AKSHAYA
COLLEGE OF ENGINEERING AND TECHNOLOGY
(Approved by AICTE, Affiliated to Anna University & Accredited by NAAC)
Kinathukadavu, Coimbatore-642109. www.acetcbe.edu.in

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

TECHNICAL MAGAZINE

Issue 3[March, 2024]

Message from the Head of Department

The Department of Computer Science and Engineering was established in the year 2009, and presently it offers Under Graduate programme in Computer Science and Engineering with a student intake of 120 and Post Graduate programme in Computer Science and Engineering with a student intake of 9. The Department has well qualified faculty and supporting staff in areas such as Networking, Artificial Intelligence, Programming languages and Machine Learning.

The department's primary objective is to deliver world-class quality education in the field of Computer Science. Equipped with computers featuring fully networked terminals with the latest hardware and software configurations, the department provides a conducive learning environment. Additionally, the department offers Internet connectivity with a bandwidth of 300 Mbps on a 1:1 ratio, ensuring seamless access to online resources. These facilities empower students to explore and innovate in the ever-evolving field of Computer

Prof. M. Nisha, M.E., (Ph.D.),
Assistant Professor (S.G) & HOD (i/c)
Department of Computer Science and Engineering

Vision and Mission of the Department

Vision of the Department

To develop competent Computer Science Engineers, capable of meeting the challenges in the globalized technological society.

Mission of the Department

DM 1: To provide good quality academic and infrastructure environment that would help the students acquire deep knowledge and skills in Computer Science and Engineering.

DM 2: To prepare students for careers in IT Industry, encourage Entrepreneurship and mould them to take leadership for the betterment of the society.

DM 3: To produce competent graduates with human values, for carrying out research in cutting edge technologies in Computer Science and Engineering.

Program Educational Objectives (PEOs)

PEO 1: Prospective Career: To exhibit knowledge and skills in the various domain areas of Computer Science and Engineering with an awareness in different disciplines for a prospective career and to undertake novel research as per the needs of the society, government and industries.

PEO 2: Higher Education: To be strong in fundamentals of Computer Science and Engineering for successfully pursuing higher education and research in reputed institutions.

PEO 3: Product Development: To apply their knowledge and innovative ideas to design and develop products in interdisciplinary areas for real time problems and to emerge as entrepreneurs.

Program Specific Outcomes (PSOs)

PSO 1: Able to analyze and develop solutions to complex engineering problems in IT such as Operating Systems, Networks, Data Structure, Database Management Systems, Cloud Computing and Mobile computing, to meet the society and industrial needs.

PSO 2: Able to solve the industry problems with knowledge in recent technology and tools such as Machine Learning, Internet of Things, Oracle, Java Programming etc with good team skills and ethical values.

Program Outcomes (POs)

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2: Problem analysis: Identify, formulate, review 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 the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

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 the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

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

PO 9: Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary 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: Project management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Message From Editorial Team

Welcome to an exciting edition of the technical magazine of Department of Computer Science and Engineering, where innovation, creativity, and technology converge. In this topic, we deliver Artificial Intelligence (AI) is transforming industries and reshaping the future of technology. By mimicking human intelligence through algorithms and machine learning, AI systems can process vast amounts of data, recognize patterns, and make decisions with increasing accuracy. From self-driving cars and virtual assistants to medical diagnostics and predictive analytics, AI is revolutionizing how we interact with machines and enhancing the efficiency of countless processes. As AI continues to evolve, its potential to drive innovation, solve complex challenges, and enhance human capabilities positions it as a critical force in the digital age.

We would like to extend our heartfelt gratitude to all contributors who have taken the time to share their insights and expertise. Your work is the keystone of this publication, and it is your dedication that makes each edition of our Magazine a success.

As you explore the content within these pages, we encourage you to think beyond the boundaries, to question, to innovate, and to contribute to the vibrant tapestry of ideas that defines our institution.

Thank you for your continued support and enthusiasm. We hope you enjoy this issue as much as we have enjoyed putting it together.

Chief Editor:

Mrs. M,Nisha, HOD(i/c).

Faculty Advisors:

Mrs.K.Malarvizhi, AP/CSE,

Mrs.K.Gomathi, AP/ CSE,

Mr.V.Balamurugan, AP (Sr.G.)/CSE.

Student Editors:

Mr. Sradesh B – IV CSE,

Mr. KalidassG – III CSE,

Mr.Nithish Kumar S– II CSE

Design Team:

Mr. Kaviraj C – IV CSE,

Mr. Partheepan R – III CSE,

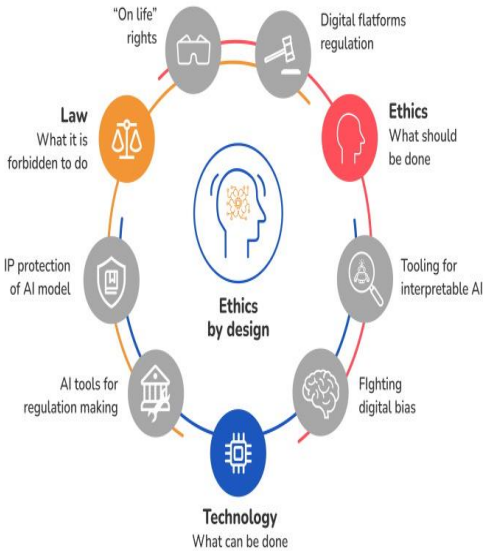
Mr. AnbuselvanS – II CSE.

