TEJAS

VOLUME 1 EDITION 1

2022

AIML DEPARTMENT

EXPLORING A NEW WORLD

Artificial Intelligence and Machine Learning Department

Vision

“To become a department of international relevance in the field of Artificial Intelligence and Machine learning”

Mission

"To nurture students with sound engineering knowledge in the field of AIML through effective use of modern tools with a focus on imbibing professionalism, leadership qualities, ethical attitude, lifelong learning and social sensitivity."

Program Outcomes POs

PO 1: ENGINEERING KNOWLEDGE: Apply Knowledge of Mathematics, Science, engineering fundamentals and an engineering specializationto the solution of complex.

PO 2 : PROBLEM ANALYSIS: Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

PO 3 : DESIGN / DEVELOPMENT OF SOLUTIONS: Design solutions for complex engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal and environmental considerations

PO 4 : CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS: Using research based knowledge and research methods including design of experiments, analysis and interpretation of data and synthesis of information to provide valid conclusions

Program Outcomes POs

PO 9: INDIVIDUAL AND TEAM WORK: Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.

PO 10: COMMUNICATION: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations and give and receive clear instructions.

PO 11: LIFE-LONG LEARNING: Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

PO 12 : PROJECT MANAGEMENT & FINANCE: Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects in multidisciplinary environments.

Program Outcomes POs

PO 5: MODERN TOOL USAGE: Create, select and apply appropriate techniques, resources and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

PO 6 : THE ENGINEER AND SOCIETY: Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

PO 7: ENVIRONMENT AND SUSTAINABILITY: Understand the impact of professional engineering solutions in societal and environmental context and demonstrate knowledge of and need for sustainable development.

PO 8: ETHICS: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

Programme Educational Objectives (PEOs)

01

PEOs: Ability to contribute to problem identification, analysis, design, and development of systems using principles and concepts of Artificial Intelligence and Machine Learning.

02

PEOs: Ability to apply the concepts, principles and practices of Artificial Intelligence and Machine Learning and critically evaluate the results with proper arguments, selection of tools and techniques when subjected to loosely defined scenarios.

03

PEOs: Use Artificial Intelligence and Machine Learning models on data for enabling better decision making.

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MESSAGES

Dr. Megharani Patil

Incharge Head of
Department - AI&ML

Education is the ability to inculcate discipline, build trust and enhance the growth of individuals at various levels. With hard work and punctiliousness laced with knowledge and interaction, one can achieve the great success that one desires. The vision of our magazine is to impart quality education in all core disciplines of knowledge by focusing on the empowerment of our students with overall development.

With our first AI&ML department magazine, TEJAS serves as a wonderful platform for students to reflect their ideas and research into knowledge. The enthusiastic contribution of students in form of articles not only boosts their linguistic, semantic and technical expertise, but also provides readers with beguiling and interesting information.

The topics covered in the magazine not only cover the various domains being studied but serve as a beacon of inspiration for students to aim for greater heights. Thus, through TEJAS, we have tried to inculcate the value of lifelong learning and to thus make our own little contribution towards the betterment of our society. We hope that the readers grasp all that we wish to convey through this issue, acknowledging the hard work.

Lastly, we would like to congratulate and thank the committee and the students, and faculty for their exemplary contribution, valuable time and effort.

Mrs. Shilpa Mathur

Faculty Incharge

It gives me immense pleasure to present the very first issue of our technical magazine "TEJAS". The technical magazine is one of the best platforms for our students to put forward innovative ideas. This magazine intends to bring out the creativity and flamboyance of the minds of the students at TCET.

It is the talent and outcome of our students which is reflected through this. In its very first edition, we have tried to keep it informative, inspiring, and fun.

I applaud all the students for making our department one of its kind and unique by participating in different national and state-level Hackathons, Coding Competitions, and many other activities.

I heartily congratulate all the editorial members and faculty members for helping and working together to publish this magazine. Thank you all for your precious time and noteworthy efforts.

We all wish that TEJAS stands tall for all the future editions to come.

Mr Anand A. Maha

Faculty Incharge

First of all, I would like to congratulate the editorial team for their effort in bringing out the first issue of departmental technical magazine Tejas.

Tejas is a cloud of information which provides an opportunity to the students and staff to express their original thoughts on technical topics. The magazine plays an instrumental role in providing a technical platform to the students to express their innovative ideas in Artificial Intelligance and Machine Learning. This also brings professional attitude, leadership, ethical and social sensitivity among students.

This first issue of Tejas has come up with topics like technical papers which is the first step towards research and development. On a concluding note, I would like to wish you all the best for more such initiatives and future endeavors.

TEAM

YEAR 2022

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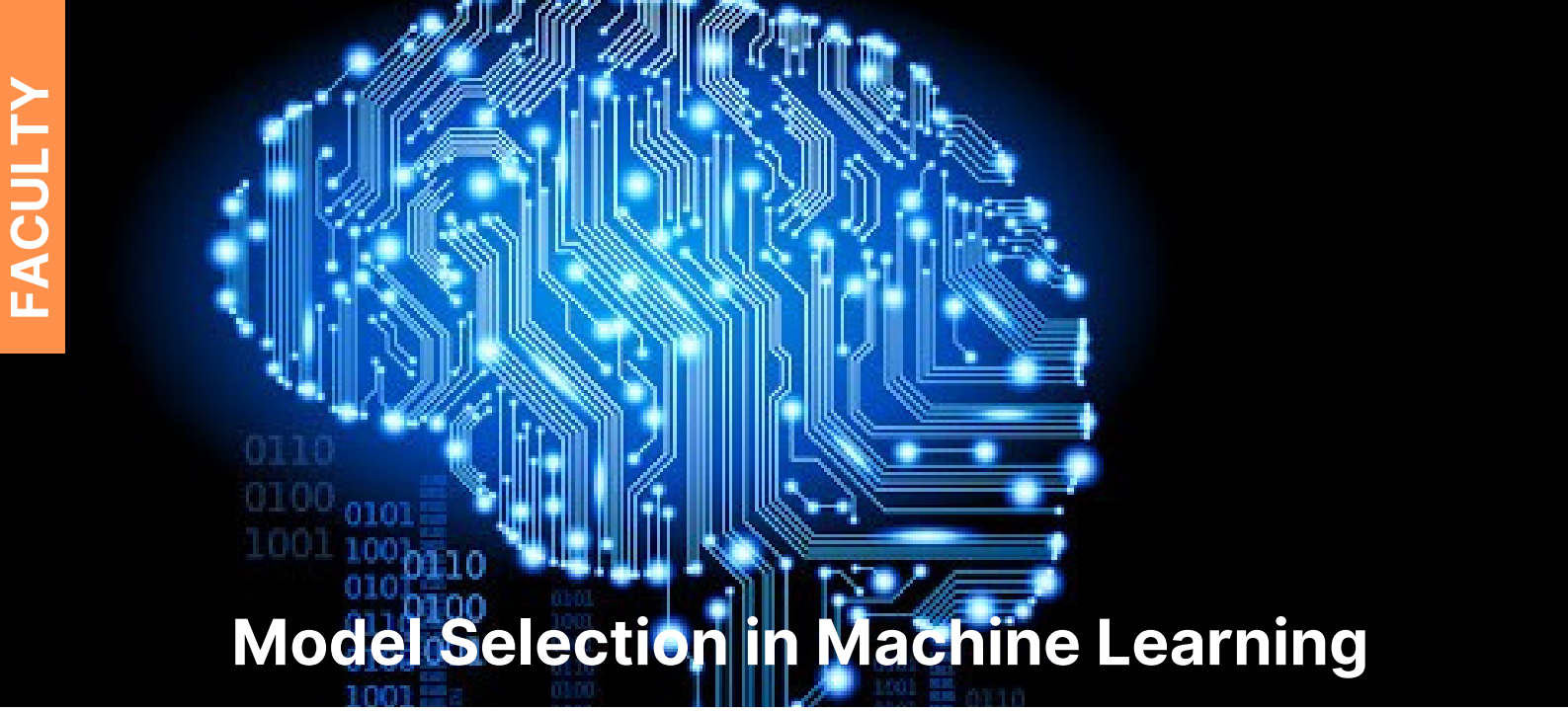


Model Selection in Machine Learning

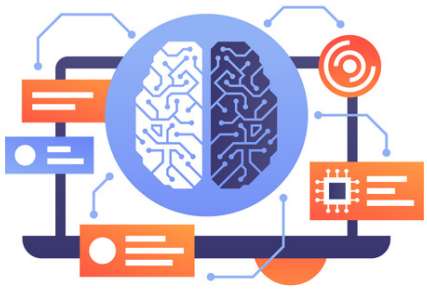
The central issue in all of Machine Learning is "how do we extrapolate what has been learnt from a finite amount of data to all possible inputs 'of the same kind'?". We build models from some training data. However the training data is always finite. On the other hand the model is expected to have learnt 'enough' about the entire domain from where the data points can possibly come. Clearly in almost all realistic scenarios the domain is infinitely large. How do we ensure our model is as good as we think it is based on its performance on the training data, even when we apply it on the infinitely many data points that the model has never 'seen' (been trained on)?

Occam's Razor is a predictive model has to be as simple as possible, but no simpler. Often referred to as the Occam's Razor, this is not just a convenience but a fundamental tenet of all of machine learning.

To measure the simplicity, we often use its complementary notion — that of the complexity of a model. More complex the model, less simple it is. There is no universal definition for the complexity of a model used in machine learning. However here are a few typical ways of looking the complexity of a model.

