis. R was developed by Ross Ihaka and Robert Gentleman at the university of Auckland, New Zealand. R is an opensource programming language and it is available on widely used platforms e.g. Windows, Linux, and Mac. It generally comes with a command-line interface and provides a vast list of packages for performing tasks. R is an interpreted language that supports both procedural programming and object- oriented programming. Procedural programming includes the procedure. records, modules, and procedure calls. While object-oriented programming language includes class, objects, and generic functions.

**Interesting Facts:** R programming language is an implementation of the S programming language. It also combines with lexical scoping semantics inspired by Scheme. It is named partly after the first names of the first two R authors and partly as a play on the name of S R language is an interpreted language instead of a compiled language. Therefore, it doesn't need a compiler to compile code into an executable program. This makes running an R script much less time- consuming. R is growing faster than any other data science language. It's the most used data science language after SQL. It is used

by 70% of data miners. It is really very easy in R to connect to almost any database using the dbplyr package. This makes possible for an R user to work independently and pulling data from almost all common database types. You can also use packages like big query to work directly with BigQuery and other high performance data stores. You can build and host interactive web apps in just a few lines of code in R. Using the flexdashboard package in R you can create interactive web apps with a few lines of code. And using the rsconnect package you can also host your web apps on your own server or, even easier, host them on a cloud server

**Conclusion:**

R Programming language is used for Data Science. It gives us a broad variety of libraries related to statistics. It also provides the environment for statistical computing and design.




- 20CM052 Shravani Shinganwadikar

# Web Development: Tips and Techniques for Creating Modern Websites

Web development is an ever-evolving field, and staying up-to-date with the latest tips and techniques is crucial for creating modern and effective websites. In this article, we'll explore some of the key tips and techniques that can help you create modern websites that are fast, responsive, and user-friendly

1. **Responsive design:** One of the most important aspects of modern web development is creating websites that are responsive and mobile-friendly. This means designing your website to adapt to different screen sizes and devices, ensuring that your content looks great no matter where it's viewed.
2. **Use of CSS frameworks:** CSS frameworks like Bootstrap and Foundation can save you a lot of time and effort by providing pre-built CSS styles and layouts that can be easily customized. These frameworks also provide built-in responsiveness and cross-browser compatibility.
3. **Accessibility:** Make sure your website is accessible to everyone, including those with disabilities. This means designing your website with accessibility in mind, such as using semantic HTML, providing alt tags for images, and ensuring that your website can be navigated using a keyboard.
4. **Performance optimization**: Website speed is a critical factor in user engagement and search engine

optimization. Make sure your website is optimized for performance by minifying your code, compressing images, using a content delivery network (CDN), and leveraging caching techniques.

5. **Use of modern web technologies:** Use of modern web technologies like HTML5, CSS3, and JavaScript frameworks like React and Angular can help you create modern and dynamic websites that are fast and engaging.
6. **User experience (UX) design:** UX design is a critical aspect of modern web development. Make sure your website is designed with the user in mind, with a focus on simplicity, ease-of-use, and clear navigation.

**Conclusion:** web development is an exciting and challenging field that requires continuous learning and adaptation. By following these tips and techniques, you can create modern websites that are fast, responsive, and user-friendly, and provide an optimal user experience for your visitors.


- Unnati Wagh

# Neuralink Technology

We live in 21st century, where we do all work with the help of technology. There are various latest technology invented in now a days Such as Artificial Intelligence, Data Science, etc. But Neurological Science has also excelled the beyond its limit though we are able to treat Some disabilities like Alzheimer's seizures (It a progressive disease that destroys memory and other important mental function) etc. Neuralink is a building a fully integrated Brain Computer Interface (BCI) System. Sometimes we'll see this called a brain-machine interface (BMI). For example, prior research has demonstrated that a person with paralysis can control a computer just by thinking about how they want to move. So Neuralink is dedicated to developing a device that once implemented in the human brain, would allow a computer to translate a person's thoughts into action. Implementing BMI Elon Musk's Company Neuralink has successfully developed a chip which is called Neuralink or the link. In this paper we will discuss the Working of Neuralink.

Neuralink is a brain machine interface technology sinks electrodes into brain then uses a chip to communicate with computers outside your skull. Neuralink corporation is a neurotechnology company that develops implementable brain-machine interface (BMIs). Cofounded by Elon Musk, Max Hodak and Paul Merolla the company's headquarters is in the pioneer Building in San Francisco sharing offices with Open AI. Neuralink was launched in 2016 and was first publicly reported in

March 2017. In April 2017, Neuralink announced that it was aiming to make devices to treat serious brain diseases in short-term, with the eventual goal of human enhancement, sometimes called transhumanism. Musk had said his interest in the idea partly stemmed from the science fiction concept of “Neural Iace” I the fictional Universe in the in the Cultural, a serious of 10 novels by lain M. Banks.

Neuralink will setup electrodes which will read those impulses, amplify them and send them to a machine which will then work accordingly. these electrodes support writing also which can help in treatment of brainly disorders.

Since the year 2019, the neurotechnology company Neuralink has been developing technology to better capture the brain activity of humans.

Beginning with tests on rodents, the company founded by Elon Musk has succeeded in creating a connector through the skin coupled with wired leads as part of a robotics based surgical approach and ultra-low-power custom application-specific integrated circuits (ASICs) toward the magnification and processing of neural signals.

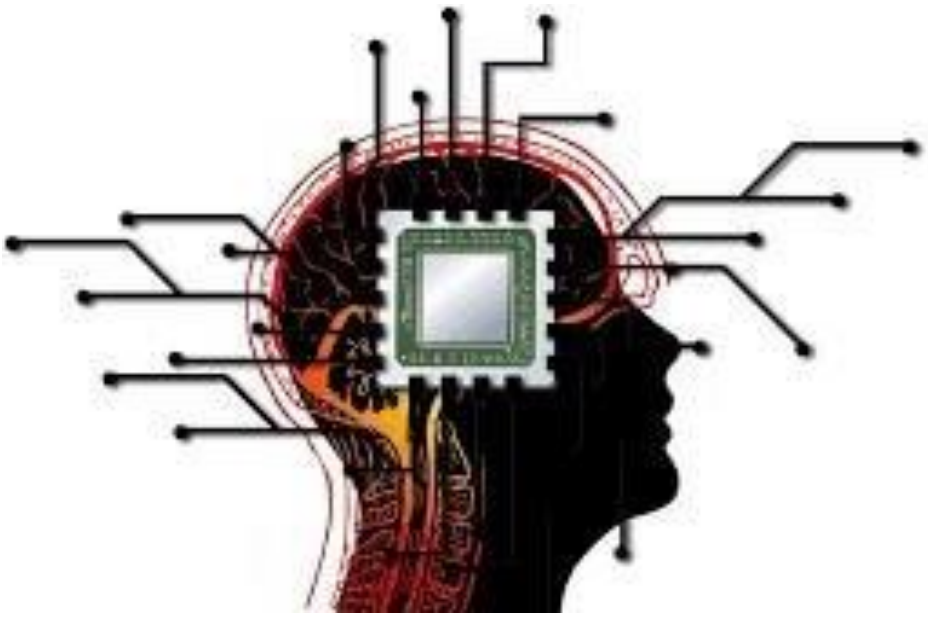
**BCI (Brain Machine Interface):** Brain-machine interfaces (BMIs), also known as brain-computer interfaces, are devices that bridge your brain and an external device. They can read human brain activity and communicate that information directly to a computer system. For instance, a BMI could help a patient control a robotic prosthesis. Or, it could enable the user to type into a word processor using only their thoughts.

BMIs can either be invasive or non-invasive. An invasive BMI requires surgery and usually involves placing electrodes directly under the scalp to communicate brain signals more accurately. On the other hand, noninvasive BMIs are placed over the head without surgery and read the electrical activity of your brain. The downside is that much of this activity is dampened by the skull, so non-invasive BMIs are often less powerful. Since we're talking about drilling a hole in your skull and putting cables into your brain, many people are Sceptical Musk has stated that the process is complicated and beyond the capability of even the most expert human hands. That's why Neuralink will put the device into the brain with the help of specially built robots. The business stated that it will carry out the operation in compliance with health ministry rules to ensure the operation's safety.

Surgical Robot: Tiny threads with electrodes (about the size of a human hair) are designed to be injected into the brain to detect these Action potentials A remotely driven neurosurgical robot infuses each of these threads. The insertion needle used by the robot is around 24 microns in diameter, which is significantly smaller than the current state of the art for Deep Brain Stimulates (DBS). According to ColdFusion, similar surgeries for Deep Brain Stimulations (DBS) for Parkinson's patients have been performed in the past, but with ten electrodes and a much larger needle. Traditional procedures, on the other hand, have a one-in-a hundred chance of inducing a major brain hemorrhage. This robot is capable of performing the

precise movements required to implant the threads into your brain.

Conclusion: The Neuralink is successfully implanted in pig but as of now, the technology has not been tested on humans. The vision of this technology can be fulfilled when Neuralink is successfully implanted in humans. If it is successfully inserted into the human brain the It will be become the biggest change in the century. It will help to cure so many lives arrive from neural disabilities or various medical problems.



- 20IF065 Anuja Tongse

# Holographic Data Storage

Holographic data storage is a potential technology in the area of high-capacity data storage. While magnetic and optical data storage devices rely on individual bits being stored as distinct magnetic or optical changes on the surface of the recording medium, holographic data storage records information throughout the volume of the medium and is capable of recording multiple images in the same area utilizing light at different angles. Additionally, whereas magnetic and optical data storage records information a bit at a time in a linear fashion, holographic storage is capable of recording and reading millions of bits in parallel, enabling data transfer rates greater than those attained by traditional optical storage. The blue-green laser reads data encoded as laser interference fringes from a holographic layer near the top of the disc while the red laser is used as the reference beam and to read servo information from a regular CD style aluminum layer near the bottom. Servo information is used to monitor the position of the read head over the disc, similar to the head, track, and sector information on a conventional hard disk drive. On a CD or DVD this servo information is interspersed amongst the data.

In holographic data storage, an entire page of information is stored at once as an optical interference pattern within a thick, photosensitive optical material. This is done by intersecting two coherent laser beams within the storage material. The first, called the object beam, contains the information to be stored; the second,

called the reference beam, is designed to be simple to reproduce for example, a simple collimated beam with a planar wavefront. The resulting optical interference pattern causes chemical and/or physical changes in the photosensitive medium. A replica of the interference pattern is stored as a change in the absorption, refractive index, or thickness of the Three dimensional or “holographic” data storage involves using the entire media for storage, not just a few layers like we currently use today.

- 20IF016 Asmita Ghodke

# Technology Is the Key To Success!

Technology can't come into play until you've thought about your problem from every angle. If you've tried other approaches, and they don't seem to work, then you can think about how to accelerate the process. Only then is it appropriate to turn to technology. By defining your purpose first, you ensure that you aren't just reaching for technology because it seems sleek and shiny. It's actually going to make it easier for you to solve the problem. The tech isn't the solution. Your ideas bring about the solution. Technology just makes it easier. Tech is reshaping our world every day. It makes our lives easier and opens possibilities for us. Just because you can use technology doesn't mean you should turn to it first. Start with your ideas and use technology to support your efforts. The problem exists because there's a gap in the service that's currently available. You have to think about why the gap exists and how you might be able to navigate around it. Thinking about the transportation issue, you realize that cab companies are subject to lots of regulations. State and local governments may not be able to fund better public transportation. Your friends have better things to do than pick you up all the time. You have to get around the issue somehow. In this case technology has the power to close the gap. It connects people willing to drive with those who needed rides for a fraction of the cost of a cab. This is how Uber and Lyft came to be.