TABLE OF CONTENTS

ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) has rapidly evolved from a theoretical concept to a pivotal technology influencing various aspects of human life. As AI systems become increasingly integrated into critical domains such as healthcare, finance, transportation, and social media, ethical considerations have become paramount. The ethical landscape of AI encompasses a range of issues including fairness, accountability, transparency, privacy, and the broader societal impact. This comprehensive exploration addresses these concerns in detail.

Artificial Intelligence (AI) has rapidly evolved from a theoretical concept to a pivotal technology influencing various aspects of human life. As AI systems become increasingly integrated into critical domains such as healthcare, finance, transportation, and social media, ethical considerations have become paramount. The ethical landscape of AI encompasses a range of issues including fairness, accountability, transparency, privacy, and the broader societal impact. This comprehensive exploration addresses these concerns in detail.



AI systems often operate based on data collected from diverse sources. If this data reflects historical inequalities or biases, the AI systems trained on it may perpetuate or even exacerbate these biases. For instance:

- **Algorithmic Bias**: AI algorithms used in hiring, loan approval, or law enforcement may inadvertently favor certain groups over others. For example, facial recognition systems have been shown to perform less accurately on people of color compared to white individuals.
- **Mitigation Strategies**: To address these issues, strategies such as diverse data collection, bias detection, and algorithmic fairness techniques are employed. Ensuring that training datasets are representative and that algorithms are regularly audited can help mitigate bias.

NATURAL LANGUAGE PROCESSING

Natural Language Processing (NLP) is a field within artificial intelligence (AI) that focuses on enabling computers to understand, interpret, and generate human language. NLP bridges the gap between human communication and computer understanding, making it possible for machines to process and respond to natural language in a meaningful way. Here's a detailed exploration of NLP, its components, applications, and challenges:

1. Core Components of NLP

NLP involves several core components and processes that enable machines to handle and analyse text and speech data. Key components include:

Tokenization: The process of breaking down text into smaller units, such as words or phrases (tokens). This is often the first step in text processing. For example, the sentence "NLP is fascinating" is tokenized into ["NLP", "is", "fascinating"].**Part-of-Speech Tagging**: Assigning grammatical categories (e.g., noun, verb, adjective) to each token in a sentence. This helps in understanding the syntactic structure of the text. For instance, in the sentence "The cat sleeps," "The" is a determiner, "cat" is a noun, and "sleeps" is a verb.

Named Entity Recognition (NER): Identifying and classifying entities within text, such as names of people, organizations, locations, dates, etc. For example, in the sentence "Apple Inc. was founded by Steve Jobs," NER identifies "Apple Inc." as an organization and "Steve Jobs" as a person.

Parsing: Analysing the grammatical structure of a sentence to understand its syntactic relationships. Parsing helps in creating a parse tree that represents the structure of the sentence.

Sentiment Analysis: Determining the sentiment or emotional tone expressed in a text, such as positive, negative, or neutral. This is useful for analysing customer reviews or social media posts.

Semantic Analysis: Understanding the meaning of words and sentences in context. This involves tasks like word sense disambiguation, which determines the meaning of a word based on its context.

Machine Translation: Automatically translating text from one language to another. This involves complex NLP techniques to preserve meaning and context across languages.

Rule-Based Systems: Early NLP systems relied heavily on manually crafted rules and linguistic knowledge. While effective for specific tasks, they lack flexibility and scalability.

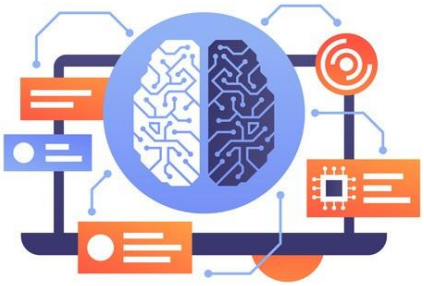
By
Ms.Gayathri M – II - CSE
Mr. Kalidass G – III CSE,
Mr. Partheepan R – III CSE,
Mr. Anbuselvan S – II CSE

MODEL SELECTION IN MACHINE LEARNING

Just like other Apple devices, this watch is also recognized for its high-quality color and material choices. What choices will customers have for customizing the color and material of the Apple Watch? Various customization options for the Apple Watch, such as glass finishing, metal finishing, and strap materials like rubber, leather, and steel, are available. Releasing a gold edition of their flagship model has become a popular trend for all companies.

Rumours indicate that Apple might unveil a watch with a golden sapphire glass tomorrow. The functionality of the wearable device is also a vital aspect. The number of available applications in the market determines how well a wearable device performs. Currently, numerous applications for Android are available on the Play Store.

There are rumours going around that Apple is set to reveal a new platform tomorrow, which will have a variety of specialized apps for their wearable gadgets. It helps enhance the user's experience. Apple will prioritize this topic, and I have full confidence in it. According to sources from Apple, it is expected the company will unveil around 100,000 apps for its wearable platform tomorrow.



Typically, we select the model with the fewest assumptions from the top performers in the data to use as our choice. The complexity of a model is closely related to its usefulness in a learning situation. Below, we will further discuss this connection.

Less complex models are typically broader in their applicability and can be more easily applied in various situations.

Explanation: The meaning of "Let sleeping dogs lie" is to avoid stirring up trouble or causing problems by leaving things as they are having a strong grasp of a few fundamental principles in a subject (simple model) allows for better problem-solving abilities when faced with unfamiliar situations compared to simply memorizing a full 'guidebook' with numerous solved examples (complex model). The second student can quickly solve any problem that resembles one in the guidebook. If faced

with a new and unfamiliar problem that doesn't fit into any of the known 'templates' in the guidebook, the second student would struggle more to solve it compared to the one who grasps the fundamental concepts and can build upon them. A model that can predict with accuracy.