- Number of parameters required to specify the model completely. For example in a simple linear regression for the response attribute y on the explanatory attributes x1,x2,x3 the model y = ax1 +bx2 is 'simpler' than the model y = ax1 +bx2 +cx3 — the latter requires 3 parameters compared to the 2 required for the first model.
- The degree of the function, if it is a polynomial. Considering regression again, the model y = ax2 1 +bx3 2 would be a more complex model because it is a polynomial of degree 3.
- Size of the best-possible representation of the model. For instance the number of bits in a binary encoding of the model. For instance more complex (messy, too many bits of precision, large numbers, etc.) the coefficients in the model, more complex it is. For example the expression (0.552984567 ∗ x 2 + 932.4710001276) could be considered to be more 'complex' than say (2x +3x 2 +1), though the latter has more terms in it.
- The depth or size of a decision tree.

Intuitively more complex the model, more 'assumptions' it entails. Occam's Razor is therefore a simple thumb rule — given two models that show similar 'performance' in the finite training or test data, we should pick the one that makes fewer assumptions about the data that is yet to be seen. That essentially means we need to pick the 'simpler' of the two models.



In general, among the 'best performing' models on the available data, we pick the one that makes fewest assumptions, equivalently the simplest among them. There is a rather deep relationship between the complexity of a model and its usefulness in a learning context. We elaborate on this relationship below.

- Simpler models are usually more 'generic' and are more widely applicable (are generalizable).

Explanation:

One who understands a few basic principles of a subject (simple model) well, is better equipped to solve any new unfamiliar problem than someone who has memorized an entire 'guidebook' with a number of solved examples (complex model). The latter student may be able to solve any problem extremely quickly as long as it looks similar to one of the solved problems in the guidebook. However given a new unfamiliar problem that doesn't fall neatly into any of the 'templates' in the guidebook, the second student would be hard pressed to solve it than the one who understands the basic concepts well and is able to work his/her way up from first principles. A model that is able to accurately 'predict.

- Simpler models require fewer training samples for effective training than the more complex ones and are consequently easier to train. In machine learning jargon, the sample complexity is lower for simpler models.
- Simpler models are more robust — they are not as sensitive to the specifics of the training data set as their more complex counterparts are. Clearly we are learning a 'concept' using a model and not really the training data itself. So ideally the model must be immune to the specifics of the training data provided and rather somehow pick out the essential characteristics of the phenomenon that is invariant across any training data set for the problem. So it is generally better for a model to be not too sensitive to the specifics of the data set on which it has been trained. Complex models tend to change wildly with changes in the training data set. Again using the machine learning jargon simple models have low variance, high bias and complex models have low bias, high variance. Here 'variance' refers to the variance in the model and 'bias' is the deviation from the expected, ideal behaviour. This phenomenon is often referred to as the bias-variance tradeoff.
- Simpler models make more errors in the training set — that's the price one pays for greater predictability. Complex models lead to overfitting — they work very well for the training samples, fail miserably when applied to other test samples.

The validity of Occam's razor has long been debated. Critics of the principle argue that it prioritizes simplicity over accuracy and that, since one cannot absolutely define "simplicity," it cannot serve as a sure basis of comparison.

-Mrs Shilpa Mathur
Assistant Professor-AIML


STUDENTS
ARTICLES

STUDENT

VIRTUAL ASSISTANT USING AI

INTRODUCTION

A virtual assistant is considered as a technology based on artificial intelligence. The software uses a device's microphone to receive voice requests while the voice output takes place at the speaker. But the foremost exciting thing happens between these two actions. It's a combination of several different technologies: voice recognition, voice analysis and language processing. Voice recognition may be a complex process using advanced concepts like neural networks and machine learning. The auditory input is processed and a neural network with vectors for every letter and syllable is created. This is often called the data set. When an individual speaks the device compares it to this vector and the different syllables are pulled out with which it has the highest correspondence.

2.WORKING

The working of Virtual Assistant uses following rules:

a) Natural Language Processing: Natural Language Processing (NLP) refers to AI method of communicating with an intelligent system using a natural language such as English. Processing of NLP is required when you want an intelligent system like robot to perform as per your instructions, once you want to hear decision from a dialogue based clinical expert system, etc.
Five Steps in Natural Language Processing are:

- **Lexical Analysis**
- **Syntactic Analysis**
- **Semantic Analysis**
- **Disclosure Integration**
- **Pragmatic Analysis**

b) Automatic Speech Recognition: To know command according to user's input.
c) Artificial Intelligence: To find out things from user and to store all information about behaviour and relations of user. The power of a system to calculate, reason, perceive relationships and analogies, learn from experience, store and retrieve information from memory, solve problems, comprehend complex ideas, use natural language fluently, classify, generalize, and adapt new situations.

d) Inter Process Communication: To urge important information from other software applications.

3. ADVANTAGES
• A VA makes your life easier
• A VA saves you time and money
• A VA gives you more free time for your personal life
• A VA are often an expert in the field

4. APPLICATIONS
• Alexa
• Siri
• Google Assistant
• Cortana
• Bixby

5. FUTURE TRENDS

• Voice bots are getting mainstream.
• AI-based bots will get more human-like.
• Deep customer insights to empower virtual assistant behaviour
• Messaging platforms as a growth driver for virtual assistants.

6. REAL WORLD EXAMPLE

Alexa

Alexa, Amazon's virtual assistant, is made into the Amazon Echo line of smart speakers. you'll also find it on some third-party speakers from brands like Sony. You'll ask the Echo questions like, "Alexa, what's the star cast of the movie 'Sholay'?" You can also ask it to play a song, make a call, or control your smart home devices. It's a feature called "multi-room music," which allows you to play the same tunes from each of your Echo speakers.
Alexa recognizes a couple of wake words, including "Alexa," "Amazon," "Computer," "Echo," and "Ziggy."
You can also configure the Amazon Echo with third-party apps, so you'll use it to call an Uber, pull up a recipe, or lead you to do workout

-Vaibhav Yadav
TT AIML

STUDENT

Composition on auto driving vehicle

1Introduction

Auto driving buses are the buses which can drive on road without any mortal interaction. This is done with the help of detector, camera, radar and artificial intelligence. The detectors and radars give the condition of the surrounding and consequently the sheering move. There are numerous things which the auto descry use while driving vehicle similar as business light, road lane, people walking on the road, people crossing the road, etc.
The society of robotization have stated 6 position of robotization in buses . position 0 where the is completely homemade there no robotization in the vehicle, position 1 then one or two functionality are automated position 2 then the ka perform the driving by controlling boscage and steering but it need administrator of mortal being, in position 3 the auto analyses the terrain and can perform numerous task like parking, etc but then also mortal being have to supervise, when it comes to position 4 buses can perform any task under specific circumstances that a normal auto do manually. Geofencing is needed. Humans can stamp the command. The last position 5 then the buses can perform any task without mortal monitoring and commerce.

Working

AI technologies power tone- driving auto systems. inventors of tone- driving buses use vast quantities of data from image recognition systems, along with machine literacy and nue-ral networks, to make systems that can drive autonomously.
The neural networks identify patterns in the data, which is fed to the machine learning algorithms. That data includes
That data includes images from cameras on tone- driving buses from which the neural network learns to identify business lights, trees, checks, climbers, road signs and other corridor of any given driving terrain.
For illustration, Google's tone- driving auto design, called Waymo, uses a blend of detectors, lidar(light discovery and ranging-- a technology analogous to RADAR) and cameras and combines all of the data those systems induce to identify everything around the vehicle and prognosticate what those objects might do next. This happens in fragments of a alternate. Maturity is important for these systems. The more the system drives, the further data it can incorporate into its deep literacy algorithms, enabling it to make further nuanced driving choices.

The following outlines how Google Waymo vehicles work

* The motorist(or passenger) sets a destination. The auto's software calculates a route.
* A rotating, roof- mounted Lidar detector monitors a 60- cadence range around the auto and creates a dynamic three-dimensional(3D) chart of the auto's current terrain.
* A detector on the left hinder wheel observes

sideways movement to descry the auto's position relative to the 3D chart.
* Radar systems in the front and hinder fenders calculate distances to obstacles.
* AI software in the auto is connected to all the detectors and collects input from Google Street View and videotape cameras inside the auto.
* The AI simulates mortal perceptual and decision- making processes using deep literacy and controls conduct in motorist control systems, similar as steering and thickets.
* The auto's software consults Google Charts for advance notice of effects like milestones, business signs and lights.
* An override functioon is available to enable a mortal to take control of the vehicle

Advantages
* Reduce the cost of transportation
* Creates a new sluice of job openings
* Offer lesser mobility independence for people with disability
*Eco-Friendly

Application
Autonomous exchanges and vans: Companies similar as Otto and Starsky Robotics have concentrated on independent exchanges. robotization of exchanges is important, not only due to the advanced safety aspects of these veritably heavy vehicles, but also due to the capability of energy savings through platooning. Autonomous vans are being developed for use by online grocers similar as Ocado. Research has also indicated that goods distribution on the macro (civic distribution) and micro position(last afar delivery) could be made more effective with the use of independent vehicles thanks to the possibility of lower vehicle sizes.
Transport systems In Europe, metropolises in Belgium, France, Italy and the UK are planning to operate transport systems for automated buses , and Germany, the Netherlands, and Spain have allowed public testing in business. In 2015, the UK launched public trials of the LUTZ Pathfinder automated cover in Milton Keynes. Beginning in summer 2015, the French government allowed PSA Peugeot- Citroen to make trials in real conditions in the Paris area. The trials were planned to be extended to other metropolises similar as Bordeaux and Strasbourg by 2016. The alliance between French companies THALES and Valeo(provider of the first tone- parking auto system that equips Audi and Mercedes premi) is testing its own system. New Zealand is planning to use automated vehicles for public transport in Tauranga and Christchurch

Example

Tesla Autopilot is a full suite of motorist-backing programs features that range from lane to auto- parking. This system requires minimum motorist intervention. Features similar as those set up in this system are likely to be present in unborn tone- driving vehicles.
Robo race is an independent race auto that made its debut between 2016 and 2018. These vehicles operate in a competitive environment. still, their brigades 'capacities in developing artificial intelligence and real- time algorithms show pledge for these buses' capacities as a whole.