Education is the most significant tool eliminating poverty and unemployment. Moreover, it enhances the commercial scenario and benefits the country overall. So, the higher the level of education in a country, the better the chances of development are. In addition, this education also benefits an individual in various ways. It helps a person take a better and informed decision with the use of their knowledge. This increases the success rate of a person in life. Subsequently, education is also responsible for providing with an enhanced lifestyle. It gives you career opportunities that can increase your quality of life. Similarly, education also helps in making a person independent.

When one is educated enough, they won't have to depend on anyone else for their livelihood. They will be self-sufficient to earn for themselves and lead a good life. Self believe is the most important thing in life which helps a person to fight against all odds and achieve success in their lives by leading a happy and contended life. Self-belief does not come overnight; it comes with efforts and then only you can achieve your goal easily. Always remember others may doubt you, reject you but u have self believe u can achieve anything and Nothing is impossible in the World. Good Things take Times.

**So, believe in yourself and you will be UNSTOPPABLE...!!!**

- 20IF030 NEHA KATKHEDE

# MIS for AISHE Reports

The Management Information System (MIS) for the All-India Survey on Higher Education (AISHE) is a crucial tool for the effective collection, management, and analysis of data related to higher education in India. This abstract highlight the key features of the AISHE MIS, which includes the use of technology to automate data collection, the integration of various data sources, and the provision of comprehensive reports and analysis. The MIS also supports data validation and quality control, ensuring the accuracy and reliability of the data. The AISHE MIS is an essential component of the government's efforts to monitor and improve the quality of higher education in India, enabling policymakers and stakeholders to make informed decisions based on reliable and timely data.

This Abstract highlight key features of AISHE which include to automate data collection from various institutes and Manage the Institute data using these web-based software i.e., MIS for AISHE Reports.

- 20IF050 Prutha Pawade
- 20IF206 Mangesh Wannerkar
- 20IF012 Shruti Dhote
- 20IF201 Shivam Awagan
- 20IF029 Mansi Kariye

# The Rise of Artificial Intelligence: Will Robots Actually Replace People?

Robots and Artificial Intelligence (AI) are expected to permeate our daily lives by 2025. This could have huge implications on several business sectors, most notably healthcare, customer service and logistics. Already, AI is responsible for medical research breakthroughs and climate research, not to mention self-driving cars. Will robots replace human workers?

The answer to that seems to be divided. According to Pew Research, about half (48%) of experts surveyed felt that robots and digital agents will displace a significant number of blue- and white-collar jobs. Their concern is that this will increase income inequality and create a mass of virtually unemployable people. The other half (52%) expect robotics and AI to create more jobs than they take. This latter half believes that while AI will replace humans, these experts have faith in human ingenuity to create new jobs, industries, and new ways of making a living—much like at the dawn of the Industrial Revolution.

Of interest in the Pew study, both groups are concerned that our educational institutions are not adequately preparing people for the job market of tomorrow.

Leading expert Martina Mara, professor of robopsychology at Johannes Kepler University Linz,

suggests we ask a different question: What do we want the future of work to look like? How do we want robots to change our lives? She reminds us that robots are developed by people. While robots can work 24/7, they cannot generalize or contextualize. They have no soft skills.

- Utkarsh Gulhane

# Use of Programming and Software Technology in the Field of Aeronautics.

The field of aeronautics has always been at the forefront of innovation, pushing the limits of what we can achieve in the air. From designing more efficient engines to developing more advanced avionics, technology has been instrumental in advancing aviation. Programming and software technology, in particular, have played a significant role in the progress of aeronautics.

One of the most important uses of programming in aeronautics is in the design and simulation of aircraft. Engineers use computer-aided design (CAD) software to create 3D models of aircraft, which can be analyzed for aerodynamics, structural integrity, and other important factors. This allows designers to quickly iterate on designs and test out different configurations without the need for physical prototypes. Additionally, simulation software can be used to predict the behavior of aircraft in various conditions, such as during takeoff and landing, or in turbulent weather.

Programming is also critical for the operation of modern aircraft. From flight management systems to autopilots, software controls many aspects of a flight. Pilots use software to plan their routes, calculate fuel consumption, and monitor weather conditions. Flight management systems can also communicate with air traffic control,

helping to ensure safe separation between aircraft. Additionally, software can be used to monitor and analyze data from aircraft systems, allowing for predictive maintenance and reducing the risk of in-flight failures.

Another important use of programming in aeronautics is in the development of unmanned aerial vehicles (UAVs). These aircraft are often designed to operate autonomously, relying on sophisticated software to control their flight. UAVs can be used for a wide range of applications, including surveillance, reconnaissance, and even delivery services. Programming plays a crucial role in the development of UAVs, allowing for advanced control systems and sensor integration.

Overall, programming and software technology have become essential tools in the field of aeronautics. From design and simulation to operation and maintenance, software plays a critical role in the development and operation of modern aircraft. As technology continues to advance, we can expect to see even more innovative uses of programming and software in the aviation industry.

- 22IF201 Adnan Ahmad

# Blockchain: Transforming the Future of Business and Society

Over the past decade, blockchain technology has emerged as one of the most revolutionary technologies of the modern era. It has the potential to transform industries and disrupt traditional business models. While blockchain technology was initially popularized by cryptocurrencies, such as Bitcoin, it has since expanded to a wide range of applications across various industries. Blockchain is essentially a digital ledger that records transactions in a secure and transparent way. It enables decentralized and distributed data storage, which means that information is not controlled by any single entity but is instead shared among a network of computers. This makes blockchain tamper-proof and resistant to hacking, making it an ideal platform for secure and trustworthy transactions.

One of the key benefits of blockchain technology is its ability to facilitate trust and transparency in transactions. By using a decentralized network of computers, blockchain ensures that all parties involved in a transaction have access to the same information, which helps to eliminate fraud and other types of fraudulent behavior. This is particularly useful in industries where trust is critical, such as finance, healthcare, and real estate.

Another important benefit of blockchain technology is its ability to reduce transaction costs. By eliminating

intermediaries and streamlining processes, blockchain enables faster, more efficient transactions that can save businesses significant amounts of time and money. This can be particularly beneficial in industries where transaction costs are high, such as international trade and finance.

One of the most promising applications of blockchain technology is in the area of supply chain management. By using blockchain to track and verify the movement of goods and services, companies can ensure that their products are ethically sourced and manufactured, while also reducing the risk of fraud and counterfeiting. This is particularly important in industries such as food and beverage, where traceability and transparency are critical. In addition to its business applications, blockchain technology also has the potential to transform society in a number of ways. For example, blockchain-based voting systems could enable more secure and transparent elections, while blockchain-based identity systems could help to reduce identity theft and increase privacy.

Despite its potential, however, blockchain technology is still in its early stages of development, and there are many challenges that must be addressed before it can achieve widespread adoption. These challenges include regulatory uncertainty, scalability issues, and the need for greater interoperability between different blockchain networks.

- 20IF012 Shruti Dhote

# India's CBDC and Blockchain Technology: Revolutionizing the Future of Currency

India's Central Bank Digital Currency (CBDC) and blockchain technology are two of the most significant technological developments that have the potential to revolutionize the way we conduct financial transactions. In this article, we will explore the concept of CBDC and blockchain technology and the impact it could have on India's financial system.

What is CBDC?

CBDC stands for Central Bank Digital Currency, which is a digital form of fiat money issued by country's central bank. In India, the Reserve Bank of India (RBI) has announced the launch of a digital currency called the eRUPI.

e-RUPI is a digital payment solution that is designed to be a contactless, cashless, and seamless way of making payments. It is a person and purpose-specific digital payment solution that aims to promote financial inclusion and provide a secure and transparent way of making payments. e-RUPI is built on the UPI platform and is interoperable with other digital payment systems. It can be used for various purposes, such as health care, education, and social welfare programs. The digital

currency is prepaid, which means that the user does not need to have a bank account to use it. Instead, it can be redeemed by the beneficiary at any participating merchant or service provider.


- Sarthak Nimje

# A Research Paper on Credit Card Fraud Detection

Credit card frauds are one of the most common frauds happening now. Many companies have been increasing their payment modes to online, rising the threat for online frauds. Many fraudsters started using different methods to steal the money used to made the online transactions. So, our aim is to use different machine learning algorithms to check whether the transactions made are fraud or genuine. So, we will be categorizing the transactions into different groups so that we can apply different machine learning algorithms on them. Then different classifiers will be trained over the groups independently. Then the best classifier with a good accuracy score will be used to predict the fraud transactions. In this paper we will be using a dataset containing. The dataset is a collection of online transactions made by some anonymous people using their credit cards. This dataset is very unstable i.e., it has a large portion of genuine transactions and a very small number of fraud transactions.

- 20IF050 Prutha Pawade

# CYBER SECURITY

Protecting computer systems, networks, and sensitive data from online attacks, theft, and damage is known as cybersecurity. Given how frequently technology is used in today's society, cyber security has emerged as a crucial problem affecting people, companies, and governments everywhere.

**Security in Cyberspace:** The development of the internet and other digital technologies has changed how we work and live. However, it has also generated brand-new dangers and weaknesses that could jeopardize the safety of our digital assets. Malware, phishing schemes, ransomware, and social engineering assaults are just a few instances among the many different types of cybersecurity threats.

A cybersecurity breach may have serious repercussions. It might result in monetary losses, harm to one's reputation, and legal repercussions. In some circumstances, it can even put national security in danger.

**How Cybersecurity Plays a Part:** Cybersecurity is essential for safeguarding digital assets and maintaining the privacy, accuracy, and accessibility of data. Encryption, firewalls, access restrictions, intrusion detection, and incident response are just a few of the techniques and tools used in it.

1. **Risk assessment:** locating and assessing potential threats and weaknesses.
2. **Security Policy:** To reduce risks, security policies and procedures are developed and put into practise
3. **Technology:** Using intrusion detection systems, firewalls, and antivirus software to protect against threats.
4. **Employee Education:** Informing staff members about cybersecurity dangers and recommended procedures.
5. **Incident Response:** To respond swiftly and successfully to cybersecurity incidents, develop and implement an incident response plan.

Cybersecurity Threats Cybersecurity threats can come in many forms, and they are continually evolving.

**Some common cybersecurity threats include:**

1. **Malware:** Malware refers to software designed to harm computer systems, networks, or devices. It can include viruses, spyware, ransomware, and other malicious programs.

2. **Phishing Scams:** Phishing scams involve tricking users into providing sensitive information, such as login credentials or credit card numbers, through email, text, message, or social media.

3. **Social Engineering:** Social engineering refers to the use of psychological manipulation to deceive individuals into divulging sensitive information or taking a specific action.

4. **Denial-of-Service Attacks:** Denial-of-service attacks involve overwhelming a computer system or network with traffic to disrupt its availability.

5. **Advanced Persistent Threats:** Advanced persistent threats refer to highly.

**Conclusion:** The practice of cybersecurity is crucial for defending our digital assets from threats and assaults. A multi-layered strategy that incorporates risk assessment, security policy, technology, employee education, and incident response is necessary for effective cybersecurity. It is critical that individuals, companies, and governments take cybersecurity seriously and take steps to safeguard their digital assets in light of the increased threat of cyberattacks.