Less complex models need fewer training samples to be effectively trained compared to more complex models, making them easier to train. In the language of machine learning, simpler models have fewer sample requirements.

Less complex models are more resilient; they are less affected by the nuances of the training data set compared to their more intricate counterparts. We are clearly understanding a 'concept' through a model, not the actual training data. Ideally, the model should not depend on the specific training data given, but should instead focus on identifying the fundamental characteristics of the phenomenon that remain consistent across any training data set. It is generally preferable for a model to not be overly sensitive to the details of the dataset it has been trained on. Sophisticated models have a tendency to fluctuate greatly when there are changes in the training dataset. Once again in the realm of machine learning, basic models exhibit minimal variability and strong predisposition, whereas sophisticated models show minimal predisposition and high variability. 'Variance' denotes the variation in the model, while 'bias' is the difference from the anticipated, perfect performance. This occurrence is frequently known as the tradeoff between bias and variance.

More basic models have higher error rates on the training data, but this tradeoff leads to improved predictability. Elaborate models result in overfitting - while they perform effectively with the training data, they perform poorly with different test data.

There has been ongoing debate about the legitimacy of Occam's razor. Critics argue that the principle values simplicity more than accuracy and, because "simplicity" is not clearly defined, it cannot be relied upon for comparison.

BY
Ms. Akalya K – II CSE,
Mr. Kaviraj C – IV CSE.

AI-BASED VIRTUAL ASSISTANT

INTRODUCTION

A technology based on artificial intelligence is referred to as a virtual assistant. The software utilizes the microphone on a device to capture voice commands, and the responses are delivered through the speaker. However, the most thrilling event occurs in the interaction between these two activities. It involves a mixture of various technologies: voice recognition, voice analysis, and language processing. Voice recognition can involve complicated techniques such as neural networks and machine learning. The incoming sound is analyzed, resulting in the formation of a neural network with individual vectors for each letter and syllable. This collection of information is commonly referred to as the data set. The device matches an individual's speech to a vector and identifies the syllables that best match.

2. Working

The book discussed the impact of technology on society, particularly focusing on its effect on communication. Employed

The operation of Virtual Assistant is based on the following guidelines:

a) NLP Definition: Natural Language Processing (NLP) involves using a natural language like English to interact with an intelligent system through AI. NLP processing is necessary for tasks such as having a robot follow your commands or getting advice from a clinical expert system during a conversation.

There are five stages in Natural Language Processing.

Lexical, syntactic, semantic, pragmatic, and integrative analyses are all part of the study of language.

b) Automatic Speech Recognition involves understanding commands based on the user's input.

c) Artificial Intelligence: Gathering user input and storing data on user behavior and relationships. The ability of a system to process information, make decisions, recognize patterns and similarities, acquire knowledge through practice, save and

recall data from memory, tackle challenges, grasp sophisticated concepts, communicate effectively in a language, categorize, make predictions, and adjust to unfamiliar circumstances.

d) Inter Process Communication: Requesting crucial data from other software programs.

3. Benefits

• A VA helps you save both time and money. A virtual assistant simplifies your life.

• A Virtual Assistant provides you with extra time to enjoy your personal life.

• A VA is typically a specialist in the industry.

4. Applications

4. In order to be successful, students must prioritize their studies and dedicate sufficient time and effort to learning and improving their skills. Uses or purposes of something

- The virtual assistant Alexa.
- The digital assistant Siri
- The Google Assistant
- Cortana is a virtual assistant AI developed by Microsoft.
- Bixby voice assistant

5. Future Trends

- Automated voice assistants are becoming increasingly popular.
- AI-powered bots will become increasingly similar to humans.
- Profound understanding of customers to enhance virtual assistant performance.
- Messaging platforms serve as a factor that drives the growth of virtual assistants.

Real World Problem

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.

BY
Mr.Mohamed Sahil - III CSE
Mr. Anbuselvan S – II CSE

COMPOSITION ON AUTO DRIVING VEHICLE

Introduction

Autonomous buses are buses that can operate on roads without any human intervention. This is achieved through the assistance of a detector, camera, radar, and artificial intelligence. The sensors and radar provide information about the environment, which then influences the direction of the maneuver. The auto descry utilizes various elements like business light, road lane, pedestrians walking and crossing the road, etc., while driving.

The robotization society has outlined 6 levels of robotization in buses. Starting at position 0, with no robotization present, to position 1 where one or two functions are automated. Moving to position 2, the bus can drive itself but still requires a human overseer. In position 3, the bus can analyze terrain and complete tasks like parking with human supervision. Finally, in position 4, buses can handle tasks normally done manually by a human driver. The use of geofencing is necessary. People have the ability to give the order. Position 5 enables the buses to operate independently without human supervision and conduct business activities.

Working

AI technologies enable tone-driven autonomous systems. Developers of tone-driven buses utilize large amounts of data from image recognition systems, as well as artificial intelligence and neural networks, to create systems capable of autonomous driving.

The machine learning algorithms are fed with data where patterns are identified by neural networks. The data encompasses

The information consists of images captured by cameras on self-driving buses, which the neural network uses to recognize elements such as street lights, trees, pedestrians, traffic signs, and other objects found along the road in any driving environment.