-Sarvesh Kumar Yadav
TT AIML

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AI: The Future of Healthcare

Introduction

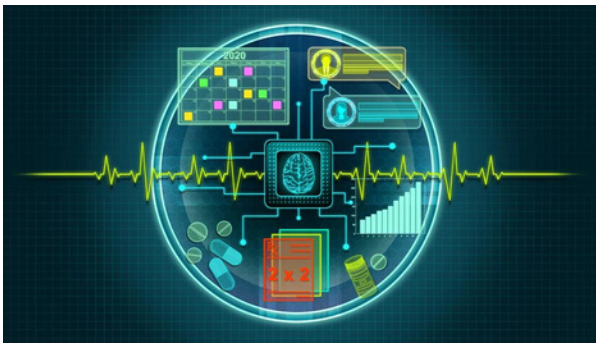
Artificial intelligence (AI) and similar technologies are becoming more and more common in business and society, and they are starting to be used in healthcare too. Many facets of patient care could be changed by this technology, as well as internal administrative procedures at payer, provider, and pharmaceutical organizations. In the future, AI will be used more and more in the healthcare industry as a result of the complexity and growth of data in the sector. Payers, care providers, and life sciences organizations currently use a variety of AI technologies. The main application categories include recommendations for diagnosis and treatment, patient engagement and adherence, and administrative tasks. Despite the fact that there are many situations in which AI can execute healthcare duties just as well as or better than humans, implementation issues will prohibit the widespread automation of healthcare professional positions for a substantial amount of time.
Types of AI that is used in the healthcare sector

1. Machine Learning- Neural Networks and Deep Learning: The neural network is a more advanced type of machine learning. This technology, which has been around since the 1960s and has been widely employed in medical research for several decades, is used for categorization applications like predecting predicting whether a patient will contract a specific disease. It approaches issues in terms of variables, weights, or "features," that link inputs and outputs. It has been compared to how neurons interpret signals, however the comparison to how the brain works is not very strong.

2. Natural Language Processing: The generation, comprehension, and classification of clinical documentation and published research are the primary applications of NLP in the field of healthcare. NLP systems are able to conduct conversational AI, create reports (for example, on radiological examinations), analyze unstructured clinical notes on patients, and record patient interactions.

3. Physical Robots: Surgical robots give surgeons "superpowers," enhancing their vision, capacity to make precise, minimally invasive incisions, close wounds, and other surgical procedures. However, important choices are still made by human surgeons. Gynecologic surgery, prostate surgery, and head and neck surgery are among the common surgical procedures performed with robotic surgery.

4. Robotic Process Automation: They are employed in the healthcare industry for routine duties like billing, prior authorization, and patient record updates. They can be used to extract data from, say, faxed photographs



and feed it into transactional systems when paired with other technologies like image recognition.
5. Rule Based Experiment Systems: In the 1980s and succeeding decades, expert systems built on databases of "if-then" rules dominated the field of artificial intelligence. Over the past two decades, they have been extensively used in the healthcare industry for "clinical decision support" purposes, and they are still frequently used today. Today, a lot of suppliers of electronic health records (EHRs) provide a set of guidelines with their systems.

Current Trends in Healthcare

Current use of AI and Machine Learning shows a future of possibilities. Today, a number of significant businesses and start-ups, such as Enlitic, MedAware, and Google, have started large-scale projects aimed at advancing AI and ML and integrating it into the healthcare domain, for example Google's DeepMind Health project and IBM's Avicenna software. Additionally, the Cleveland Clinic and Atrius Health are working together with IBM's Watson Health to integrate cognitive computing into their healthcare system, which experts anticipate will lead to a decrease in physician burnout. Recently, k-nearest neighbours, naive and semi-naive Bayes, lookahead feature building, backpropagation neural networks, and other ML methods have been evaluated and developed.

Future of AI in healthcare

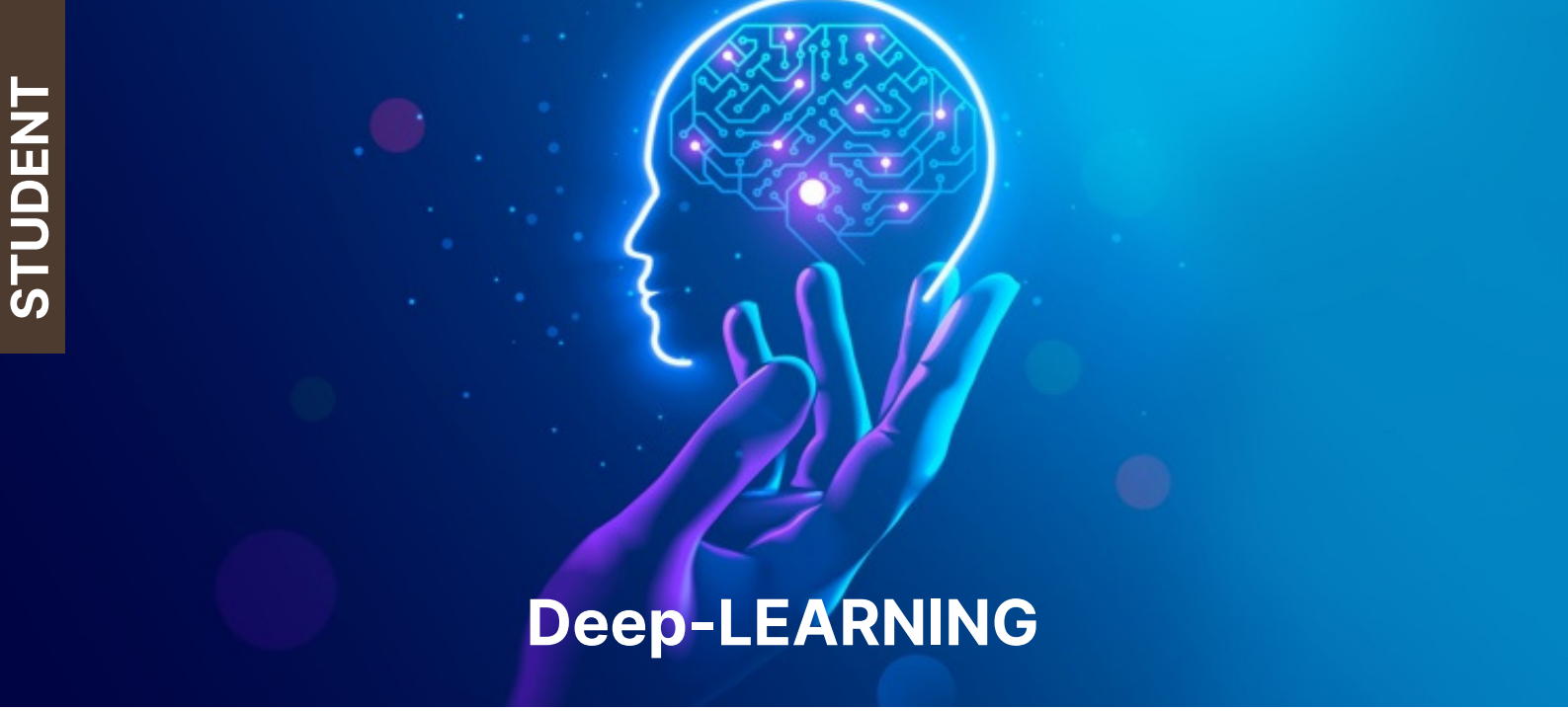
The biggest hurdle for AI in various healthcare sectors is not determining whether the technologies will be capable enough to be beneficial, but rather guaranteeing their acceptance in routine clinical practice. In order for AI systems to be widely adopted , they must be accepted by regulators, integrated with EHR systems, sufficiently standardised so that related products function similar to how it is taught to physicians.

Conclusion

The future of machine learning lies in complimenting human experience and knowledge with machine learning technologies in order to maximise the decision-making for patients with serious injuries.

-Samhita K.R.
TT AIML

STUDENT



Deep-LEARNING

Introduction

Deep learning is a sub-field of machine learning dealing with algorithms inspired by the structure and function of the brain called artificial neural networks. In other words, It mirrors the functioning of our brains. Deep learning algorithms are similar to how nervous system structured where each neuron connected each other and passing information.
Deep learning models work in layers and a typical model atleast have three layers. Each layer accepts the information from previous and pass it on to the next one.
Deep learning models tend to perform well with amount of data wheras old machine learning models stops improving after a saturation point.

How does Deep Learning Works ?