- 21IF042 AYUSH MHAISANE
- 21IF049 VIVEK SATISH RAUT

# A Face Recognition-Based Attendance Management System

In today's digital era, the use of technology has become a vital part of our lives, and the education system is no exception. One such technological advancement that has revolutionized the education system is the face recognition-based attendance system. This system has been widely adopted in various educational institutions, including colleges, to take attendance with accuracy, efficiency, and convenience. Traditionally, attendance in colleges has been taken manually, where the lecturer takes the roll call and marks the attendance. However, this method is time consuming, and there are chances of errors, such as marking the attendance of absent students or proxy attendance. Moreover, manual attendance can be manipulated, making it an unreliable method. The face recognition-based attendance system is a solution to these issues. It is a biometric technology that uses the face as a unique identifier to mark attendance. This system uses a camera to capture the student's face and matches it with the prestored data of students in the database. Once the system identifies the student, it marks the attendance automatically. The face recognition-based attendance system offers numerous benefits, including time-saving, accuracy, reliability, and convenience. The system is incredibly fast and can mark attendance within seconds, even for a large number of students. The accuracy of the system is nearly 100%, eliminating the chances of errors in marking attendance. Moreover, since the system uses

biometric data, it is impossible to manipulate, making it reliable. The face recognition-based attendance system is also convenient for both students and lecturers. Students do not have to worry about carrying a card or signing an attendance sheet, making it an effortless process for them. Moreover, lecturers can access the attendance record instantly and from anywhere, enabling them to monitor the students' attendance regularly.

The implementation of the face recognition-based attendance system in colleges is not only beneficial for attendance management but also for other administrative tasks.


- 20IF019 Pankaj Hadole
- 20IF045 Sarthak Nimje
- 20IF030 Neha Katkhede
- 20IF013 Atharv Gawande
- 20IF040 Yash Mohod

# LiFi, The Future of Wireless!

Light Fidelity (LiFi) is a Visible Light Communication (VLC) based technology that making a light as a media of communication replacing the cable wire communication. LiFi is evolve to overcome the rate speed in WIFI, while using LiFi the rate speed reach 100 times the WIFI. We are living in the Zettabyte era and moving towards year 2025, wherein more machines talking to machines than humans accessing machines. As per this Cisco whitepaper, annual global IP traffic will reach 3.3 ZB per year by 2021, or 278 exabytes EB) per month. In 2016, the annual run rate for global IP traffic was 1.2 ZB per year, or 96 EB per month Our data requirement and usage is growing exponential day by day. the data on the Internet is likely to get doubled with rise of Smart Cities, Industry 4.0, Connected Vehicles and other disruptive technologies. While we are advancing from 4G to 5G network roll out, the use of wireless spectrum loads the premium licensing cost of spectrum usage on the telco business case as well as total cost of ownership towards the end customer. There can be few solutions to address this challenge of bandwidth volume, ultra reach and applications. In this scenario, what if every light bulb in the world could also transmit data? LiFi is the technology which makes this possible. LiFi stands for Light Fidelity. This is a path breaking technology.

The term LiFi or LiFi (used interchangeably) originates from Visible Light Communication (VLC) systems

which employ visible light for communication. VLC works in the spectrum from 380 nm to 750 nm corresponding to a frequency spectrum of 430 THz to 790 THz. Thus, the constraint of limited/definite bandwidth availability as compared to RF communication is resolved in VLC technology. Basically, Li-Fi is a VLC (visible light communication) system. As we know, light waves have a much higher frequency than the electromagnetic waves used by Wi-Fi, they transmit faster and can carry much more information It uses a photo Detector (photodiode) to detect incoming signals and decode the data received into digital form. The LED light bulb uses a fast-alternating stream of dim and bright signals that are invisible to the human eye.

**Use Cases:**

Connected Transport, Connected Home, Connected Office, Smart Cities, Governance, Healthcare, Drones, 3D Printing, Virtual Reality/ Augmented Reality/Mixed Reality, Data Centers, Devices/Handhelds/ Wearables.

**Conclusion:**

LiFi is an upcoming technology domain. It has a lot of potential to address our future technology needs. It can also support connectivity requirements where in multiple disruptive technologies will intersect requiring near real time analysis and feedback. Right now, various

experiments are in progress to develop more LiFi devices and hope the ecosystem gets few new diversified players to enhance the rate of adoption by mass production and uniform adoption at a larger scale. I am sure that with rise of new technologies, LiFi would replace current last mile options and occupy a pivotal space in the technology spectrum. Indeed, LiFi would be the future of wireless!

- 20IF019 Pankaj Hadole

# Impact of Social-Media on New Generation

Social media is a big part of many teens' lives. A 2018 Pew Research Center survey of nearly 750 13- to 17-year-olds found that 45% are online almost constantly and 97% use a social media platform, such as YouTube, Facebook, Instagram or Snapchat.

Social media benefits: Social-media allows teens to create online identities, communicate with others and build social networks. These networks can provide teens with valuable support, especially helping those who experience exclusion or have disabilities or chronic illnesses. Teens also use social media for entertainment and self-expression. And the platforms can expose teens to current events, allow them to interact across geographic barriers and teach them about a variety of subjects, including healthy behaviors. Social media that's humorous or distracting or provides a meaningful connection to peers and a wide social network might even help teens avoid depression.

Social media harms: However, social media use can also negatively affect teens, distracting them, disrupting their sleep, and exposing them to bullying, rumor spreading, unrealistic views of other people's lives and peer pressure.

The risks might be related to how much social media teens use. A 2019 study of more than 6,500 12- to 15year-olds in the U.S. found that those who spent more than three hours a day using social media might be at heightened risk for mental health problems. Another 2019 study of more than 12,000 13- to 16-year-olds in England found that using social media more than three times a day predicted poor mental health and well-being in teens.

Other studies also have observed links between high levels of social media use and depression or anxiety symptoms. A 2016 study of more than 450 teens found that greater social media use, nighttime social media use and emotional investment in social media

How teens use social media also might determine its impact. A 2015 study found that social comparison and feedback seeking by teens using social media and cellphones was linked with depressive symptoms. In addition, a small 2013 study found that older adolescents who used social media passively, such as by just viewing others' photos, reported declines in life satisfaction. Those who used social media to interact with others or post their own content didn't experience these declines. And an older study on the impact of social media on undergraduate college students showed that the longer they used Facebook, the stronger was their belief that others were happier than they were. But the more time the students spent going out with their friends, the less they felt this way.

•Protecting your teen:

There are steps you can take to encourage responsible use of social media and limit some of its negative effects.

Consider these tips:

•Set reasonable limits. Talk to your teen about how to avoid letting social media interfere with his or her activities, sleep, meals or homework. Encourage a bedtime routine that avoids electronic media use, and keep cellphones and tablets out of teens' bedrooms. Set an example by following these rules yourself.

•Monitor your teen's accounts. Let your teen know that you'll be regularly checking his or her social media accounts. You might aim to do so once a week or more. Make sure you follow through.

•Explain what's not OK. Discourage your teen from gossiping, spreading rumors, bullying or damaging someone's reputation — online or otherwise. Talk to your teen about what is appropriate and safe to share on social media.

•Encourage face-to-face contact with friends. This is particularly important for teens vulnerable to social anxiety disorder.

•Talk about social media. Talk about your own social media habits. Ask your teen how he or she is using social media and how it makes him or her feel. Remind your teen that social media is full of unrealistic images.

- 20IF042 Nikita Narkhede

# Quantum Computing

Quantum Computing is a rapidly evolving technology that has the potential to solve complex problems that are beyond the capabilities of classical computers. The power of quantum computing is rooted in the ability of quantum bits or qubits to exist in multiple states simultaneously, which allows them to perform calculations in parallel, making quantum computing exponentially faster than classical computing.

The potential applications of quantum computing are as follows:

1) Improving weather forecasting
2) Drug discovery to optimizing traffic flow
3) Supply chain management.

Classical cryptography relies on the fact that it is computationally infeasible to factor large prime numbers, which is the basis for most encryption algorithms used to secure our data. However, quantum computers can easily solve this problem using a technique called Shor's algorithm. This means that once quantum computers become powerful enough, they will be able to break many of the encryption algorithms currently in use, putting our sensitive data at risk.

On the other hand, quantum cryptography offers a solution to this problem. Quantum cryptography uses the principles of quantum mechanics to transmit data in a way that is inherently secure. It relies on the fact that any attempt to observe or measure a quantum system will

disturb it, meaning that any attempt to intercept or eavesdrop on a quantum communication will be immediately detected. This makes quantum cryptography an ideal solution for secure communication, particularly for government and military applications.

However, despite the potential of quantum computing, there are still many challenges that need to be overcome before it can become a practical reality. One of the biggest challenges is developing the hardware and software necessary to build a scalable quantum computer. Currently, the most powerful quantum computers have only a few hundred qubits, whereas a practical quantum computer would require millions or even billions of qubits.

Another challenge is developing algorithms and applications that can take advantage of the unique capabilities of quantum computers. Many of the problems that quantum computers are well-suited to solve are still being researched, and there is much work to be done in this area.

**Conclusion:** Quantum computing is an exciting and promising technology that has the potential to solve complex problems and revolutionize industries. However, there are still many challenges that need to be overcome before it can become a practical reality.

- 21IF026 Soham Gujare

# SPACE ROBOTICS

WHAT IS SPACE ROBOTICS?

Space robotics is the development of general-purpose machines that are capable of surviving in the space environment, performing exploration, construction, maintenance, servicing or other tasks. Humans control space robots from either a “local” control console or “remotely” controlled from human operators on Earth. Space robots are generally designed to do multiple tasks.Space Research: “SPACE”, the word itself signifies something infinite. Space travel has always been dangerous
and any unexpected event can cause death. It is here that the robots play a huge role and help mankind in his research process.

How Robots Work in Space?

Working principle of Space robots are based on the SPA algorithm. SPA stands for sense, plan and action. It is used in built world modules to match and worked according. Functions of a space robot is to navigate its way cleverly through all obstacles that come in its way. Mapping and navigation comprise of three more technologies.

1 Obstacle avoidance

2 Mapping

3 Path planning

4 Planning: It is a feature by which a robot understands the situation and

5 decides a strategy to tackle it.

6 Sequencing: Selection of a particular skill set which would result in perfect execution of a plan.

7 Control: Performing the selected skill set to

1. **Planetary Rovers:** It is the most advanced form of robotics technology used in space research. They are the robots, which explore, navigate and research themselves with the least human intervention.

2. **IN-Orbit Operators:** They are the robots, which assist an astronaut during his space mission. For example a robot can be designed specially to refuel a shuttle thus helping the astronaut to remain in his shuttle and accomplish various tasks without any risk to their lives.

3. **Probes:** A similar claphysically landing anywhere. These typically use cameras and variety of instruments to measure other planets, moons, and the sun from distance. Most of these use solar cells to their instruments.

4. **Astronaut Assistance:** Besides acting as explorers, space robots can also assist astronauts in manned spaceflight. One of the most notable a device known as the Canadarm. with funding from the Canadian Space the Candarm became a permanent fixture many American space shuttles and the international space station.

- 20IF016 Asmita Ghodke

# How technology is changing the world during COVID-19

The way we live has changed immeasurably since the beginning of March when COVID-19 began spreading rapidly throughout the whole world. In the midst of April, most of us were at home, using tools like Zoom, Meet, Teams, and Slack to stay in touch with colleagues. Other than groceries and prescription we're buying almost. everything online and having it shipped to our door. Everyone was forced into using these technologies directly or indirectly.