Google's self-driving car prototype, known as Waymo, utilizes a combination of sensors, lidar, and cameras to perceive its surroundings and anticipate the behavior of objects nearby. This occurs in pieces of a different reality. Maturity plays a crucial role in the functioning of these systems. The system can increase its deep literacy

algorithms' knowledge by driving more, which helps it make more nuanced.

The next section explains the functioning of Google Waymo vehicles.

- The driver (or rider) chooses a destination. The vehicle's software computes a pathway.
- A Lidar detector mounted on the roof of a vehicle scans a 60-degree area around the car, generating a live 3D map of the surrounding terrain.
- A sensor located on the back left wheel detects.
- Lateral shift to determine the car's location in relation to the three-dimensional graph.
- Radar systems located in the front and rear fenders determine the distances to obstacles.
- The AI software in the vehicle is linked to all sensors and gathers data from Google Street View and cameras installed inside the vehicle.
- The AI replicates human sensory and decision-making functions through extensive knowledge and manages behavior in driver control systems, such as steering and brakes.
- The car's software checks Google Charts beforehand to anticipate things such as landmarks, store signs, and traffic lights.
- An override feature is provided for a mortal to assume control of the vehicle.

Advantages

- Minimize the expenses associated with transportation.
- Generates a fresh stream of job opportunities.
- Provide limited independence in mobility for individuals with disabilities.
- Environmentally friendly

Application

Autonomous trucks and vans: Companies like Otto and Starsky Robotics have focused on self-driving trucks. Automating trucks is crucial not just for safety reasons, but also for potential energy savings from platooning. Self-driving vans are currently being created for online grocery delivery services like Ocado. Studies have also shown that improving goods distribution at both macro (civic distribution) and micro levels (last mile delivery) can be achieved by using autonomous vehicles due to their potential for smaller vehicle sizes.

The transport networks in Europe, big cities.

Belgium, France, Italy and the UK have plans to implement automated bus transportation systems, while Germany, the Netherlands, and Spain have approved public testing for commercial use. Public trials of the LUTZ Pathfinder automated vehicle were introduced in Milton Keynes by the UK in 2015. In summer 2015, the French government authorized PSA Peugeot-Citroen to conduct real-life trials in the Paris region. By 2016, they planned to expand the trials to other cities like Bordeaux and Strasbourg. The partnership of French companies THALES and Valeo, who developed the first tone-parking auto system for

Audi and Mercedes premium models, is currently trialing their own system. New Zealand intends to utilize autonomous vehicles for public transportation 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.

BY
Mr. Athithya P – IV CSE,
Mr. Partheepan R – III CSE

AI: THE FUTURE OF HEALTHCARE

Introduction

The utilization of artificial intelligence (AI) and similar technologies is increasing in business, society, and healthcare. This technology has the potential to alter various aspects of patient care and internal administrative processes within payer, provider, and pharmaceutical organizations. AI is expected to become increasingly prevalent in the healthcare industry in the future due to the increasing complexity and expansion of data within the sector. Currently, AI technologies are being utilized by payers, care providers, and life sciences organizations. The primary application categories consist of recommendations for diagnosis and treatment, patient involvement and adherence, and administrative duties. While AI can perform healthcare tasks as effectively as or better than humans in many scenarios, challenges with implementation will delay the automation of healthcare roles for a significant period.

AI types utilized in the healthcare industry.

- Original: The dog ran quickly towards the ball in the park.
- Paraphrased: Quickly, the dog sprinted towards the ball at the park. Machine Learning- Neural Networks and Deep Learning: Neural networks represent a higher level of complexity within machine learning. This technology, in existence since the 1960s and extensively utilized in medical research for many years, is utilized for categorization tasks such as predicting.
- Forecasting whether a patient will develop a particular illness. It addresses problems by considering variables, weights, or "features" that connect inputs and outputs. The comparison to how neurons interpret signals is there, but it doesn't hold up well when compared to how the brain actually functions.
- The company's profits in the second quarter exceeded expectations. The main uses of NLP in healthcare are creating, understanding, and sorting clinical records and research publications. NLP systems have the capability to engage in conversational AI, generate reports (such as those for radiological exams), evaluate unstructured clinical notes regarding patients, and document patient interactions.
- Could you rephrase the next paragraph using identical syntax and vocabulary? Physical robots, such as surgical robots,

provide surgeons with enhanced abilities like improved vision, greater accuracy in making precise incisions, closing wounds, and conducting various surgical procedures. Nevertheless, human surgeons continue to make crucial decisions. Common surgical procedures performed with robotic surgery include gynecologic surgery, prostate surgery, and head and neck surgery.

- Rephrase the text while maintaining the original input language and word count:

- We need to change our approach to the problem in order to find a solution. During the 1980s and subsequent years, the field of artificial intelligence was largely controlled by expert systems that relied on databases containing "if-then" rules. During the last twenty years, they have been widely utilized in the healthcare sector for providing "clinical decision support" and are still commonly used today. Nowadays, many EHR suppliers include a set of guidelines with their systems.

Recent Developments in Healthcare

AI and Machine Learning's current application indicates a promising future full of opportunities. Presently, several major corporations and new companies, like Enlitic, MedAware, and Google, are initiating extensive initiatives to improve AI and ML in healthcare, such as Google's DeepMind Health project and IBM's Avicenna software. Moreover, the Cleveland Clinic and Atrius Health have partnered with IBM's Watson Health to incorporate cognitive computing into their healthcare system, a move that is expected to reduce physician burnout. In recent times, various ML techniques such as k-nearest neighbours, naive and semi-naive Bayes, look ahead feature building, back propagation neural networks, among others, have been tested and enhanced.