- Deep Learning uses a Neural Network to imitate animal intelligence.
- There are three types of layers of neurons in a neural network: the Input Layer, the Hidden Layer(s), and the Output Layer.
- Connections between neurons are associated with a weight, dictating the importance of the input value.
- Neurons apply an Activation Function on the data to “standardize” the output coming out of the neuron.
- To train a Neural Network, you need a large data set.
- Iterating through the data set and compar-
- comparing the outputs will produce a Cost Function, indicating how much the AI is off from the real outputs.
- After every iteration through the data set, the weights between neurons are adjusted using Gradient Descent to reduce the cost function.

Advantages

Cost Effectiveness: While training deep learning models can be cost-intensive, once trained, it can help businesses cut down on unnecessary expenditure.

Advanced Analytics: Deep learning, when applied to data science, can offer better and more effective processing models. Its ability to learn unsupervised drives continuous improvement in accuracy and outcomes.

Scalability: Deep learning is highly scalable due to its ability to process massive amounts of data and perform a lot of computations in a cost- and time-effective manner.

Self-Learning Capabilities: The multiple layers in deep neural networks allow models to become more efficient at learning complex features and performing more intensive computational tasks.

APPLICATIONS

- Self-driving Cars
- Sentiment Analysis

- Virtual Assistant
- Social Media
- Healthcare

Real-World Applications and Examples

AGRICULTURE: Agriculture will remain a key source of food production in the coming years, so people have found ways to make the process more efficient with deep learning and AI tools. In fact, a 2021 Forbes article revealed that the agriculture industry is expected to invest $4 billion in AI solutions by 2026. Farmers have already found various uses for the technology, wielding AI to detect intrusive wild animals, forecast crop yields and power self-driving machinery.
Blue River Technology has explored the possibilities of self-driven farm products by combining machine learning, computer vision and robotics.

-Aman Gupta
TT AIML

STUDENT

Computer Vision in Sports For developing a Sportsman's efficiency

In todays era, Artificial Intelligence and Deep Learning was introduced in sports field not less than 5 years of span. Computer Vision is making its way into various industries and now even in sports. It is used to enhance the broadcasting experience for any sport or club to be more competitive and achieve success. The sports industry has substantially increased the adoption of new technology in a very less time. In major sports it is observed that a sportsperson has fast motion that becomes difficult for the coach or the analyst to track those details. The data insights obtained from these footages require manual inputs and spends numerous hours manually noting and multiple replays. In such manner Computer vision can play a major role to fill these gaps between sports and analytical insights by giving valuable and accurate analysis via automated systems which locate segments and follow them throughout the footage.

In a sports , footage can be acquired through various cameras installed at a specific proximity where the event will be held (i.e. goal post , midline , boundaries , etc). The positioning of camera , its angle and hardware requirements may vary from sport to sport, event to event. With the help of these footages , precise position of a player can be detected as well as its movement , direction can be recorded which can be difficult for a normal person to capture and track. Computer vision has partially solved the limitations with its application of image processing, differentiation of ground players and object.

Player Tracking :

It is one of the key aims of applying computer vision in sports i.e. to keep track of players at a particular moment. It allows coaches to instantly analyse the performance of their team or any individual player moving in the field or to track the formation of the team.

Automated Segmentation technique is used in application of computer vision in sports to pinpoint the regions that correspond to players. The result obtained from the computer vision system expanded by applying ML and Data Mining Techniques to the raw player tracking data. Semantic Information can be generated once the information is gathered from the video frame, in order to create context on what action the player is performing (i.e. pass ,run , dribble , defend , etc). These techniques are labelled as semantic events. Such data can be used for analysis of a player or team. Construction of suggestion can be done based on the optimal position of the player on the pitch , the kicking angle of the ball,the accuracy of ball hitting the best spot , etc. These statistics can be displayed to the coach which they can compare and do the desired changes which will improve the efficiency of the team or a specific player. This technology of tracking player , analysing and suggesting has the potential to revolutionise training and improving the efficiency of a team.

The above example not only limits to a specific sport Football , instead it can be applied to various other sports like Basketball,

Badminton, Tennis, Tabe-Tennis, Cricket, etc. A great example of using computer vision can be related to a major tournament in sports Tennis in 2017, Wimbledon which was partnered by IBM. In the tournament, highlights were created by automating the key moments in the match by gathering data from the audience and the player. A small device designed by Grégoire Gentil which called in and out in a tennis match which gathered the data of speed and placement of a shot which determined the ball was out of bounds. In FIFA ,7 - camera computer vision system was developed by Hawk-Eye which used a gaol detection systems with multiple view high-speed cameras. These cameras covered each goal area which detected moving objects by sorting objects which resembled a playing ball on its area, colour and shape with an accuracy error rate of 1.5cm and a detection speed of 1s. It helped the referees to take decisions if the ball crossed the goal line.

Challenges of Computer Vision :

Even though Computer Vision has so many plus points there are still critical areas that need to be overcome before it can be fully exploited in sports and field of analysis. A major challenge encountered is that optical tracking systems cannot yet cope up to varying body posture of a human while exercising. Tracking a player is quite challenging due to the swift motion, similar appearance of players in team sports and even close interaction betweenplayers.
Nevertheless I the field of AI and Computer Vision its rapid advancement in computer power, increase datasets and develop new techniques to get closer to our human capabilities. Eventually these advancements will overcome the challenges and make their way into sports as teams and team aim to leverage modern technologies to improve the performance and become more competitive. It goes undoubtedly that the expansion of Computer vision will transform the key areas in Performance Analysis in sport.

-Hardik Chemburkar
TT AIML

STUDENT

Ambient Intelligence

Introduction

With the help of ambient intelligence (AMI), which is a developing field, our everyday environments become intelligent and user-sensitive. It stands for a network of covert, intelligent interfaces that can detect users' presence and change their surroundings to suit our current needs. Aml environments could be extremely varied, such as your house, vehicle, workplace, or even a museum you're visiting. These environments contain Aml systems that take in data, communicate with users, engage in complex reasoning, and direct actions on the environment. Information is collected through sensing, either manually by humans using their senses or automatically by machines like ultrasonic devices, cameras, and microphones.
Human decisions and actions, as well as those of artificial intelligence systems like robots and agents, are used to affect these environments.

Evolution

- AI was initially implemented in hardware, such as the SNARC(Stochastic Neural Analog Reinforcement Computer) developed by Dean Edmonds and Marvin Minsky.
- One of the technologies used on such systems was neural networks. The Mycin expert system is a good illustration of AI's second phase, when AI was computer-focused. The Authorizer's Assistant by American Express served as a ground-bre -aking during the third phase, which was networks-focused.
- Several search engines and recommender systems using intelligent agents and, more recently, ontologies were developed during the 1990s Web boom.

Correlation with AI

In Aml environments and scenarios, AI methods and techniques can help accomplish the following important tasks required for an ergonomic environment.

1. Speech Recognition:
An electric signal is obtained from a microphone for speech recognition. Signal processing and pattern recognition are used in the first step, which is to identify the phonemes in this signal. The following step involves connecting phonemes and locating words. Depending on how the user speaks, different speech recognition systems are available and can be more or less successful.

2. Natural Language Processing (NLP):
The output of a speech recognition system, from a keyboard, or even from a written document is referred to as natural language input. The goal of natural language processing is to comprehend this data. Semantic analysis comes comes after syntax analysis as the next step. In NLP, knowledge representation is significant. One of the most researched areas of NLP, using statistical and knowledge-based methods,is automatic translation systs.

3. Computer Vision:
Humans' most sophisticated sensory input is vision. Therefore, the capacity to automate vision is crucial. In essence, computer vision is a problem of geometric reasoning. The field of computer vision covers a wide range of topics, including image acquisition, processing, object recognition in two and three dimensions, scene analysis, and image flow analysis. In Aiml, computer vision can be applied to a variety of scenarios. It can be used, for instance, by intelligent transportation systems to detect traffic issues, traffic patterns, or approaching vehicles. Computer vision can also recognise human gestures for controlling machinery or facial expressions for reading emotions.

Future Scope

Artificial intelligence is a necessary ingredient for achieving ambient intelligence. The AI community's next exciting challenge is presented by AMI environments. Machine learning is used frequently these days, so Aml will probably need to manage this technology as well. Learning through user observation is one of Aml's requirements. Many systems can understand user commands, but they lack the intelligence to refrain from acting in ways that the user would prefer. Aml systems will be able to learn from users by using fundamental machine learning techniques, which will increase users' acceptance of these systems.

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Agri-TECH

Introduction

Agriculture is an essential part of human life. It's how we produce the food that we eat, and it's been a cornerstone of civilization for thousands of years. But as our population has grown, so too has the demand for food leading to a need for more efficient ways to produce it.
Thankfully, over the years, agricultural technology has evolved to meet this challenge, and today there are many devices and machines which help farmers do their job more efficiently and with fewer resources. In this article, we'll explore seven such advancements in agricultural technology.

1. Machines for Harvesting Crops

One of the most important aspects of agriculture is automation. With the help of machines, it's possible to produce more food with fewer resources. One example of this is the many types of devices that are used for harvesting crops. There are machines that can pick fruits and vegetables, as well as grain harvesters which can quickly harvest large fields of wheat or corn. This helps farmers to reduce the amount of time and manpower needed to harvest their crops, which in turn reduces both costs and environmental impact.

2. Devices for Irrigation

Another important aspect of agricultural technology is irrigation. To maximize crop yield, it's essential to ensure that plants have enough water. This can be a challenge in areas where rainfall is scarce or unpredictable. However, there are now many types of devices that can help with irrigation. From simple hand-held pumps to large-scale systems that can cover entire fields, these devices make it possible to provide crops with the water they need when they need it.