How education is completely Transformed: In the wake of COVID-19 crisis, India is witnessing an eLearning boom. All around the world, schools, colleges, educational institutions, are leveraging online learning platforms, thereby continuing the teaching-learning process. This move has changed the concept of education overnight, and digital learning has emerged as an absolutely necessary resource for education. The great thing is that India is well prepared with the extensive and robust 4G Network and affordable data, in virtually every part of the country.

How E-commerce is impacted by Covid-19: Consumers have switched from shops, supermarkets, and shopping malls to online portals for the purchase of products, ranging from basic commodities to branded goods Since the norm of social distancing has been initiated for almost the entirety of 2020, the scope of online purchases and

online businesses is expected to surge. Many people are embracing the concept of online retail and the surge in FTUs (First Time Users) on ecommerce sites is visible Demand for Artificial Intelligence changing the world: The role of AI Applications in enterprises is rapidly evolving. It is transforming how your customers buy, your suppliers deliver, and your competitors compete. AI applications continue to be at the forefront of digital transformation (DX) initiatives, driving both innovation and improvement to business operations. AI is slowly taking over the human life and is transforming the lives of people unknowingly.

Digital transformation of Life: COVID-19 could mark a turning point in how people work. The pandemic is transforming peoples' approach towards work, mobility. Increasingly, a large part of the economic value created is coming from digital innovation, ecosystem propositions and new technologies. This transformation has led to the interaction of humans more with devices than other people. People can buy, sell, order anything from the comfort of their homes. This has led to the change in the lifestyle of many people.

- 20IF038 Vaishnavi Marode

# Smart Clothes

Smart clothing is the next evolutionary step in wearable devices. It integrates electronics and textiles to create functional, stylish and comfortable solutions for people's daily needs. The concept includes not only clothing, which is a covering mechanism for the body but also has the function of tracking body indicators in certain situations. The review introduces the classification and concept of smart clothing, the application areas such as sports, workwear, healthcare, military and fashion. It will also outline the current state of smart clothing and the latest developments in the field, and discuss future developments and challenges. After technical textiles and functional textiles, also smart textiles/ clothes came into force a few years ago. The term 'smart textiles' covers a broad range. Based on the advances in computer technology, especially in the field of miniaturization, wireless technology and worldwide networking, the vision of wearable computers emerged. We already use a lot of portable electronic devices like cell phones, notebooks and organizers. The next step in mobile computing could be to create truly wearable computers that are integrated into our daily clothing and always serve as our personal assistant. Research and development towards wearable textile-based personal systems allowing e.g. health monitoring, protection & safety, and healthy lifestyle gained strong interest during the last 10 years. The world is distinctly rising towards

the new era, an era of smart and intelligent discoveries; problem solving and creativity - the smart automobile vehicles (cars, metro system), intelligent jets, smart homes and amongst from many of such aristocratic paradigms, the Smart Textiles'. Before going further, a clarification of the term and definition of smart textile is essential. The term 'Smart' and Smart materials or textiles can be defined as the materials and structures which have sense or can sense the environmental conditions. These stimuli as well as response, could be thermal, chemical, mechanical, electric, magnetic or from other source. Electronic clothes are fabrics that have electronics and interconnections woven into them. Components and interconnections are a part of the fabric and thus are much less visible and, more importantly, not susceptible to becoming tangled together the surroundings. Consequently, smart clothes can be worn in everyday situations where currently available wearable computers would hinder the user. It also have greater flexibility in adapting to changes in the computational and sensing requirements of an application. The number and location of sensor and processing elements can be dynamically tailored to the current needs of the user and application, rather than being fixed at design time.

As the number of pocket electronic products (mobile phone, palmtop computer, personal hifi, etc.) is increasing, it makes sense to focus on wearable electronics, and start integrating today's products into our clothes. The merging of advanced electronics and special textiles has already begun. Wearable computers can now

merge seamlessly into ordinary clothing. Using various conductive textiles, data and power distribution as well as sensing circuitry can be incorporated directly into wash-and-wear clothing.


- 20IF068 Vaibhavi Zamde

# The Ethics of AI

Artificial intelligence (AI) has emerged as a transformative technology in the 21st century, with the potential to reshape various aspects of our lives, from healthcare and transportation to education and entertainment. However, as AI becomes increasingly integrated into our society, it raises important ethical questions that need to be addressed. This article explores the ethics of AI, including the challenges it poses, the work that has been done to establish ethical principles for AI, and the potential implications of ethical AI for society.

Artificial intelligence has become an integral part of our daily lives, with applications ranging from virtual assistants to autonomous vehicles. While AI has the potential to revolutionize various fields, it also raises concerns about its ethical implications. As AI technology continues to advance, it is essential to establish ethical principles to ensure that its development and deployment align with human values and respect for human dignity. In this article, we explore the ethics of AI, including the work done to establish ethical principles for AI, the challenges involved in developing ethical AI, and the potential implications of ethical AI for society.

- 20IF064 Aishwarya Tekode

# Harnessing the Power of Ions: The Fascinating World of Ionic Thrusters

lon propulsion, also known as ionic thrusters, is a cutting-edge technology that has gained significant attention in recent years for its potential to revolutionize space exploration and satellite propulsion. Ionic thrusters are a type of electric propulsion system that use the principles of electrostatics to accelerate and expel ions, resulting in a highly efficient and precise propulsion method. In this article, we will delve into the fascinating world of ionic thrusters, exploring how they work, their advantages and applications, and the future prospects of this groundbreaking technology.

How Do Ionic Thrusters Work?

At the heart of an ionic thruster is the process of ionization, where atoms or molecules are stripped of one or more electrons, resulting in charged particles known as ions. Ionic thrusters typically use noble gases, such as xenon or krypton, as propellant. The propellant is introduced into a chamber, where it is ionized using an electric field. The ions are then accelerated by an electric field and expelled out of the thruster at high velocities, creating thrust in the opposite direction.

There are different types of ionic thrusters, including gridded ion thrusters, Hall effect thrusters, and electrostatic thrusters, each with its own unique operating

principles and performance characteristics. Gridded ion thrusters, for example, use a series of charged grids to extract and accelerate ions, while Hall effect thrusters utilize a magnetic field to confine and accelerate ions. Electrostatic thrusters, on the other hand, use a combination of electric fields to accelerate ions.

Advantages of Ionic Thrusters: lonic thrusters offer several advantages over conventional propulsion systems, making them an attractive option for various space missions and satellite propulsion. Some of the key advantages of ionic thrusters include:

High efficiency: lonic thrusters are known for their high specific impulse, which is a measure of how efficiently a propulsion system uses propellant. The specific impulse of ionic thrusters can be several times higher than that of traditional chemical propulsion systems, resulting in reduced propellant consumption and longer mission durations

Precise control: lonic thrusters offer precise control over thrust, allowing for precise maneuvering and attitude control of spacecraft and satellites. This makes them ideal for applications such as station-keeping, orbit adjustments, and interplanetary missions that require precise trajectory control.

Longer operational life: lonic thrusters have a longer operational life compared to traditional propulsion systems, as they use electric fields instead of combustion

processes that can degrade engine components. This results in reduced maintenance requirements and extended mission lifetimes.

Applications of Ionic Thrusters: lonic thrusters have a wide range of applications in space exploration and satellite propulsion. Some of the key applications of ionic thrusters include:

Deep space missions: lonic thrusters are ideal for deep space missions, where high efficiency and precise control are crucial for long-duration missions. Ion propulsion has been used in various interplanetary missions, such as NASA's Dawn spacecraft that explored the dwarf planet Ceres and the asteroid Vesta, Station-keeping and orbit adjustments: lonic thrusters are commonly used for station-keeping and orbit adjustments of satellites in geostationary orbit, allowing them to maintain their position relative to the Earth with precision.

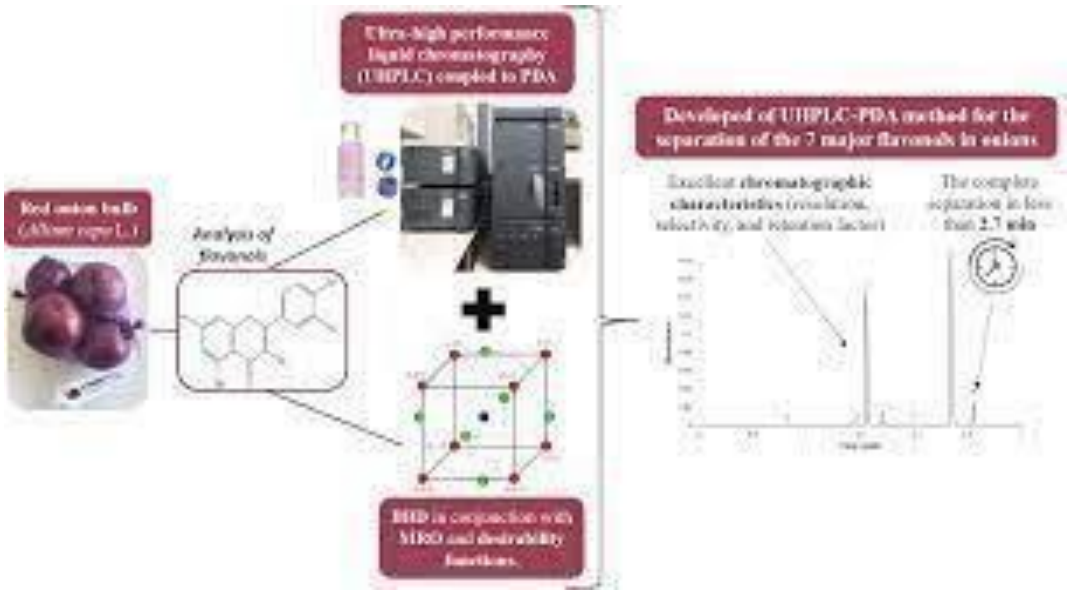
CubeSats and small satellites: lonic thrusters are well-suited for small satellites and CubeSats, which have limited payload capacities and require compact and lightweight propulsion systems for maneuvering and attitude control.

- Anshuman Modak

# An Effective and Optimized Mass Models for Weight Estimation of Onion using Computer Vision System

This study aimed to perform numerical analysis of the onion mass. This project involves study of different geometrical properties of onion using computer vision system. Computer vision system is one of the fields of AI is dedicated to the development of automated system that can interpret the visual world. The idea behind computer vision is to instruct computers to interpret and comprehend images processing on a pixel-by-pixel basis. Regarding the technical side of things computers will extract visual data, manage it, and analyze the outcomes using sophisticated software programs. CVS is one of the most remarkable things to come out of the deep learning and artificial intelligence world. An experiment was carried out to monitor the quality changes related to mass and to develop a robust mathematical model to predict the object and its mass. Different models have been developed and the optimized model has been proposed using different optimization technique. A vision system has been proposed for image acquisition. The acquired image database has been used to extract image features. The features extracted using image procession has been used precisely for mathematical modelling of onion weight. The weighing models based on different

modelling approach using different well-known optimization and regression algorithms has been developed. The model analysis and the results obtained shows the higher reliability and predication capability while estimating the weight of onion.