The future of artificial intelligence in the healthcare industry.

The main challenge facing AI in different healthcare fields is not assessing if the technologies will be effective enough to provide benefits, but ensuring their adoption in regular medical procedures. AI systems need to be embraced on a large scale.

Regulators must approve them, they need to be compatible with EHR systems, and they have to be standardized to ensure they work similarly to what physicians are taught.

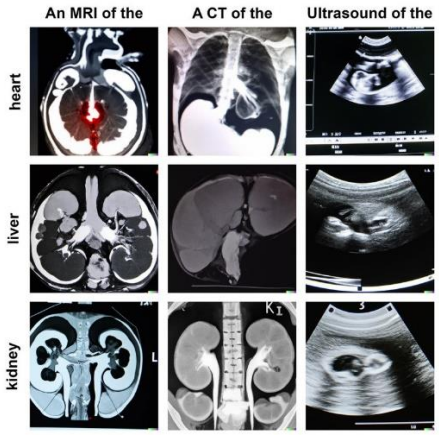
AI in healthcare is transforming the way medical services are delivered, enhancing diagnostic accuracy, personalizing treatment, and streamlining administrative processes. Here's a detailed exploration of how AI is impacting healthcare:

1. Diagnostics and Imaging

AI algorithms have shown remarkable potential in analyzing medical images, often with high accuracy, assisting radiologists in diagnosing conditions from X-rays, MRIs, and CT scans. **Medical Imaging**: AI systems can detect anomalies in medical images, such as tumors or fractures, with precision. For instance, deep learning models can analyze mammograms to identify signs of breast cancer earlier than traditional methods. **Pattern Recognition**: AI algorithms can recognize patterns in images that might be missed by the human eye, improving early detection and diagnostic accuracy for conditions like diabetic retinopathy and age-related macular degeneration.

2. Personalized Medicine

AI is playing a significant role in tailoring medical treatments to individual patients based on their unique genetic, environmental, and lifestyle factors. **Genomic Analysis**: AI can analyze genomic data to identify mutations linked to diseases and predict individual responses to specific drugs. This can lead to personalized treatment plans and targeted therapies.



3. Predictive Analytics

AI-driven predictive analytics can forecast disease outbreaks, patient deterioration, and treatment outcomes, which is crucial for proactive healthcare management. **Risk Prediction**: AI models can predict the risk of diseases such as cardiovascular conditions or diabetes by analyzing patient data, including medical history, lifestyle, and genetic information. This helps in early intervention and preventive care.

CONCLUSION

The future of machine learning involves enhancing decision-making for patients with severe injuries by combining human expertise and knowledge with machine learning technologies.

BY
Mr. Azaarudeen A – III CSE,
Mr. Kaviraj C – IV CSE.

DEEP LEARNING

Introduction

Deep learning is a branch of machine learning which focuses on algorithms that are influenced by the brain's structure and function, known as artificial neural networks. Simply put, it reflects how our brains work. Deep learning algorithms function similarly to the way the nervous system is organized, with interconnected neurons transmitting information to each other.

Deep learning models function through layers, with the minimum amount being three layers in a typical model. Every layer receives data from the one before it and transfers it to the succeeding layer.

Deep learning models excel with large amounts of data while traditional machine learning models plateau in improvement beyond a certain threshold.

"What is the mechanism behind Deep Learning?"

- Deep Learning, utilizing Neural Networks, replicates the intelligence found in animals.
- There are three different layers of neurons within a neural network: the Input Layer, the Hidden Layer(s), and the Output Layer.
- The connections between neurons have a weight that determines the significance of the input value.
- Neurons use an Activation Function to normalize the output from the neuron.
- In order to train a Neural Network, a substantial data set is required.
- Iterating across the dataset and comparing...
- Analyzing the results will generate a Cost Function, showing the discrepancy between the AI's outputs and the actual outputs.
- Following each cycle through the dataset, the weights connecting neurons are modified using Gradient Descent in order to minimize the cost function.

Advantages

Cost efficiency: Although it can be expensive to train deep learning models, they can ultimately help businesses save money by reducing unnecessary spending.

Advanced Analytics: Deep learning, when utilized in data science, can provide more efficient and improved processing models. The continuous enhancement in accuracy and results is propelled by its capability to learn without supervision.

Scalability in deep learning is excellent thanks to its capacity to handle large volumes of data and execute numerous computations efficiently in terms of cost and time.

Self-learning abilities: Deep neural networks with multiple layers enable models to improve in learning intricate features and handling demanding computational tasks.

APPLICATIONS

- Autonomous Vehicles
- Analysis of emotions or opinions

- Digital helper
- Healthcare on social media

Applications and Examples in the Real World

AGRICULTURE: Agriculture will continue to be a vital source of food production in the future, prompting individuals to utilize deep learning and AI tools to enhance efficiency in the process. A 2021 Forbes article disclosed that the agricultural sector plans to spend $4 billion on AI solutions by 2026. Farmers have already discovered several applications for the technology, utilizing AI to identify invasive wild animals, predict crop yields, and operate autonomous machinery.

Blue River Technology has investigated the potential of autonomous agricultural products by integrating machine learning, computer vision, and robotics.