3. Soil Preparation Devices

Another important part of agriculture is soil preparation. Before crops can be planted, the soil needs to be properly prepared. This can involve a number of different tasks, such as tilling, plowing, and applying fertilizer. In the past, all of these tasks were done by hand or with simple tools. However, there are now many types of machines that can automate these tasks-making it possible to prepare large areas of land in a short amount of time.

4. Machines for Planting Crops

Planting crops is another essential part of agriculture. In the past, this was a task which was done by hand-seeds were simply planted into the ground one at a time. However, there are now many types of machines that can plant crops much more quickly and efficiently. From small hand-held devices to large tractor-mounted machines, these devices can plant hundreds or even thousands of seeds in a single day-reducing both the time and labor needed to get crops in the ground.

5. Machines for Crop Monitoring

Finally, agricultural technology can also be used for crop monitoring. In order to produce a high-quality product, farmers need to be able to track the condition of their crops throughout the growing season. This can involve tasks such as measuring soil moisture levels, checking for pests or diseases, and assessing the nutritional needs of plants. There are now many types of machines that can automate these tasks-making it possible to monitor large areas of land in a short amount of time.
For instance, drones in agriculture are becoming increasingly popular. Drones can be used to quickly and easily assess the condition of crops over large area-providing farmers with valuable information that can be used to improve yield and quality.

6. Precision Agriculture

Precision agriculture is a relatively new field that uses technology to help farmers optimize their production. This involves using sensors and data analytics to track the condition of crops, soil, and water in order to make better decisions about when and where to apply fertilizer, pesticide, or irrigation. By using precision agriculture techniques, farmers can reduce inputs while maintaining or even increasing yields.

7. The Internet of Things

The internet of things is a term that refers to the way in which everyday objects are being connected to the internet. This includes everything from home appliances to cars and even livestock. In agriculture, the internet of things is being used to connect various devices such as irrigation systems, soil preparation machines, and crop monitoring sensors-to create a network that can be used to optimize agricultural production. By using this technology, farmers can get real-time information about the status of their crops, allowing them to make better decisions about how to manage their land and resources.

Conclusion

In conclusion, agricultural technology has come a long way over the years. With the help of automation and precision agriculture techniques, it's now possible for farmers to produce more food with fewer resources. In the years to come, we can expect to see even more advancements in this field as farmers continue to find new and innovative ways to increase their production.

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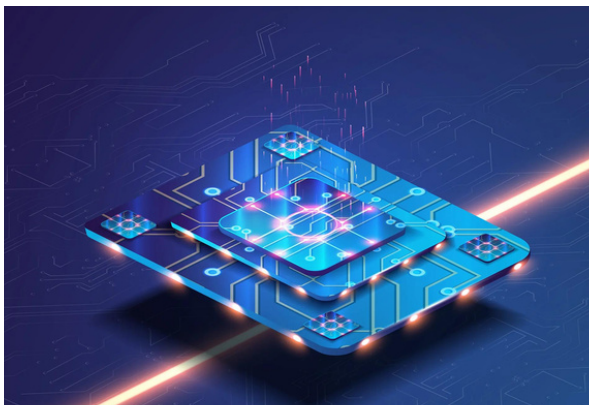
STUDENTS

QUANTAM COMPUTERS & ITS APPLICATIONS



Since the 20th century, the word quantum computers has been really a buzzword, but why was this “Quantum Computers” a buzzword during the 20th century, well it was found out that quantum theory applies not only to atoms and molecules but to bits and logic operations in a computer. So how do these QCs(Quantum Computers) helps us? So There are problems that even the most powerful classical computers are unable to solve because of their scale or complexity. Quantum computers may be uniquely suited to solve some of these problems because of their inherently quantum properties.

Last year at Multicon PPC in my technical paper, I talked about some of the fundamentals of quantum mechanics that are involved within a QC, Some of the terminologies that are explicit to a QC. The difference between Classical Computers and Quantum Computers.The different algorithms that will be used in quantum computers. What will be the effect on blockchain technology due to QCs. Let’s dive more into this QC.

Quantum computing has bits, just like any computer. But instead of ones and zeros, its quantum bits, or qubits, can represent a one, a zero, or both at once, which is a phenomenon known as superposition. However, the superposition that occurs in a quantum computer is very different than any conventional computer – it allows two or more qubits to behave in a coordinated way that cannot be explained by supposing each is doing its own thing. This is called entanglement, and it’s what gives a quantum computer its uncanny power. Quantum thinking will allow us to re-imagine computing that can solve some problems too hard for conventional computers, and do things with information no one thought possible.

Applications of Quantum Computers
There is an immense application of QCs that will help us solve real-world problems these includes :

- Artificial Intelligence
- Drug Development
- Financial Modelling
- Complex Manufacturing
- Weather forecast and climate change

At the last, I would also like to express my special gratitude to the dept of AI&ML for giving me an opportunity to express myself and my research in my technical paper.

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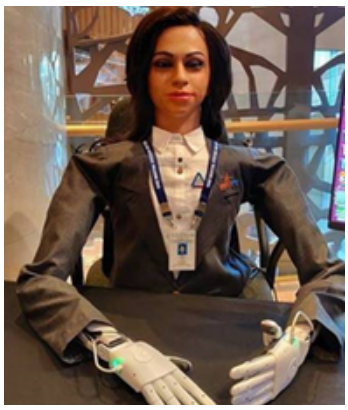
Vyommitra: The AI space robot..!



With the ethos of sky is not the limit, India's premier space agency Indian Space Research Organisation (ISRO) is gearing up for the country's maiden human space-flight mission 'Gaganyaan'. Sharing the details about the landmark endeavor, Union Minister of State for the Ministry of Science and Technology, Jitendra Singh recently said that the first trial of the human space mission will be done by the end of 2023 or at the beginning of 2024.

What is worth mentioning here is that the Minister informed about 'Vyommitra', a half-humanoid being developed by the ISRO, which will eventually fly to space after the first flight. It aims to lay the ground for ISRO's manned mission.

"The first trial for Gaganyaan will be done by the end of 2023 or the beginning of 2024. The first test flight will be followed by sending a female-looking humanoid robot – 'Vyommitra'. We have to ensure that the final Gaganyaan flight should be normal and uneventful," Union Minister of State Jitendra Singh informed.

Last month in August, the Indian Space Agency achieved a major milestone in the Ga-

"Next year one or two human beings of Indian origin will go to space. The preparations for our Gaganyaan have been done. Before that, two trials will be conducted by the end of this year. The first trial will be empty and in the second a female robot (astronaut) will be sent whose name is Vyommitra," Jitendra Singh added.

The aim of Gaganyaan mission is to demonstrate the capability of sending humans to Low Earth Orbit (LEO) in the short-term, which will lay the foundation for a sustained Indian human space exploration programme in the long run.

ISRO's Vyommitra (vyoma means space, mitra means friend) is called a half-humanoid since she has a head, two hands and a torso, and doesn't have a lower limbs. Coming to the functioning of Vyommitra, she can switch panel operations, ECLSS [environment control and life support systems] functions, can also be a companion,and converse with the astronauts by recognising them and also responding to their queries.

The human spaceflight programme has both tangible and intangible benefits for the nation, which includes progress towards a sustained and affordable human and robotic programme to explore the solar system and beyond.

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TECHNOLOGY IN HEALTH CARE-EARLY CARE

The healthcare industry is the emerging field of digital innovation and evolution. Increase in digital technology occupancy has the potential to improve the health care partner and patient experience and also renovate fully safe care delivery. While these advancements made a efficiencies which benefit both patient and health provider, the methods in which these technologies are employed can increase the scale on their impact.

Case study of patient through the healthcare system vary extensively. thus, there's no single approach in perfecting experience. Cases pierce the health system for different types of medical care. They've different communication preferences grounded on digital knowledge and or access to digital bias. While numerous cases who live on their computers day to day enjoy the speed and convenience of digital drug, a large portion of cases find these tech- enabled relations to be cold and impassive.

Despite the essential challenges associated with investing digital technology into current care operations, communicating the " why " can help with change operation. For illustration, creating an experience that includes robotic process robotization and artificial intelligence offers benefits like expedited completion of attestation, simplified content confirmation, streamlining bill payment.

Digital technology can also ameliorate provider experience and case care. Simplified relations through recording, automated patient outreach, and using artificial intelligence to descry complaint more snappily in individual testing are just a many tools helping to lighten the cargo and help collapse of our healthcare professionals.

COVID- 19 created an optimal case study that instanced the occasion technology brought to uncloak. Organizations saw the use of robotization, chatbots, conversational AI and operation program interfaces(API) abused on a coordinated,
large scale for testing, vaccination, and communication processes. COVID- 19 needed massive scalability with limited mortal coffers, which only technology could sustain across the world. literacy were deduced from each associations approach and rigidity t, as well as automated tradition renewals, to name a many.These technologies have a two fold benefit of making the experience more simple for the case, and further cost-effective for the health system. It was needed as demand retrograded and flowed.One of the topmost exemplifications of this principle was the finding that virtual visits between cases and providers can be an effective and effective way to render health care.

Artificial intelligence is set to revolutionize

the healthcare industry completely. It has the ability to mine medical records and the AI algorithms can design treatment plans, develop drugs quicker than any current doctor, and diagnose cancerous and non cancerous tissue samples.Virtual reality is changing the lives of patients and physicians alike. Looking into the future, you could travel to Spain or home while you are in a hospital bed or you may watch operations as if you're holding the scalpel. Pain management is one area that has benefited from virtual reality. For example, during labor pain, women are being equipped with VR headsets that allow them to visualize a soothing landscape. Patients diagnosed with cardiac, neurological, gastrointestinal, and post-surgical pain have shown a decrease in their pain levels when using VR as a stimuli.