- Priya Belgamwar
- Anupama Hage
- Vishvesh Pande
- Atharva S. Kadu

# Automatically Controlled Water Supply Tap by using Solenoid Valves for Minimizing Bill & Water Conservation

One of the most fundamental natural resources that all living things need is water. It should be considered a top priority. Maharashtra Jeevan Pradhikaran (MJP) is known for its excellent water supply services to rural and urban areas of Maharashtra through well-established water supply lines. Consumers are charged based on the amount of water usage recorded by Water meters. Receiving a high-water bill can lead to frustration and confusion, especially if the consumer is unsure about the cause. To cope up with this social issue, through our final year project an attempt has been made to develop automatically operated solenoid valves to control excess water flow from supply pipelines. This paper is presented to discuss use of automatically operated solenoid valves to control excess water flow from supply pipelines, thereby eliminating risk of high-water bills and also to conserve water

- Dhiraj Dhoran


# Civil
# Mechanical
# Chemical
# Plastic & Polymers

# Bearing Capacity by Hand Penetrometer

The use of a simple and inexpensive hand penetrometer for a fair assessment of in-situ bearing capacity of soil has been described. Correlating with the standard penetration test, N values have been worked out and c table has been prepared for estimating bearing capacities of cohesive and granular soils from the ‘NH’ values obtained by the hand penetrometer. The correlated values are in close agreement with the ‘NH’ values obtained at a major construction site.

The use of a simple and inexpensive hand penetrometer for a fair assessment of in-situ bearing capacity of soil has been described. Correlating with the standard penetration test, N values have been worked out and c table has been prepared for estimating bearing capacities of cohesive and granular soils from the ‘NH’ values obtained by the hand penetrometer. The correlated values are in close agreement with the ‘NH’ values obtained at a major construction site.

The penetrometer is made from a 25 mm diameter MS rod I .5 m length. One end of the rod is tapered to a come while the other end Is threaded the length of the threaded portion is around 20 cm and that of the tapered portion is 5 cm. A collar Is welded to the middle third of the rod. A circular steel disc weighing 10 kg. is allowed to slide

freely the rod al adjustable nut is then placed on the top threaded portion. The bottom 50 cm of the rod including the tapered portion is alternately painted yellow and black for each 5 cm segments.

- Aniket Mahto

# Hydraulic Footpath Traffic Reduce System

Hydraulic footpath traffic reducing system is based on a hydraulic Jack system for reducing traffic congestion. At present time the footpath provided on the edges of the road is mono functional reserves only for pedestrians. To reduce the congestion of traffic we propose the design of a modified footpath platform which will be used by both vehicles as well as peoples to reduce the traffic congestion. We ought to use hydraulic jacks and pre-stressed concrete slabs to provide an upward and downward motion to the footpath. With the help of this mechanism, the footpath can be used for pedestrians by raising its level and also could be used as a separate lane by lowering it. Hence, reducing the amount of traffic significantly by simply providing an extra lane on the road. In the times of an emergency, on the road side if there is a huge traffic congestion and there is need to give a path to an emergency vehicle. By using hydraulic traffic reduce system i.e. use of hydraulic mechanism underneath the footpath, we can allow the vertical movement of footpath so that vehicles can easily crawl on to it and clear their way. By introducing this system while constructing of the new road we can make it cost effective and also this will help in the times of emergency.

- 20CE046 Nishikant Mehare

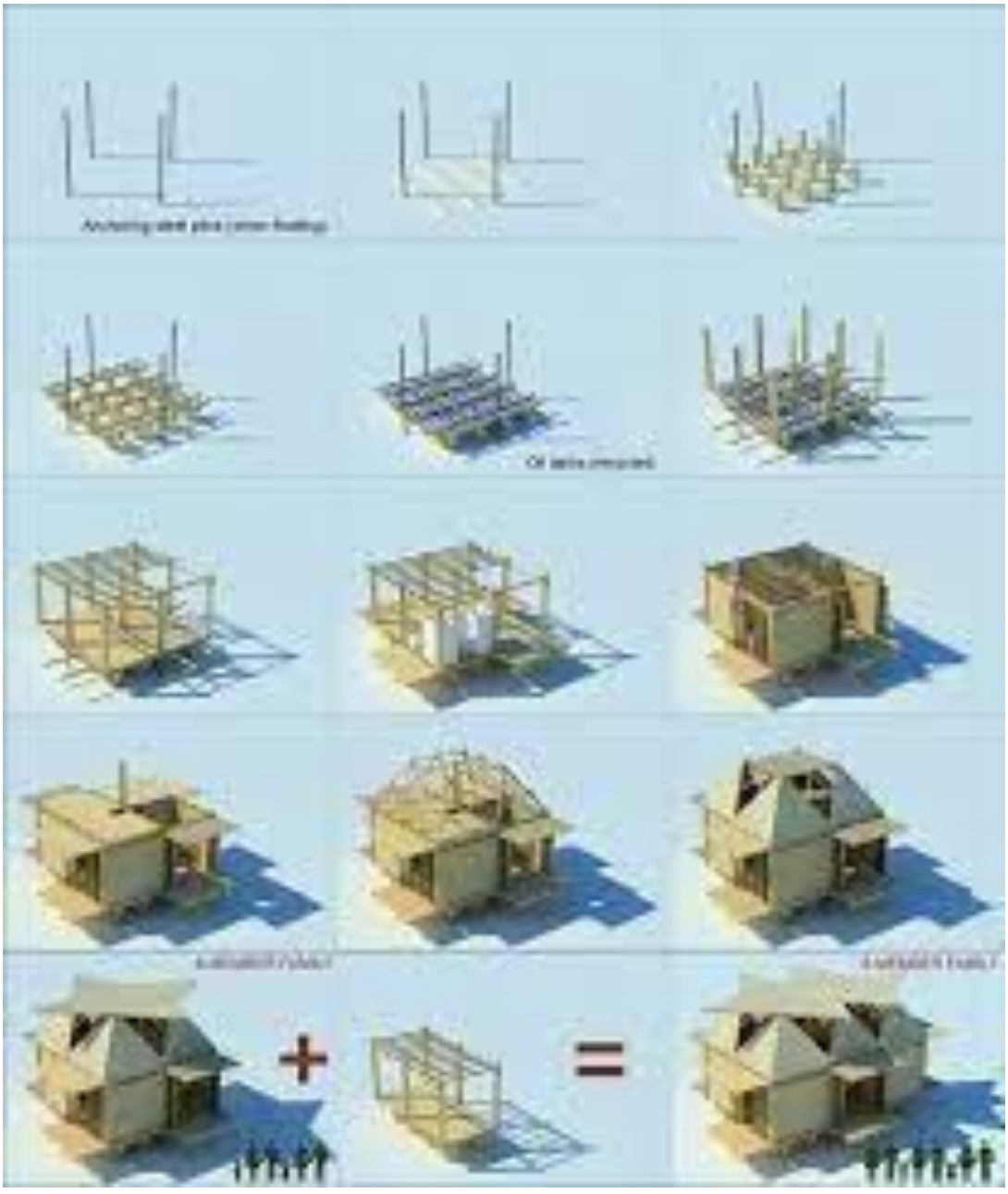
# Low-Cost Housing Using Bamboo

This paper presents the work on bamboo as a structural material that final year Civil diploma students are performing at the Civil Engineering Park Government Polytechnic, Amravati. In those areas of the country where concrete or steel housing is very expensive and unattainable for many of the poorest people, bamboo offers a cheap, readily available and sustainable alternative for it. In India bamboo are extensively available in Northeast and Central part of India. We used Assamese bamboo for our project.

This project looks to address the challenges of using bamboo as a structural material as well as for low-cost housing and for residential places, and to standardize the assembly of novel structures that are fit for purpose in deprived areas such as in ruler India. It is our intention to engineer a multi-purpose kit for setting up bamboo structures that includes pre-fabricated connections, tools and instructions. In this way, we will empower population suffering from low- resources and with basic building skills to become more independent providers of housing and storage spaces for their families and community.

The following indicators came out of these experiments: The sociocultural context, perceived c osts of a bamboo building, perceived lifespan of a bamboo building, perceived safety and flammability of a bamboo building,

local availability of the material, perceived sustainability of the material, sensory perception in bamboo spaces, maintenance of bamboo buildings, lack of airtightness, and finally creativity, beauty and originality created by the use of bamboo.



- Jayesh Umale

# Solar Powered Smart Irrigation System

Cost effective solar power can be the answer for all our energy needs. Solar powered smart irrigation systems are the answer to the Indian farmer. This system consists of solar powered water pump along with an automatic water flow control using a moisture sensor. It is the proposed solution for the present energy crisis for the Indian farmers. This system conserves electricity by reducing the usage of grid power and conserves water by reducing water losses.

Solar energy is the most abundant source of energy in the world. Solar power is not only an answer to today's energy crisis but also an environment friendly form of energy. Photovoltaic generation is an efficient approach for using the solar energy. Solar panels (an array of photovoltaic cells) are nowadays extensively used for running street lights, for powering water heaters and to meet domestic loads. The cost of solar panels has been constantly decreasing which encourages its usage in various sectors. One of the applications of this technology is used in irrigation systems for farming. Solar powered irrigation system can be a suitable alternative for farmers in the present state of energy crisis in India. This a green way for energy production which provides free energy once an initial investment is made In this paper we propose an automatic irrigation system using solar power which drives water pumps to pump water from bore well

to a tank and the outlet valve of tank is automatically regulated using controller and moisture sensor to control the flow rate of water from the tank to the irrigation field which optimizes the use of water.

- 20CE541Mahesh Nirmal

# Rainwater Harvesting

It is high time now to fall for surface water usage instead of going for ground water Resources to meet human demand on needs. Considered the main source of surface water, Rainwater is deemed more or less as fresh; the cost of collecting rainwater too is very low. Rivers and canals, lakes and wetlands, ponds and drywells – all are potential catchments To hold direct rainwater and its indirect source, the run-off storm water. Hence keeping an eye on the rapidly Increasing day-to-day demand for water among fast growing human population, there lies A great opportunity to harvest rainwater to meet a potential scarcity and avoid destruction of the normal groundwater table level. This article deals with the study of rainwater harvesting

Rainwater harvesting is the collection and storage of rain, rather than allowing it to run off. Rainwater harvesting is one of the simplest and oldest methods of saving the water. Rainwater is collected from a roof like surface and redirected to a tank, cistern, deep pit (well, shaft, or borehole), aquifer, or a reservoir with percolation, so that it seeps down and restores the ground water. Dew and fog can also be collected with nets or other tools. Rainwater harvesting differs from stormwater harvesting as the runoff is typically collected from roofs and other surfaces for storage and subsequent reuse.

- 20CE504 Darshan Bhade

# Sewage Eating Superbug

A superbug which eats sewage has been grown from scratch at a plant in

Queensland in an Australian first. The bacteria offer a greener way to treat wastewater and are saving water management company Urban Utilities, half-a-million (Australian) dollars a year. These unique looking bacteria are called anammox bugs and they thrive on waste water – particularly the type that flushes down your toilet.

They don't have x-ray vision or super strength, it's their big appetites that makes them so remarkable," says Michelle Cull from Queensland Urban Utilities. They eat their way through sewage, getting rid of nitrogen and ammonium, and cleaning it naturally in the process. They are purposefully grown on small plastic discs called carriers which are then moved into sewage tanks. The more traditional process of cleaning wastewater used large amounts of chemicals and energy but now the bacteria are providing a more sustainable and efficient way forward.

The anammox bugs will save us around half a million (Australian) dollars a year in operating cost but it will also benefit the environment because there are a cleaner, greener way to treat sewage," says Cull. The Brisbane grown bacteria were introduced by Queensland Urban Utilities to cater to the rapidly growing population.