BY
Mr. Ganesh V – IV CSE
Mr. Anbuselvan S – II CSE

COMPUTER VISION IN SPORTS FOR DEVELOPING A SPORTSMAN'S EFFICIENCY

In the present time, Artificial Intelligence and Deep Learning have been incorporated into the sports industry for at least a 5-year period. Computer Vision is increasingly being utilized in a wide range of industries, including the field of sports. It is utilized to improve the viewing experience for any athletic event or organization to become more competitive and attain success. The sports sector has greatly embraced new technology in a short period. In popular sports, it is common to see athletes moving quickly, making it challenging for coaches or analysts to keep up with all the details. The data analysis from these videos needs manual input and involves spending many hours manually taking notes and replaying multiple times. Computer vision can significantly contribute to bridging the gaps between sports and analytics by providing precise and valuable analysis through automated systems that track specific segments in the footage.

Different cameras positioned at certain locations in a sports venue can capture footage of the event, such as the goal post, midline, and boundaries. The camera's placement, its angle, and the equipment needed may differ depending on the sport and specific event. Using these videos, a player's exact location and movements can be identified, along with their direction, which may be challenging for an average person to monitor and follow. Computer vision has addressed some of its limitations by utilizing image processing and distinguishing between ground players and objects.

Tracking of player movements on the field:

One of the main objectives of using computer vision in sports is to monitor players at a specific time. Coaches can quickly evaluate their team's performance or track individual player movement on the field, as well as monitor the team's formation.

The Automated Segmentation method is utilized in computer vision applications in sports to identify the areas that represent players. The outcome derived from implementing Machine Learning and Data Mining Techniques into the raw player tracking data within the computer vision

system. Context on the player's action, such as passing, running, dribbling, or defending, can be established by generating semantic information from the video frame after gathering the information. These methods are known as semantic occurrences. This data can be utilized to analyze a player or team. Suggestions can be created by considering factors such as the player's position, the angle of the kick, and the accuracy of the shot. Coaches can use these statistics to make improvements that will enhance the team's overall performance or an individual player's skills. This player tracking technology, which analyzes and provides suggestions, has the ability to transform team training and enhance efficiency.

The example mentioned above is not restricted to just one sport, such as Football, but can also be extended to other sports such as Basketball.

Sports such as Badminton, Tennis, Table-Tennis, and Cricket can benefit from computer vision technology. An excellent illustration of this was seen during the 2017 Wimbledon tournament, a major tennis event sponsored by IBM. During the tournament, automated systems generated notable moments in the game by collecting information from both spectators and players. GrégoireGentil created a tiny gadget that tracked the speed and placement of shots during a tennis match, signaling when a ball was out of bounds. In the game FIFA Hawk-Eye developed a camera computer vision system with goal detection systems and multiple high-speed cameras. The cameras monitored both goal areas, identifying moving objects that looked like a ball based on their area, color, and shape. They had an accuracy error of 1.5cm and could detect objects in 1 second. The referees were assisted in making decisions when determining if the ball had crossed the goal line.

Obstacles in the field of Computer Vision:

Despite the numerous advantages of Computer Vision, there are still important challenges that must be addressed before its full potential can be realized in sports and analysis fields. One big problem is that optical tracking systems are still unable to adjust to the changing body positions of a person during exercise. It is difficult to track a player because of their fast movements, team sports often have players who look alike, and there is also frequent interaction between players. Despite the rapid improvement in computer power, larger datasets, and the development of new techniques, the field of AI and Computer Vision continues to strive towards achieving capabilities similar to those of humans. In the end, these innovations will conquer the obstacles and become integrated into sports as teams strive to achieve their goals.

Utilize cutting-edge technologies to enhance efficiency and increase competitiveness. There is no doubt that the growth of Computer vision will revolutionize the main aspects of Performance Analysis in sports.

BY
Ms.Gayathri M – II CSE,
Mr. Partheepan R – III CSE.

AMBIENT INTELLIGENCE

Introduction

Through the use of ambient intelligence (AMI), our everyday surroundings are transformed into intelligent and user-responsive spaces. It refers to a system of hidden, smart connections that are able to sense users' presence and adjust their environment to meet our immediate requirements. AmI environments can range widely, including your home, car, office, or a museum you're exploring. These settings have AmI systems that receive data, interact with users, perform intricate reasoning, and control actions in the environment. Data is gathered either manually by people using their sensory perception or automatically by devices such as ultrasonic technology, cameras, and microphones.

Decisions and behaviors made by both humans and artificial intelligence systems such as robots and agents are utilized to influence these surroundings.

The process of evolution.

- AI was first used in physical form, like SNARC, created by Dean Edmonds and Marvin Minsky.
- Neural networks were among the technologies utilized on these systems. The Mycin expert system exemplifies the second stage of AI, where the focus was on computers.
- During the internet boom of the 1990s, multiple search engines and recommendation systems were created with the help of intelligent agents and ontologies.

Connection with artificial intelligence

In AI environments and scenarios, AI methods and techniques can assist in achieving crucial tasks needed for an ergonomic environment.

The new software update will be released next month. It will include several new features and improvements. Recognition of speech:

A microphone is used to capture an electric signal for speech recognition. Signal processing and pattern recognition are employed initially to recognize the phonemes present in the signal. The next stage includes linking sounds and identifying words. Different speech recognition systems are on hand

and can vary in success depending on the user's speaking style.

The boy rode his bike to school every day without fail. The processing of human language through artificial intelligence (AI) techniques.