In order to understand the advantages of digital technology in care the look method is crucial. it's necessary to interact patients and suppliers regularly throughout the method. Understanding crucial aspects of our patient and supplier wants can cause roaring solutions. For patients, it's imperative to know social health additionally as physicial health. Access to devices, broadband and digital acquisition can all impact the expertise. it'll be necessary to style digital methods with these factors in mind. Not together with these factors within the style can cause a divide among our most vulnerable patients United Nations agency would like facilitate accessing care. For suppliers, it's necessary to form solutions that really improve their progress and skill to provide higher outcomes. Digital solutions that add additional work or ar tough to use can ultimatily fail.The manner in which we deploy digital technology will determine its utility.

Technology is a part of a result to a problem but isn't the result. In order to be successful, it'll be necessary to keep the case in the center of the design. Understanding essential complications will allow us to truly transfigure case and provider experience and redesign care delivery, all while lowering the total cost of care. All laudible pretensions that have been fugitive, on a larger scale, until now.

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AV1:HISTORY & FUTURE

What is AV1 ?

AV1 is a codec developed by the Alliance for Open Media, a conglomerate of a ton of differentcompanies in the technology space.Its main benefits are that it's royalty-free (so, companies can implement it in their software for free), and it has some immense savings over the likes of VP9 and H264. Facebook Engineering conductedtests in 2018, concluding that the AV1 reference encoder achieved 34%, 46.2%, and 50.3% higher data compression than libvpx-vp9, x264 High profile, and x264 Main profile, respectively. This means that for those on slower connections, you may be able to enjoy a quality higher than what you're used to, and for those on faster connections, you'll be able to get an even higher bitrate on the same connection speed.

The first smartphone chipset to support AV1 decode was the MediaTek Dimenisty 1000, which supported up to 4K 60 FPS. The Nvidia Geforce 3000 series supporteddecoding, the new Nvidia Geforce4000 series supportsboth encoding and decoding, and Samsung's Exynos 2100/2200 both support AV1 decode as well. Support is slowly growing in the industry, and the chipset in the Chromecast HD also supports AV1 decode, too. We reached out to Google for comment and were told that the Chromecast with Google TV (HD) supports AV1.

Not only that, but YouTubeon desktop also supports AV1, and you can enableit in your account settings so long as you're using a compatible browser. In fact, the companyhas designed its own silicon for the encoding of AV1 video that will be used in data centers for YouTube.The chip, code-named"Argos", is a second-gen Video (trans) Coding Unit (VCU) that converts videos uploaded to the platform to various compression formats and optimizes them for differentscreen sizes. Google claims that its new Argos VCU can handle videos 20-33 times more efficiently than conventional servers.

The History of AV1

The context behind AV1 and why it was createdis important as well. VP9 is a royalty-free codec developed by Google that anyone can use, and because it's royalty-free, it could be implemented on any platform or service that wanted it. YouTube made use of the codec on any device that could support

support it (as that meant big savings for Google thanks to reduced bandwidth), and it has even been adopted by video-on-demand services such as Netflix, Twitch, and Vimeo.

However, because Google has a vested interest in adopting better compression algorithms to reduce the bandwidth usage of its data centers,it began to work on VP10 — the successor to VP9. A tiny increase in video compression per video can result in huge cost savings and a major improvement in user experience when you're accounting for billions of video minutes.Google announced that they planned to release VP10 in 2016, and then would release an update every 18 months to ensure a steadyprogression. It got to the point where Googleeven started to release code for VP10,but the company announced the cancellation of VP10 and formed the Alliance for Open Media (AOMedia) instead.

The Alliance for Open Media includes everyone from processor designers (AMD, Arm, Broadcom, Chips&Media, Intel, Nvidia) to browser developers (Google, Microsoft, and Mozilla), to streaming and videoconferencing services(Adobe, Amazon, BBC R&D, Cisco, Netflix, Youtube).All of these companieshave been offering up some form of support to AV1, be it through hardwaredecoders introduced in chipsets, the implementation of decoders in browsers, or the use of the codec on streaming services.

AV1 versus HEVC/H265

The biggest difference betweenAV1 and HEVC (High-Efficiency Video Coding), also known as H.265, is in the licensing. In order to ship a product with HEVCsupport, you need to acquire licensesfrom at least four patent pools (MPEG LA, HEVC Advance, Technicolor, and Velos Media) as well as numerous other companies, many of which do not offer standard licensing terms — instead requiringyou to negotiate terms.

These steep royalties were already problematic for products like Google Chrome, Opera, Netflix, Amazon Video, Cisco WebEx Connect, Skype, and others, and they completely exclude HEVC as an option for projects like Mozilla Firefox. This is because it goes against multiple core values of the Firefox project: Firefoxneeds to be royalty-free in order to ship in many FOSS projects, which HEVC usage would prevent it from being; and Mozilla believes in a free and open web, and that isn't possible if you promote patent-encumbered standards. Even ignoring those two problems, Mozilla simply cannot afford to waste hundredsof millions of dollars on royalties and all that time negotiating the necessary licensingagreements.

A fun fact as well, these same problems are what prevented Firefox (and Chromium) from even including native H.264 playbackon many platforms until a couple of years ago... and it stillrequires a plugin on Linux. It's unlikelythat Firefox will even be able to support HEVC before its patents expirein the 2030s (or possibly even later). Even to this day, Firefox only supports H.264 natively thanks to Cisco offering to pay all of the licensing costs for Mozilla through OpenH264, in order to standardize H.264 for streaming across the market until the next generation codec was ready. On the Mozilla video codec guide, the company says that "Mozilla will not support HEVC while it is encumbered by patents." To this day, only Edge and InternetExplorer support native HEVC playback,and only on specific hardwarethat supports decoding.

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In efficiency terms, both codecs go toe-to-toe against each other. Their efficiency is generally on-par with each other (thoughtests have shown AV1 to edge slightly ahead), but there’s a catch — AV1 typically takes significantly longer to encode, thanks to the lack of hardware encoding capabilities. The University of Waterloo found in 2020 that while AV1 offered a bitrate saving of 9.5% when compared to HEVC in encoding a 4K video, AV1 videos also took 590-times longer to encode than AVC. In contrast,HEVC took only 4.2-times longer. These tests were obviouslyrun quite early on in AV1’s lifespanwhen hardware supportwasn’t really available.

The Future of AV1

It’s looking likely that AV1 will blaze the trail for high-quality compressed videoplayback, as more and more devices support hardware decoding. Given that HEVC is only supported by one browser on a desktop (now that Internet Explorer is dead, anyway),AV1 is clearly the go-to codec for the future as a VP9 successor.With support only expected to grow, more and more devices are going to end up using it. There are already some experiment flags referring to AV2 on the AOM repository and a “starting anchor for AV2 research” that was committed to the repository last year, which suggests that we’ll see iterations in the future as well.

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STUDENTS

Artificial Intelligence- Revolutionizing the Car Designing and Manufacturing Industry.

Since cars were introduced in the 19th century, humans have always been a part of its manufacturing process. From the initial design until the product's final launch, the human workforce carried out all the processes in between. As the years passed, advanced technology assisted workers in performing these processes. And now, in the 21st century, manual labor is slowly being replaced by intelligent machines that hardly require any human assistance. But one aspect of car manufacturing that hasn't completely been taken over by machines and is still human-dependent is Design.

Designing is a task that has always been done by hand – be it sketching, moulding clay, or digital rendering. The Automotive design process consists of developing the appearance, both interior and exterior, along with the mechanical design which includes designing the parts and components of the vehicle. While designing a vehicle, a designer must keep in mind factors such as the basic geometry, the dimensional requirements, and the industry standards to name a few.

Even though designers nowadays are assisted by machines for purposes like digital rendering and prototyping, and access to more tools, humans cannot be completely replaced by machines as the creativity and emotions present in man-made designs cannot be mimicked by machines.

But recent advancements in the Artificial Intelligence and Machine Learning sector are gradually proving otherwise.

Design teams only have a limited amount of time, money, and resources at their disposal and hence cannot prototype more than a few designs. But there can be a chance that some of the designs that don't make it to the prototyping stage have the potential to produce a lighter, cheaper, and better product. This is where the concept of Machine Learning comes into the picture.

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Machine Learning is a branch of Artificial Intelligence (A.I.) that focuses on building and understanding methods that leverage data to improve performance on a specific set of tasks. Machine Learning 'Algorithms' work by building a model based on sample data, known as 'training' data that 'train' the model to make predictions and decisions without specifically being programmed to do so.

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In the Automotive Design scenario, the process works by inputting a very large number of designs (training data) into the model. The model interprets and analyzes these designs thereby learning more information. The end product is a unique design created by the model.

Another major part of AI used to design cars is decision-making. The programmers will input certain parameters and rules, set by the engineers and designers, that are to be followed by the computer. This is to ensure that the final design is of the required dimensions and proportions.

A real-life example of this new-age technology is the American-made hypercar, the Czinger 21C. The car has been designed using A.I. and built using 3D printing. Its A.I. learns millions of mechanical principles to produce the most cost-effective design; while accounting for external factors and natural phenomena such as wind resistance and gravity. This precision makes the car look exactly as if it were designed by a human. The additive manufacturing method also decreases the number of resources used and is far cheaper than conventional manufacturing methods.