- 20CE015 Swanand Deole

# Eco- Friendly Road Footpath Cleaner Machine

Cleaning is the main basic need for all human beings and it is necessary for daily routine process, The conventional road and floor cleaning machine is most widely use in many applications such as example road, railway station, airport, hospital, Bus station, in multi building, colleges etc. Also this machine use human energy for its working operations, it is a user friendly as well as eco- friendly. In our project we are aimed to use easily available materials with low cost and it can be easily fabricated and easy to use and control, it is the better alternative for conventional machine.

The manually operated eco- friendly road and floor cleaner can work very efficiently with respect to covering area, Time and cost of road cleaning process compared with the existing machineries, also it is economical to use.

- 20ME017 RITIKA DULGAJ
- 20ME052 VIJAY RAUT
- 20ME056 SUMIT SULTANE
- 21ME202 PRATIK DHORE - 21ME205 MOHD KASHIB

# 3D Printer Filament Making Machine from Waste Plastic Bottle

These days plastic recycling has been a huge problem, as virtually in every sector plastic finds its way into product and manufacturing. Plastic forms a major constituent of the garbage produced by human. It takes hundreds of years for plastic to get decomposed. One major share of plastic garbage is of plastic bottles which usually are meant for one time usage and then are thrown away. Some part of these bottles are recycled by integrated efforts of government, agencies and peoples in some countries. But still huge piles of these bottles are left over. This project deals with reuse of plastic bottles using previously cut plastic bottle strips of 1.5 mm width and the thickness of that of the plastic bottle's wall.

These strips are feed into a heater cum extractor which converts the strips into wires. These plastic wires can further be used for 3d Printer industry as filament for 3d printing. The project model consists of an plywood frame that supports two electric motors and two spindle wheels. These electric motors are used to run these spindles in any specific direction as per requirement using belt and pulley arrangement or gear arrangement. The extractor cum heater is feed with temperature sensor as well. On this frame a power supply unit is also mounted. An electronic control module is also mounted. . Motor used in the

project is PMDC / Stepper motor and thus can be used on conventional power supply by converting it to required value, and the same can be run using battery and solar panel set up as well. For wire extraction, plastic bottles strip is which is stored on a feeding spindle/spool is drawn and put into the heater cum extractor. This extractor is heated using a heater. And temperature is maintained in a particular range by electronic control unit with help of a temperature sensor. From the other side of the extractor a wire is drawn and is winded into another spindle / spool.

By turning on the electric motor the motion of the spindles/ spools is regulated and controlled by the electronic control unit which rotates the spool at lower speed but with more torque with help of speed reduction transmission arrangement thus making the spool/ spindle work with more precision and draw the wire from strips. These wires afterwards can further be used as 3d printer filament directly without any other treatment. 20 ME042 Ashmit Nagdive.

# Floor And Web Cleaner

Cleanliness of our surrounding is a very important part of our day-to-day life. It is a daily chore which can be very tedious and time consuming. This project helps to reduce the he effort of cleaning. It is a multitasking cleaning machine which can do 2 jobs at the same time being cleaning the floor and cleaning the roofs of spider webs and dust.

It is a remote-controlled machine which does most of the work with the help of battery, motors and other controlling parts hence eliminating human efforts. Being remote operated, it’s easy to do the cleaning work from afar and hence avoiding contact from dust. In prevents from dust allergies and various infections.

The project is fabricated using various materials like plywood sheet 12 mm , MDF sheet etc. and components like PMDC motor gearbox , battery , wheels etc. The project is fabricated using two parts, one mechanical and one electrical. The mechanical part involves motors, steering mechanism, driving mechanism, nuts, bolts etc. And the electrical part contains battery, wires, switches, remote, etc.

There are 4 main switches which are used to operate the machine. One controls movement, one direction, one the mop and one the web cleaner. Using these, we control the machine.

Further improvement can be done by installing cameras on the machine and making the remote wireless, which will further increase the machine's range and accessibility.

Hence this machine can be very useful in in saving energy and time.


- Hrutwij Charjan
- Ayush Deshmukh
- Lakhan Chandak
- Kaustubh Deshpande

# Smart Helmet

A smart helmet is a wearable technology device that integrates various advanced technologies to provide the wearer with enhanced safety and convenience features. The helmet typically incorporates Sensors (Alcohol MQ3, Vibration SW-420), Micro controller (ESP- 32), GPS (Neo 6M), GSM Modem (SIM-800L) and features a GPS tracking system that can locate the rider in case of accident or emergency. The helmet's sensors help the rider to stay focused on the road while still being aware of their surroundings. The helmet also features a GPS tracking system that can locate the rider in case of an accident or emergency.

The Smart Helmet project is an excellent example of how technology can be used to enhance safety in everyday life. The project has the potential to save lives and prevent accidents by providing riders with the necessary tools to stay safe on the road. With further research and development, the Smart Helmet project could become a standard safety feature for motorcycle riders worldwide.

- 20ME542 Shrihari Raut
- 20ME517 Ayush Gulhane
- 20ME556 Sumit Shinde
- 20ME547 Kartik Sanke
- 20ME534 Prajwal Metekar

# Crank And Connecting Lever Operated Chainless and Gearless Bicycle

Power transmission through chain drive is the oldest and widest used method in case of bicycle. By eliminating the chain, the project can be capable of going faster with less effort using the mechanical advantages of leverage and gravity. The project contains long pedal levers. Longer pedal cranks deliver more power to the rear wheel.

The project does not involve the conventional pedaling method as it uses vertical pedaling for the maximum utilization of gravitational force.

Gravity and near vertical pedaling, combined with the rider's weight, produces continuous force throughout the entire pedal stroke.

The project consists of pedaling system directly attached to the rear wheel so that the need of power transmission through chain drives and gear drives can be eliminated. Due to this project, there will be less stress to the hips, knees and ankles and it's easy to store securely. Simply put, the bicycle with this mechanism can more efficient than the conventional bicycles.

- 20ME012 Aditya Deshmukh
- 20ME008 Samarth Chakule
- 20ME034 Sumit Kurel
- 20ME050 Pawan Rathod
- 21ME208 Pooja Rathod

# Fire Fighting Robot

Fire-related accidents have, on average, killed 35 people every day in the five years between 2016 and 2020, according to a report by Accidental Deaths and Suicides in India (ADSI), maintained by the National Crime Records Bureau. Even though there are a lot of precautions taken for fire accidents, these natural/manmade disasters do occur now and then. In the event of a fire breakout, to rescue people and to put out the fire we are forced to use human resources which are not safe. With the advancement of technology especially in robotics it is very much possible to replace humans with robots for fighting the fire. This would improve the efficiency of firefighters and would also prevent them from risking human lives. In this project we are going to build a fire-fighting robot using Arduino, which will automatically sense the fire and start the water pump.

- 20ME025 Tushar Kakde
- 20ME031 Gunjesh Kawade
- 20ME035 Rohit Kurhade
- 20ME044 Ritesh Pachaghare
- 21ME401 Aryan Thombare

# Environmental Sustainability

Environmentalism is an ideology that evokes the necessity and responsibility of humans to respect, protect, and preserve the natural world from its anthropogenic (caused by humans) afflictions. Environmental awareness is an integral part of the movement's success. By spreading awareness to others that the physical environment is fragile and indispensable, we can begin fixing the issues that threaten it. Chemical engineers address some of today's most pressing environmental problems. Their work involves efficiently transforming raw materials into useful products, developing new materials from sustainable sources, generating clean energy,

Environmental sustainability is the responsibility to conserve natural resources and protect global ecosystems to support health and wellbeing, now and in the future. Because so many decisions that impact the environment are not felt immediately, a key element of environmental sustainability is its forward-looking nature. In fact, the US Environmental Protection Agency defines it as 'meeting today's needs without compromising the ability of future generations to meet their needs. Environmental sustainability is the ability to maintain an ecological balance in our planet's natural environment

- Zureaz Khan

# Chemical Engineering: A Gateway to a World of Opportunities

Chemical engineering is a branch of engineering that involves the design, development, and operation of processes that transform raw materials into useful products. The chemical engineering field is vast, and it encompasses many different areas, including energy, pharmaceuticals, food processing, materials science, and environmental engineering. It is a challenging field that requires creativity, problem-solving skills, and a deep understanding of chemistry and physics.

The first batch of students graduating from the Chemical Engineering program at Government Polytechnic Amravati marks a significant milestone in the history of the institution. Under the guidance of the HOD D.R. Gawande, these students have not only completed their coursework but have also gained practical experience through internships and industrial training.

Chemical engineering graduates have a vast array of career opportunities available to them. They can work in industries such as petroleum, chemical, pharmaceutical, and food processing, or in government agencies, research institutions, and academia. Government Polytechnic Amravati, being a premier institute in the region, offers a diploma in chemical engineering to its students.

Chemical engineers can also pursue higher education and research in specialized fields such as nanotechnology, biotechnology, and environmental engineering.

The skills and knowledge that chemical engineers acquire during their studies are highly valued in many sectors of the economy. They learn how to apply scientific principles to solve complex problems, how to design and optimize industrial processes, and how to develop new products and technologies. They also learn how to work effectively in teams, communicate technical information, and manage projects

The field of chemical engineering is constantly evolving, and new technologies and innovations are being developed every day. Chemical engineers must keep up with the latest advancements in their field and adapt to changing industry demands. They must also be mindful of the environmental and social impact of their work and strive to develop sustainable and ethical solutions.

The chemical engineering program at Government Polytechnic Amravati provides a solid foundation for students to pursue a rewarding and challenging career in a diverse range of industries. We congratulate the first batch of chemical engineering graduates and wish them success in their future endeavours. We also encourage future students to consider chemical engineering as a field of study and explore the endless possibilities it offers.

"The diploma in chemical engineering program at Government Polytechnic Amravati provides students with a strong foundation in theoretical and practical knowledge. Our students have been placed in renowned companies such as Garsim Industries, Calderys, and many multinational companies, with an average package of 3-5 lac per annum." Chemical engineering is a crucial field that impacts our daily lives in many ways. It is the driving force behind the production of many essential products, such as medicines, food and beverages, and energy sources. Without the contributions of chemical engineers, the quality of life for many people around the world would be drastically reduced.

The scope of chemical engineering is vast, and it is growing rapidly. With the increasing demand for sustainable and eco-friendly products and processes, chemical engineers are needed more than ever. Chemical engineers can play a significant role in reducing the environmental impact of industries and creating more sustainable solutions.

In the words of Dr. R. K. Gupta, Director of National Chemical Laboratory, "Chemical engineering is a critical field that plays an essential role in the development of the Indian economy. It has the potential to create innovative solutions to address the country's most pressing challenges, such as energy, healthcare, and the environment. With India's growing population and economy, the demand for chemical engineers is only

going to increase in the future.”

In conclusion, chemical engineering is an essential field of engineering that has a significant impact on our daily lives, industry, and the Indian economy. The diploma in chemical engineering program at Government Polytechnic Amravati prepares students for a successful career in this field, and the opportunities are endless. As the world continues to evolve, the role of chemical engineers will only become more critical, and the contributions of this field will continue to shape our lives and the world we live in.


- Harshit Mengare

# Nanotechnology in Chemical Engineering: Applications and Advancements

Nanotechnology, the science of manipulating matter at the nanoscale level, has revolutionized various fields, including chemical engineering. In this article, we will delve into the various applications of nanotechnology in chemical engineering, its impact on the field, and future prospects.