Natural language input is the term used to describe the outcome of a speech recognition system, keyboard, or written document. The objective of natural language processing is to understand this information. The next step after syntax analysis is semantic analysis. In the field of NLP, the representation of knowledge holds importance. One area in NLP that receives a lot of research is automatic translation systems, which utilize statistical and knowledge-based approaches.

Although she had studied for hours, she still couldn't understand the difficult math problem. Visual processing through computers.

The most advanced sensory system in humans is their sense of sight. Hence, it is essential to have the ability to automate vision. Essentially, computer vision involves solving problems related to geometric reasoning. The area of computer vision encompasses various subjects such as image capture, manipulation, object identification in 2D and 3D, scene interpretation, and image motion analysis. In AimI, computer vision has the potential to be used in a range of different situations. For example, intelligent transportation systems can utilize it to identify traffic problems, traffic flow, or nearby vehicles. Computer vision is able to identify human gestures to operate machinery, as well as facial expressions to interpret emotions.

Prospects for the future

AI is essential in achieving ambient intelligence. AMI environments present the AI community with their next exciting challenge. These days, machine learning is commonly utilized, which means AI will likely have to handle this technology too. One of the prerequisites for AI is learning by observing users. Many systems can interpret user instructions, yet they do not possess the ability to avoid behaving in manners that the user would favor. AI systems can enhance user acceptance by utilizing basic machine learning methods to learn from users.

BY
Ms. Akalya – II CSE,
Mr. Kaviraj C – IV CSE.

AGRI - TECH

Introduction

Farming is a crucial aspect of human existence. The way we grow our food has been a fundamental aspect of society for millennia. However, with the increase in population size, there is also an increase in the need for food, which requires more efficient methods production.

Fortunately, agricultural technology has developed over time to address this issue, and now there are numerous tools and equipment available to assist farmers in completing their tasks more effectively and using fewer resources. This article will delve into seven advancements in agricultural technology

Automation is considered to be critical in agriculture. Using machines allows us to generate a larger amount of food while using less resources. One instance of this is the various kinds of tools utilized for gathering crops. Some machines are able to harvest fruits and vegetables, while there are also grain harvesters that can rapidly gather extensive wheat or corn fields. This assists farmers in decreasing the time and labor required for harvesting their crops, thereby lowering expenses and environmental consequences.

The dog chased the cat around the yard. Irrigation tools and equipment.

Irrigation is another crucial aspect of agricultural technology. To optimize agricultural yield

To produce crops, it's crucial to make sure that plants receive sufficient water. This may pose difficulty in regions with limited or uncertain rainfall. Yet, a variety of devices are available to assist with irrigation now. From small hand pumps to extensive systems that can span entire fields, these devices allow for the timely watering of crops to ensure they receive the necessary moisture.

We will need to postpone the meeting until next week due to scheduling conflicts. Tools for preparing soil

Soil preparation is another crucial aspect of agriculture. The soil must be adequately prepared before planting crops. This may consist of various tasks like cultivating, turning soil, and using fertilizer. Historically, all of these activities were carried out manually or using basic equipment. Nevertheless, there are various machines available nowadays that are capable of automating these tasks, enabling quick preparation of extensive land areas.

Growing crops is also a vital aspect of farming. This was previously a manual task where seeds were individually planted into the ground by hand. Nevertheless, there are numerous varieties of machines available that are capable of planting crops at a faster and more efficient rate.

Ultimately, agricultural technology has the potential to be utilized for monitoring crops as well. Farmers must monitor their crops' condition all through the growing season to ensure a top-notch product. This may include activities like monitoring soil moisture levels, searching for pests or diseases, and evaluating the nutritional requirements of plants. Many machines can now automate these tasks, enabling the monitoring of large land areas quickly.

One example would be the rising popularity of drones in the agriculture sector. Drones offer a fast and simple way to evaluate crop conditions across large areas, giving farmers valuable insights to enhance crop yield and quality.

Precision agriculture is an emerging industry that utilizes technology to assist farmers in maximizing their output. This includes utilizing sensors and data analysis to monitor the status of crops, soil, and water to enhance decision-making on the timing and location for applying fertilizer, pesticide, or irrigation. Farmers can lower inputs and possibly even improve yields by utilizing precision agriculture methods.

Conclusion

To sum up, advancements in agricultural technology have significantly progressed throughout the years. Thanks to automation and precision agriculture methods, farmers can now generate a greater amount of food using less resources. In the future, we will likely witness further progress in this area as farmers discover fresh and creative methods to enhance their output.

BY
Mr. Athithya P – IV CSE
Mr. Anbuselvan S – II CSE

AI REVOLUTIONIZING THE CAR DESIGNING AND MANUFACTURE INDUSTRY

Humans have consistently been involved in the production of cars since their introduction in the 19th century. From the beginning of the design phase to the ultimate release of the product, all the steps were completed by human workers. Over time, workers were aided by advanced technology in carrying out these tasks. In the 21st century, manual labor is gradually being substituted by intelligent machines that need minimal human intervention. Design remains one element of car production that has not been entirely automated and still relies on human input.

Creating has traditionally been a manual process involving techniques such as drawing, shaping clay, or using digital design tools. The process of automotive design involves creating the visual aesthetics of both the interior and exterior, as well as designing the mechanical aspects such as vehicle parts and components. When creating a vehicle, it is important for a designer to consider factors like the fundamental geometry, the dimensional specifications, and the standards in the field.

Although machines aid designers with tasks like digital rendering and prototyping and provide more tools, human creativity and emotions that are reflected in designs cannot be replicated by machines, signifying that humans cannot be entirely substituted by them.