The Czinger 21C-The first ever production car to be completely designed by an A.I.

The Chassis of the 21C designed by the Czinger A.I.
A chassis is the base frame of the car.

The Engine Bay of the Czinger 21C showcasing its 3D printed components.

Artificial Intelligence and Machine Learning when implemented with Computational Engineering is one of the most sufficient ways to design a car. It allows engineers to optimize their designs and increase their efficiency via machine learning systems that can automate a number of tedious design tasks.

While products created by human labour are of more value and are time intensive to manufacture, manufacturing a product using automated machines within a short time is more efficient and is suited to the masses. Automated machines and processes need little to no input from people or other processes but to assess whether a design is of value, will still require a human. Hence, we can say that machines won't completely replace us-at least not in the near future.

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Introduction

Before we jump into Web 3.0, Let's learn about Web and its history. In a nutshell web is a common name of WWW(World Wide Web) it is a subset of Internet. Before Web 3.0 became a dream of Thousands of Technologist, We had Web 1.0 and Web 2.0. Yes you are right web 3.0 is a Phase or evolution of Web. To explain in short Web 1.0 is an earliest version of Internet, It was developed by Berners-lee in 1990 at CERN. According to its founder web 1.0 is read only web. Which means web 1.0 allowed us to search for information and read only with very little or no interaction with web.

Web 2.0 was a Second stage in development of Internet. In next 10-20 years after the launch of web 2.0 every bland webpages of web 1.0 was changed to interactive, social connective and user-generated content of web 2.0. Web 2.0 allowed user to create their own content that can be viewed by millions of people around the globe. The Exponential growth of web 2.0 has been driven by key innovation such as mobile internet access and social Networks. These all innovation has enabled the dominance of app that has expanded online interactivity of user through apps like Meta, Twitter, Whatsapp and Google to name a few, We can say that web 2.0 is Read-Write web.

Web 3.0 was coined by Ethereum co-founder Gavin Wood, web 3.0 will be a third phase in evolution of Web. This new technology believe

The core idea of Web 3.0 is that it is :-

- Decentralized

  Instead of large swathes of the internet controlled and owned by centralized entities, ownership gets distributed amongst its builders and users.

- ·Permission less.

  Everyone has equal access to participate in Web3, and no one gets excluded.

- It has a native payment

  It uses cryptocurrency for spending and sending money online instead of relying on the outdated infrastructure of banks and payment processors.

- Trust less

  It operates using incentives and economic mechanisms instead of relying on trusted third-parties.

And many more. Apart from ideas there are some key features of Web 3.0

Key Features of Web 3.0:-

- Blockchain-based.

Blockchain is the enabler for the creation of decentralized applications and services. With blockchain, the data and connection across services are distributed in an approach that is different than centralized database infrastructure.

- Autonomous and artificially intelligent.

More automation overall is a critical feature of Web 3.0, and that automation will largely be powered by AI.

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- Decentralized.

As opposed to the first two generations of the web, where governance and applications were largely centralized, Web 3.0 will be decentralized. Applications and services will be enabled in a distributed approach, where there isn't a central authority.

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- Cryptocurrency-enabled.

Cryptocurrency usage is a key feature of Web 3.0 services and largely replaces the use of fiat currency.

Till now we had learn and known many thing about Web 3.0 and it features. But, at the end of the question remains. Why is Web 3.0 important.

Importance of Web 3.0:-

- Ownership

Web3 gives you ownership of your digital assets in an unprecedented way. For example, say you're playing a web2 game. You purchase an in-game item. If the game creators delete your account, you will lose these items.
Web3 allows for direct ownership through non-fungible tokens (NFTs). No one, Has the power to take away your ownership.

- Censorship resistance

The power dynamic between platforms and content creators is massively imbalanced.
Web 2.0 requires content creators to trust platforms, that they don’t censor them
On Web3, your data lives on the Blockchain. When you decide to leave a platform, you can take your reputation with you

- Decentralized autonomous organizations (DAOs)

Challenges of Web 3.0:-

- Security

Since blockchain technology is trustless by default, Web 3.0 remains vulnerable to certain types of attacks: from hard fork and 51% attack to DDoS, DNS hijack and sniping bots. Regular scams, including targeted ads, may also work in the new environment. These security risks generally rely on the human factor, but targeted hacker attacks could also lead to massive financial losses.

- Development complexity

The Web 3.0 applications, namely the Decentralized Apps or DApps, are inherently complex because of the consensus approach. They often require the knowledge of new programming languages, additional frameworks. A single bug in code could lead to the loss of millions of dollars in Cryptocurrency.

- Scalability

The scalability element becomes evident once a large blockchain-based app gains popularity. A rapid increase in the number of users led to a sharp increase in gas (transaction fees), The solution could be an introduction of layer 2 blockchain offloading the transaction element. However, a quick deployment of these solutions jeopardizes the decentralization component.

- Reliance on crypto

Crypto assets – cryptocurrencies and tokens – are critical to Web 3.0. Since they represent a form of payment or storage of value on the blockchain, their failure could entail the failure of the entire ecosystem.

- Moin Syed
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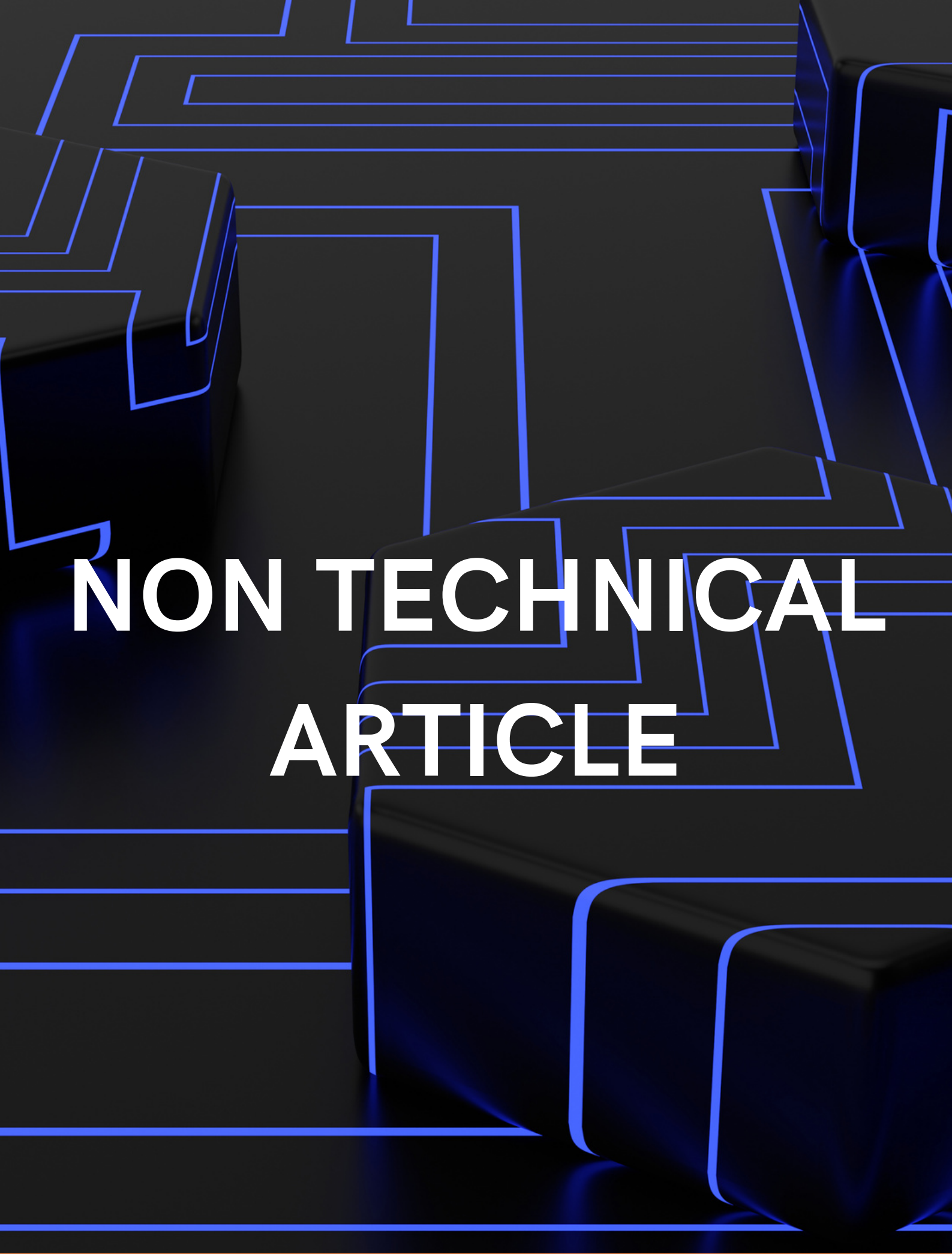


NON TECHNICAL ARTICLE

STUDENT

Social Benefits of Plastics & Applications

This article explains the records, from 1600 BC to 2008, of substances which are nowadays termed ‘plastics’. It includes manufacturing volumes and contemporary consumption styles of five predominant commodityplastics: polypropylene, polyethylene, polyvinyl chloride, polystyrene and polyethylene terephthalate. The use of components to adjust the houses of these plastics and any related safety, in use, issues for the resulting polymeric materials are described. A contrast is made with the thermal and barrier residences of other materials to demonstrate the versatility of plastics. Societal blessings for fitness, protection, electricity saving and material conservation are described, and the unique advantages of plastics in society are mentioned. Concernsrelating to littering and traits in recycling of plastics also are defined.Finally, we provide predictions for a number of the capability applications of plastic over the subsequent twenty years.