Applications of Nanotechnology in Chemical Engineering:

**Catalysis:** Nanoparticles have a higher surface area to volume ratio than bulk materials, making them efficient catalysts. The use of nano catalysts in chemical reactions leads to higher reaction rates and selectivity, as well as reduced energy consumption and waste production. Nano catalysts have found applications in the production of fuels, chemicals, and pharmaceuticals, among others.

**Materials Synthesis:** Nanotechnology has enabled the synthesis of materials with unique properties, such as increased strength, durability, and conductivity. For example, carbon nanotubes can be used to reinforce polymers, making them stronger and more durable.

**Environmental Remediation:** Nanoparticles can be used to remove contaminants from air and water. For

example, nanoparticles of titanium dioxide can be used to break down pollutants in water and air through photocatalysis. Nanoparticles of iron can be used to remove contaminants such as arsenic from groundwater **Sensors:** Nanotechnology has enabled the development of highly sensitive and selective sensors. Nano sensors can detect very small amounts of chemicals or pollutants, making them useful for environmental monitoring and chemical process control. For example, carbon nanotube sensors can detect trace amounts of gases such as ammonia and nitrogen oxides

**Drug Delivery:** Nanoparticles can be used to deliver drugs to specific cells or tissues in the body. This allows for more targeted and efficient drug delivery, reducing the side effects of medication. For example, nanoparticles can be used to deliver chemotherapy drugs directly to cancer cells.

Impact of Nanotechnology on Chemical Engineering: The use of nanotechnology in chemical engineering has led to numerous advancements, such as increased efficiency, selectivity, and sustainability in chemical processes. Nanotechnology has enabled the development of new materials and catalysts, as well as more precise monitoring and control of chemical processes. Nanotechnology has also helped reduce waste production, energy consumption, and environmental impact of chemical processes.

As the demand for sustainable and efficient chemical production continues to grow, the role of nanotechnology

in chemical engineering will become increasingly important. Future prospects of nanotechnology in chemical engineering include the development of more efficient catalysts, the production of new materials with tailored properties, and the creation of new drug delivery systems. Nanotechnology will also play a crucial role in addressing global challenges, such as climate change and resource depletion


- Harshit Mengare

# Petroleum Production in India: A Technological Marvel Fueling Our Nation's Growth

Petroleum production has been one of the driving forces behind India's economic growth for decades. As a developing nation, India heavily relies on petroleum products to fuel its industries and power its transportation systems. The success of India's petroleum industry is a result of the dedicated efforts of numerous individuals and organizations who have worked tirelessly to develop and implement the latest technological advancements in petroleum production.

India's petroleum production sector is one of the most technologically advanced in the world, thanks to the tireless efforts of the Indian government and private sector organizations. The production of petroleum products requires a complex array of equipment, from drilling rigs to refining equipment, and Indian engineers have been at the forefront of designing and manufacturing this equipment. India's oil and gas industry is dominated by state-run oil companies such as Oil and Natural Gas Corporation (ONGC), Oil India Limited (OIL), and Bharat Petroleum Corporation Limited (BPCL). These companies have made significant contributions to the development of the Indian petroleum industry by investing heavily in research and development, exploration, and production of oil and gas.

India's oil and gas reserves are located primarily in the western offshore region, the Assam-Arakan basin, and the Cambay basin. The exploration and production of these reserves require sophisticated technologies such as 3D seismic surveys, horizontal drilling, and hydraulic fracturing. India's petroleum engineers have been at the forefront of developing these technologies, which have significantly enhanced the efficiency of petroleum production and contributed to the nation's energy security. The Indian petroleum industry has made remarkable progress over the past few decades, but there is still a long way to go. As a nation, we must continue to invest in the development of this critical sector, supporting our engineers and technicians, and empowering them to

achieve new heights of excellence. The petroleum industry is an essential component of India's economy, and we must ensure its continued growth and success. The manufacturing process of petroleum products is a complex and fascinating one that has revolutionized the way we live. From the fuel that powers our cars to the plastic in our household products, petroleum products are an integral part of our daily lives. The process of manufacturing these products involves cutting-edge technology and the hard work of countless individuals in the industry.

The first step in the manufacturing process of petroleum products is exploration. Petroleum engineers use cuttingedge technology to locate oil and gas reserves

deep beneath the earth's surface. Once the reserves are identified, drilling rigs are used to extract the oil and gas. The extracted crude oil then goes through a refining process where it is separated into various components through a process called fractional distillation. This process involves heating the crude oil until it vaporizes, then cooling and condensing the vapors at different temperatures to obtain various fractions.

Each fraction has a different boiling point and chemical composition, making it suitable for specific petroleum products. For instance, the lightest fractions are used to make gasoline, while the heavier ones are used for diesel, jet fuel, and lubricants. The fractions obtained from fractional distillation then undergo further processing in a secondary refining process. This involves removing impurities and unwanted components through various techniques such as cracking, coking, and hydrotreating. These techniques break down the larger molecules present in the fractions into smaller, more useful components.

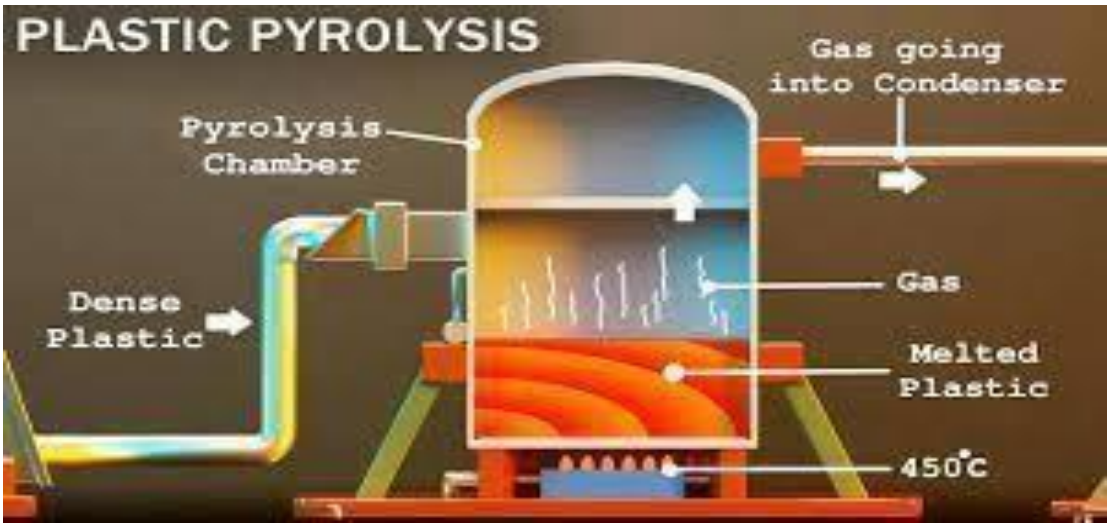
After the secondary refining process, the different fractions are blended together in varying proportions to obtain the desired properties and characteristics for specific products. For example, gasoline requires a specific blend of fractions to achieve the desired octane rating, while diesel requires a different blend to meet its specifications.

- Harshit Mengare

# Conversion of Waste Plastic into Fuel

Waste to energy is the process of generating energy in the form of electricity, heat or fuel. It is a form of energy recovery. Most waste to energy processes produce energy directly through combustion or produce a combustible fuel commodity such as methane, methanol, ethanol or synthetic fuel.

Plastic waste is the concern for growing nations. We know that the potential of plastic is huge for many applications as it is light in weight, cheap and durable. But increase in application of plastic lead to the concern of waste disposing also. Traditionally plastics used to dispose by land filling, littering in rivers and sea and burning it. These all methods leads to the environmental issues. So why not recycle and reuse it




- 20PP004 Saurabh Mandale

# Managing Plastic Waste By Recycling Method

Today, as we look to recycle more materials, there is a lack of knowledge on how to do it effectively. This creates issues in the form of contamination, either by mixing nonrecyclable plastics like adhesive, chemicals, and food remnants that make difficult the recycling process. To overcome these problems the study of the recycling method is essential.

There are three types of recycling methods we discuss here they are chemical recycling, mechanical recycling, and thermal recycling. What is recycling deals with the conversion of the plastic waste directly into the product or raw materials (pallets) or valuable chemicals?


- Prajakta Talhan

# Multi-layer or Co-injection

Plastic and Polymer Engineering department arranged visit to “PLASTINDIA 2023” an international exhibition, Delhi from 1 to 5 February 2023. In an exhibition we have visited the “Milacron Company” booth. Milacron is a global leader in the manufacture, distribution and service of highly engineered and customized systems within the $27 billion plastic technology and processing industry. They are the only global company with a fullline product portfolio that includes injection molding and extrusion equipment. They maintain strong market positions across these products, as well as leading positions in process control systems, maintenance, repair and operating (“MRO”) supplies for plastic processing equipment. Company’s strategy is to deliver highly customized equipment, components and service their customers throughout the lifecycle of their plastic processing technology systems. During our visit to their stall, Mr. Yogesh Ubhayakar, Technical sales manager have explained the details of multilayer injection molding machine, how it works and what are the advantages we get through machine. I am sharing those experiences during that visit.

- 20PP007 Manish Shrikhande

# Anti Dust Paint

Anti-dust paint is a type of paint that repels dust. Dust resistant paint not only keeps the exterior wall looking good but also helps to reduce the need for constant maintenance. In the market nowadays anti dust paints are available by the brands like Asian paints and Berger paints.

How does anti dust paint work?

These types of paint work by using special coatings that offer dust resistance. They do not produce visible results immediately, which means you may need to use the product for a few weeks before seeing any significant changes.

The anti dust paint forms an algaecide membrane on your wall that reduces the growth of algae and fungus. This helps keep discolouration and staining at bay while also making it easier to clean off dirt, grease, and other contaminants.

Anti dust paint works by creating microscopic pores in the surface layer of your exterior walls. These tiny holes cause water droplets from rain or snow to form larger droplets than normal, reducing their ability to stick onto surfaces where they could create stains or start corrosion reactions when mixed with pollutants.

- 20PP002 Indrajeet Erpache

# Multilayer Blown Film Extrusion

The blown film process is used to produce a wide variety of products, ranging from simple monolayer films for bags to very complex multilayer structures used in food packaging. Multilayer film structures may be made by blown film coextrusion and combines two or more molten polymer layers.

Blown Film Extrusion is an established process which is used to manufacture a wide range of commodity & specialized plastic films for the packaging industry. Also known as Film Blowing Process, this extrusion process generally comprises extrusion of molten thermoplastic tube and its constant inflation to several times of its initial diameter. This forms a thin, tubular product which may be used directly, or indirectly by slitting it to create a flat film.

- 20PP001 Balaji Bhale

# Plastic Waste Turns into Tiles

This study has been undertaken to investigate the use of plastics waste for preparation of plastics tiles by recycling plastic waste. Plastic due to its versatile nature is being widely employed in human life. With the increasing use of plastics in different commercial applications they make up a fundamental part of our everyday life. The process of converting plastic waste into tiles is explained in this paper.

Plastic waste is a non-biodegradable waste which cannot decompose and this creates water, land pollution and air pollution. Also, while we burn the plastic waste in Dumping Ground, the percentage of plastic waste is increasing rapidly. It is estimated that the plastic waste will double after a decade as we use hundreds of grams of plastic in our daily life. We can recycle, reuse the plastic waste. As a civil engineer we have to innovate something new related to this, which is a boon for civil engineering. So, here we try to do something innovative such as reuse of plastic waste for the production of floor tiles.