Humans have benefited from the use of polymers considering that about 1600 BC while the historical Mesoamericans first processed natural rubber into balls, figurinesand bands (Hosleret al. 1999). In the intervening years, guy has relied an increasing number of on plastics and rubber, first experimenting with herbal polymers,horn, waxes, herbal rubber and resins, till the 19th century, whilst the development of modern-day thermoplastics began. Although actually masses of plastic substances are commercially available, best a handful of these qualify as commodity thermoplastics in terms of their high quantity and comparatively low fee. Theseplastics and their fractional consumption on a international basis are shown below. Low-density polyethylene (LDPE), high density PE (HDPE), polypropylene (PP), PVC, PS and polyethylene terephthalate (PET) accountfor about ninetyin line with cent of the full demand.

1.COMMODITY PLASTICS

This organization consists of PP and PE. Polypropylene became observed in 1954 through Giulio Natta, and commercial manufacturing of the resin commenced in 1957. It is the unmarried most extensively used thermoplastic globally.It is a completely useful cost- powerful polymer and can be injection moulded, blow-moulded, thermoformed, blown movie extruded or extruded into a diffusion of products. Examples of these encompass bendy barrier film pouches (inclusive of the biaxially oriented packaging movie used for crisps and nuts); stackable crates for delivery and garage, caps and closures for containers, blow-moulded bottles,skinny-walled bins (e.g. Margarine tubs,yoghurt cups, food trays) used within the food industry; and tree shelters, soil sieves, fork handles, mulch movies, and glass substitute, window or door

water or sewage pipes and geomembranes utilized in building packages.Polypropylenes are also used in family items including bowls, kettles, cat litter trays; private items inclusive of combs, hair dryers, movie wrap for apparel; and in other packaged items.

About a half of the 35 million tonnes of PE resin produced is used to make plastic film, observed through13–14% in injection-moulded and blow-moulded products.North American, westernEuropean and Asian markets each consume about 25–30% of the PE film produced

globally. Typical applications of PE are in blow-moulded boxes with volumes starting from some millilitres such as detergent bottles(2 hundred–500 cm3) and milk jugs (0.5–4 l) to hundreds of litres including water and chemical barrels. Film packages encompass provider bags, sandwich bags, freezer bags and adhere wrap, and horticultural uses consist of irrigation pipes, glass alternative and subject liners.Polyethylene is likewisebroadly used as a dielectric insulator in electrical cables.

2.PLASTICS ADDITIVES

Plastics are hardly ever utilized by themselves; typically, the resins are mixed with different substances known as 'additives' to beautify overall performance. These can also include inorganic fillers (e.G. Carbon or silica) to enhance the plastic material, thermal stabilizers to permit the plastics to be processed at excessive temperatures, plasticizers to render the cloth pliable and flexible, fire retardants to deter ignitionand burning, and UVstabilizers to preventdegradation while uncovered to daylight. Colorants, matting marketers, opacifi and lustre additives can also be used to enhance the arrival of a plastic product. Additives are often the most pricey thing of a formulation, and the minimum amount had to obtain a given stage of performance is usually used. The components are intimately mixed with the polymer or 'compounded' into a components that is processed into the shape of the very last product.

Plasticizers are a particular group of additives that has raised concerns; however, there are numerous kinds of plasticizer (e.g. Adipates, polymerics, trimellitates, 1,2-cyclohexanedicarboxylic acid diisononyl ester, citrates, phthalates, and so on.) utilized in plastics. Of those, about 8 differing types are in commonplace use. It is no longer viable to conduct a generalized threat assessment on phthalates as a category of compounds used as plasticizers. Some phthalates, e.G. Diisononyl phthalate and diisodecyl phthalate, have been through complete European Risk Assessments and feature a completely easy bill of health in all packages, while with other phthalates inclusive of dibutyl phthalate and diethylhexyl phthalate, threat-reduction measures are required(described within the ECB postedRisk Assessments in the on-lineORATS (2008) databaseto be had from The Phthalates Information Centre Europe) to make certain that secure use has been recognized.

As suggested by the futurist Hammond (2007) in his recent book 'The World in 2030', the speed of technological development is accelerating exponentially and, for this reason, by way of the yr 2030, it will seem as if a complete century's worth of progress has taken area within the first three decades of the twenty-first century. In many approaches, lifestyles in 2030 may be unrecognizable in comparison with life these days. During this time, plastics will play a extensively extended positionin our lives.

- Banti Pathak
TT AIML


INTERVIEW

INTERVIEW

Shalu Mishra

Software developer at persistent system

Q1 How did your fascination with machine learning and deep learning begin?

ANS More than a specific event or experience, my journey has been a gradual progression of experiences that strengthened my fascination with machine learning and deep learning. My first academic degree was in mathematics, which continues to interest me to this day. My Master's thesis in image processing was perhaps my first foray into the broader field that enthused me into this research area.

My PhD thesis was in an interdisciplinary group that applied machine learning to real-world problems, which showed me the applied side of research. Through all these years, my natural ideation process always gravitated towards machine learning algorithms, which was perhaps an ideal middle ground between math on the one hand and real-world application on the other. This aspect of machine learning and deep learning continues to interest me, and I still try to work on solutions for real-world challenges. I do believe there is a long way to go.

Q2 What were your initial challenges, and how did you address them?

ANS Different challenges are encountered at different stages of career. As a research student, my initial challenges were similar to many others – understanding what kind of a research problem I want to work on; knowing when to read and when to experiment; what it takes to publish your research; how to write a paper; and so on.

To a large extent, these questions were answered through the mentorship I received from different people, discussing with peers, and sometimes just trial-and-error, or what one can call experience.

Q3 Did you encounter any data science problems during your research?

ANS I have had to deal with two biggest problems: dataset creation; and finding the problem one can solve given a certain kind of dataset. Creating a dataset is a skill by itself and often a longitudinal effort with multiple players, especially when it pertains to a domain that requires expertise, such as healthcare or aerospace or agriculture. Knowing what kind of data collection is required to solve a problem is non-trivial. Discussions with multiple stakeholders and thinking through every detail of data collection and annotation is paramount. Ethical and privacy implications must also be kept in mind, and suitable consent and permissions must be taken.

INTERVIEW

Q4 What are your thoughts on the scope of AI research in India compared to the global scenario?

ANS The scope of AI in India across different application domains is immense. Plenty of opportunities to learn AI/ML – especially certificate programs – have emerged over the last couple of years. Governments, both at central and state levels, have shown great leadership and enthusiasm in adopting AI, and even AI-based startups have emerged in diverse application domains. However, considering our population, there is always scope for more. One of the issues we lag is – innovation in AI. However, AI as a field is still growing, and making new technological innovations at the heart of AI itself – be it fundamental or applied – is something we need more of.

There are two aspects to the research scope of AI in India: to use and leverage AI to develop cutting-edge products and services in various application sectors, or to make fundamental advancements to the field of AI itself, be it theoretical or applied. The former is important not merely as an indicator of technological advancement but more fundamentally for improving the quality of life of every citizen in the country and helping scale the efforts of enablers to reach out to every corner of the country.

Q5 What's IITs' approach towards AI education and research?

ANS At IIT-Hyderabad, we have an AI department that offers Bachelors, Masters and PhD programs in AI. We also offer a certificate program for anyone interested in AI, even if they are not registered as an IIT-H student. The department consists of faculty members in AI with different backgrounds: computer science, electrical engineering, mathematics, mechanical engineering, design, liberal arts, physics, etc.

Q6 How can the government and corporations play a role in encouraging more students to enter AI fields?

ANS There is always a need to do more. India has talented students across almost every institution; however, there is a dearth of mentorship opportunities to take their learning to the next level. Many faculty, though sincere and dedicated, have not had the access to state-of-the-art topics and practices.


ACHIEVEMENTS

Achievements

AI&ML DEPARTMENT

Jwala Chorasiya & Rohit Gupta

Winner at SITS, Pune Hackathon

Prabhat Shukla

- TCET TSDW: Champion Debate-e-darbaar
- Rotaract 2021-22: Best Debater

Shivam kumar Chaurasia

- INNERVE HACKS '22 WINNER (National level Hackathon).
- 4 STAR CODER AT CODECHEF.

Nidhi Worah

2nd Runner up in computer vision project exhibition

Achievements

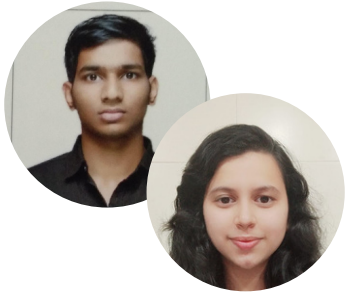
AI&ML DEPARTMENT

Tanmay & Mayani

Won Innerve Hacks, A Pan India Hackathon

Ankur yadav

Secured 1st place in "OFF D' CUFF 2022" - Sorcerers of Intellect.



Bhavya Jain & Aavya Upadhyay

First prize in Debate-e-Darbar (Institute level debate competition)

Sanskar Mishra

Multicon PPC Second prize &
SIH participant

ACKNOWLE-DGEMENT

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"Coming together is the beginning, Keeping together is progress and Working together is success."

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-The Editorial Team
TEJAS