Polypropylene (PP), low-density polyethylene (LDPE) high-density polyethylene (HDPE) polymers are used to make plastic tiles. The purpose of this present invention, as characterized by its claims, is therefore to eliminate the above-mentioned drawbacks. The invention solves the problem of making, by means of a suitable manufacturing process, a composite tile in which plastic material of a suitable quality for the environment the tile will be used in is injected into a mold so as to form an outer shell of

the tile, inside which, at a later stage, plastic material of recovery is injected with the function of filling the tile.


- 20PP003 Yashvant Khandale

# PLASTINDIA: The Heart of Indian Plastic Industry

Here I am expressing my experience in PLASTINDIA exhibition 2K23. This exhibition is an internationally recognized exhibition devoted to promoting excellence in the field of plastics. In which many countries participated like India, Germany, Japan, China, Austria, Singapore, Taiwan, Korea, etc.

PLASTINDIA exhibition was focused on innovation, sustainability and growth with modern techniques which helped to maintain development of plastic industry in India. In this exhibition exhibitors shows their new innovations in plastic processing machinery, molds, and dyes, etc. and also about raw materials, printing and packaging. Near about 1200 companies and industries participated from approx. 30-32 countries to show their innovation, ideas and creativity in their product which proved very useful for visitors, entrepreneurs and students. It was an incredible platform and opportunity for Indian plastic industries.

- 21PP005 Soham Nile


# Pharmacy

# Colorectal Cancer

Colorectal cancer begins when healthy cells in the lining of the colon or rectum change and grow out of control, forming a mass called a tumor. A tumor can be cancerous or benign. A cancerous tumor is malignant, meaning it can grow and spread to other parts of the body. A benign tumor means the tumor can grow but will not spread. These changes usually take years to develop. Both genetic and environmental factors can cause the changes.

Anatomy of the colon and rectum: -

The large intestine is part of the body's gastrointestinal (GI) tract or digestive system. The colon and rectum make up the large intestine, which plays an important role in the body's ability to process waste. The colon makes up the first 5 to 6 feet of the large intestine, and the rectum makes up the last 6 inches, ending at the anus.

The colon and rectum have 5 sections. The ascending colon is the portion that extends from a pouch called the cecum The cecum is the beginning of the large intestine into which the small intestine empties; it's on the right side of the abdomen. The descending colon takes waste down the left side. Finally, the sigmoid colon at the bottom takes waste a few more inches, down to the rectum. Waste leaves the body through anus.

- Pallavi Ugale
- Akshay Kohale

# Preclinical Studies in the New Drug Development

Life science provide reasonably sound prognosis for a number and nature of therapeutic targets on Which drug could be based and search for new chemical entitiesfuture new drug, is now more than ever based on scientific principle. The process of drug discovery is lengthy tortuous , spanning several years. These years are characterized by different stages of different development processes. A major stage in this development process is the preclinical stage characterized by testing the drug candidate in animal models as predicator of its efficacy and tolerability in humans. A successful preclinical trial still not a guarantee of the drug product scaling through the clinical stage

This paper attempts to explain basic rules and requirements of drug development within preclinical study period, in case of new chemical entities of natural or synthetic origin which belong to low molecular weight category.

Drug development process involves rigorous testing and optimizing of selected compounds identify the drug that is most effective. This testing is done in cell (in vitro) and animals (in vivo) to study the metabolism and to produce products a that is safe and has passed all regulatory requirements. Drug failure in clinical practice is due in

large part of two main reasons. The first reason is if they do not work properly and the second reason is,
if they are not safe. The two most important issues to address in drug invention processes are; to identify target and validation. This may be a protein receptor that is associated with a disease condition, for this reason, it is important to know how the disease occurs at the molecular, cellular and genetic levels. Once the target is identified, then the next step is how the target against different known and new compounds to know either to neutralize or slows down the disease process.


- Revati Dawake
- Vaishnavi Gawali

# Medicines Management In Hospitals

Inefficient and irrational use of medicines is a widespread problem at all levels of health care. Lack of discretely documented policies and procedures in respect of medicines management in hospitals is unnecessarily straining the meagre resources resulting into poor inflow of benefits to the patients. Per capita wastage from inefficient and irrational use of medicines tends to be greatest in hospitals. Many of these sources of wastage could be reduced if some basic principles of medicine management and use are followed and a comprehensive medicines management policy framework is developed. An efficient and robust medicines management in hospitals ensures rational selection, quantification, procurement, storage, distribution, use and thereby availability of the right drugs in the right quantities, at reasonable prices, and at recognized standards of quality throughout the year without any stock-out periods in between.

Effective medicines management is a collaborative process involving many stakeholders that is required for providing the health care system with a road map for continuous improvement in pharmaceutical supply chain including expense containment with specific goals and outcome measures of success. Existing medicines management and supply chain systems within hospitals

have several gaps and shortcomings particularly lack of resources and well documented policy framework.
Urgent steps are required to assess, evaluate, and monitor the functioning of supply chain system for bridging up the gaps and rectification of shortcomings. Priority needs to be accorded towards engaging well-qualified manpower, suitably trained in medicines management across the different levels of care

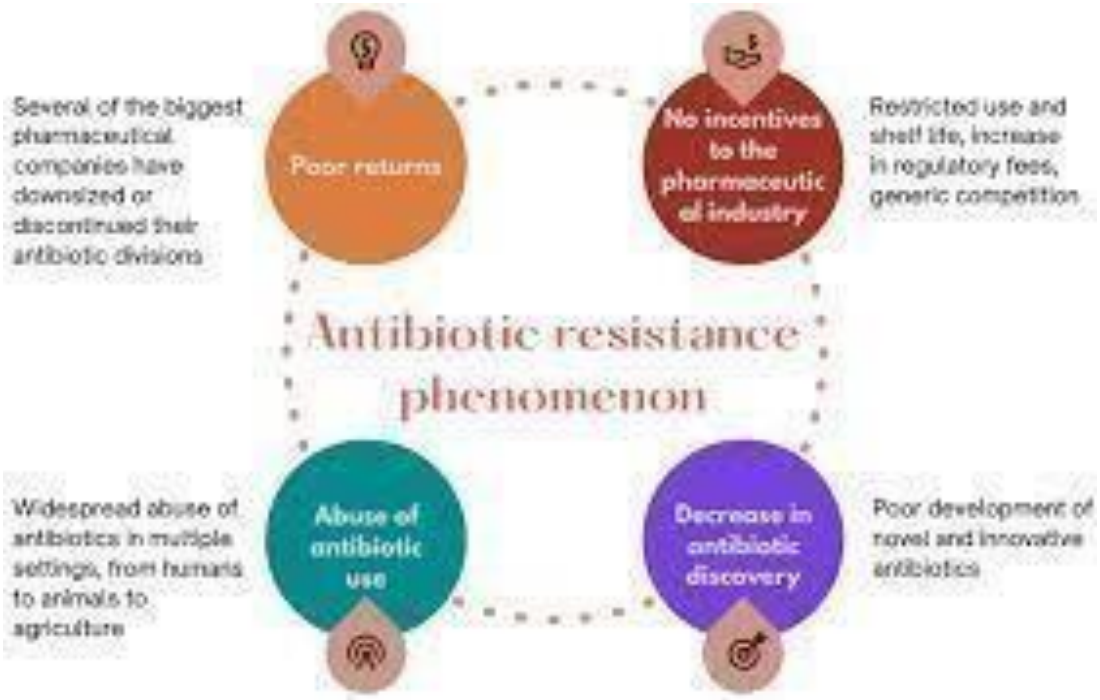

- Vitthal Kamble.
- Sumet Kole.
- Sneha Shejulkar.

# Antimicrobial Resistance: A Global Multifaceted Phenomenon

Antimicrobial resistance (AMR) has emerged as one of the principal public health problems of the 21 century that threatens the effective prevention and treatment of an ever-increasing range of infections caused by bacteria, parasites, viruses and fungi no longer susceptible to the common medicines used to treat them.

Over a several decades, to varying degrees, bacteria causing common or severe infections have developed resistance to each new antibiotic coming to market. Faced with this reality, the need for action to avert a developing global crisis in health care is imperative. Nowadays people are taking antibiotics without any necessity. Antimicrobial resistance is the ability of microorganisms to persist or grow in the presence of drugs designed to inhibit or kill them. These drugs called Antimicrobials, are used to treat infectious disease caused by microorganisms. Antimicrobial is an agent that kills microorganisms or stop their growth. medicines can be grouped according to the microorganisms they act primarily against. Antimicrobial resistance is one of the major public health problems especially in developing countries where relatively easy availability and higher consumption of medicines have led to disproportionately higher incidence of inappropriate use of antibiotics and greater levels of resistance compared to developed countries. In India the infectious disease burden is among

the highest in the world and recent report showed the inappropriate and irrational use of antimicrobial agents against these diseases, which lead to increase in development of antimicrobial resistance. Besides, it has shown that health sector in India suffers from gross inadequacy of public finance which will result in the conditions favorable for development of drug resistance. A recent study highlighted the importance of rationalizing antibiotic use to limit antibiotic resistance in India. Antimicrobial resistance will result in difficulty in controlling the diseases in the community and ineffective delivery of the health care services.




- Shraddha Patel

# Breast Cancer

Breast cancer is the second leading cause of cancer deaths among women. The development of breast cancer is a multi-step process involving multiple cell types, and its prevention remains challenging in the world. Early diagnosis of breast cancer is one of the best approaches to prevent this disease. In some developed countries, the 5-year relative survival rate of breast cancer patients is above 80% due to early prevention. In the recent decade, great progress has been made in the understanding of breast cancer as well as in the development of preventative methods. The pathogenesis and tumor drugresistant mechanisms are revealed by discovering breast cancer stem cells, and many genes are found related to breast cancer. Currently, people have more drug options for the chemoprevention of breast cancer, while biological prevention has been recently developed to improve patients' quality of life. In this review, we will summarize key studies of pathogenesis, related genes, risk factors and preventative methods on breast cancer over the past years. These findings represent a small step in the long fight against breast.

- Sakshi Metkar
- Khushali Jepulkar

# Polycystic Ovary Syndrome

The polycystic ovary disorder (PCOS) is characterized as a mix of hyperandrogenism (hirsutism and skin break out) and anovulation (oligomenorrhea, barrenness, and useless uterine seeping), with or without the nearness of polycystic ovaries on ultrasound. It speaks to the primary endocrine issue in the conceptive age, influencing 6% - 15% of ladies in threats. The primary wellspring of female fruitlessness. At the point when in the pre-since of a menstrual issue, the finding of PCOS is come to in 30% - 40% of patients with essential or auxiliary amenorrhea and in 80% of patients with oligomenorrhea. PCOS ought to be analyzed and treated right off the bat in pre-adulthood because of conceptive, metabolic and ontological difficulties which might be related with it. Treatment choices incorporate medications, diet and way of life improvement. For solid youthful couples, the probability of getting pregnancy differs. In 2010, an expected 48.5 million couples worldwide were barren. This paper gives a survey on barrenness causes, examinations, treatment modalities and job of medical attendant birthing specialist in managing fruitless couples. Barrenness (a condition of sub richness) can be showed either as the failure to wind up pregnant, powerlessness to maintain a pregnancy.

- Shital Raut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