However, recent developments in the area of Artificial Intelligence and Machine Learning are starting to show otherwise.

Design teams can only prototype a few designs due to their restricted access to time, money, and resources. However, it is possible that some designs that do not move on to the prototyping phase could actually result in a product that is lighter, less expensive, and higher quality. This is when the idea of Machine Learning becomes relevant.

Machine Learning is a sector of Artificial Intelligence (A.I.) that concentrates on creating and comprehending techniques that use data to enhance performance on a particular range of tasks. Machine Learning algorithms function by constructing a model using training data, which instructs the model to make predictions and decisions without explicit programming.

Intelligence that focuses on designing algorithms for computers to learn from and make predictions based on data.

Artificial Intelligence (A.I.) dedicated to developing and comprehending techniques that utilize data to enhance effectiveness in a particular group of assignments. Algorithms in Machine Learning create a model using sample data, also known as training data, to enable the model to make predictions and decisions without needing explicit programming.

In the Automotive Design situation, the procedure involves feeding a vast quantity of designs (training data) into the model. The model understands and evaluates these designs, acquiring additional information in the process. The final result is an original design produced by the model.

Another significant aspect of AI utilized in creating cars is the process of making decisions. The engineers and designers will establish specific parameters and rules for the programmers to input into the computer. This is done in order to guarantee that the ultimate design meets the necessary size and scale.

An American hyper car called the Czinger 21C is an example of modern technology in action. The vehicle was created with artificial intelligence and constructed through 3D printing. The artificial intelligence learns countless mechanical principles to create the most efficient design, considering external factors like wind resistance and gravity. This accuracy gives the car the appearance of being created by a person. The process of additive manufacturing also reduces resource usage and is significantly more cost-effective compared to traditional manufacturing methods.

The Czinger 21C is the initial vehicle created entirely by artificial intelligence for mass production.

When combined with Computational Engineering, Artificial Intelligence and Machine Learning are highly effective in designing a car. Machine learning systems can automate various boring design tasks, enabling engineers to enhance their designs and boost efficiency.

Although products made through human labour are more valuable and require more time to produce, using automated machines to manufacture a product quickly is more efficient and suitable for a large number of people. Automated machines and processes operate independently with minimal human or process intervention, yet human input is still necessary to evaluate the value of a design. Therefore, it can be concluded that machines will not fully take over our roles, at least not anytime soon.

BY
Mr. Mohamed Sahil S – III CSE,
Mr. Kaviraj C – IV CSE.

WEB3

Introduction

Prior to delving into Web 3.0, it is important to educate ourselves on the origins and evolution of the Web. Web, also known as WWW (World Wide Web), is a part of the Internet and is commonly referred to as the web. Before Web 3.0 was envisioned by countless technologists, we had Web 1.0 and Web 2.0. Indeed, you are correct, internet

3.0 represents a stage of progression in the development of the Web. In brief, Web 1.0 is the original version of the Internet created by Berners-Lee at CERN in 1990. The founder describes web 1.0 as a web that is only for reading. This implies that web 1.0 enabled us to browse for information and simply read with minimal to no interaction with the web.

Web 2.0 represented a second phase in the growth of the Internet. Within 10-20 years following the introduction of web 2.0, all the basic webpages of web 1.0 were transformed into interactive, socially connected, and user-generated content of web 2.0. Web 2.0 enabled users to generate their own content accessible to a global audience of millions. Key innovations like mobile internet access and social networks have fueled the exponential growth of web 2.0. The innovation of apps like Meta, Twitter, Whatsapp, and Google has allowed for increased online user interaction, making web 2.0 the Read-Write web.

Web 3.0 was named by Gavin Wood, co-founder of Ethereum, as the next phase in the evolution of the internet. This new technology is thought to be effective.

The fundamental concept of Web 3.0 is its decentralization.

- Rather than centralized entities controlling and owning vast portions of the internet, ownership is distributed among those who build and use it.
- No need for permission.
- Everyone has the same opportunities to engage in Web3, with no one being left out.

- It comes with an indigenous payment system.
- It utilizes cryptocurrency to spend and send money online, rather than depending on traditional bank and payment processing systems.
- Have less trust
- It functions by utilizing incentives and economic mechanisms rather than depending on trusted third parties.

And many others. In addition to concepts, there are several important characteristics of Web 3.0.

Built on blockchain technology.

Blockchain enables the development of decentralized apps and services. Using blockchain technology, data and connections between services are decentralized, contrasting with traditional centralized database systems.

Independent and artificially intelligent.

Increased automation is a key aspect of Web 3.0, with AI being the main driving force behind this automation.

Not centralized.

In contrast to the initial two web eras with central governance and applications, Web 3.0 will embrace decentralization. Applications and services will operate in a decentralized manner, without a central authority.

Capable of utilizing cryptocurrency.

The utilization of cryptocurrency is an essential aspect of the Internet.3.0 services predominantly displaces the need for traditional currency.

Up to this point, we have acquired knowledge and understanding of various aspects of Web 3.0 and its characteristics. However, the question still lingers. What is the significance of Web 3.0?

Possession of something.

Web3 provides a new, unprecedented level of ownership over your digital assets. For instance, imagine you're engaging in a web2 game. You buy a virtual item within the game. If your account is deleted by the game creators, you will no longer have access to these items.

Web3 enables direct ownership via non-fungible tokens (NFTs). Nobody has the ability to deprive you of your possession.

Resistance against censorship

There is a significant imbalance in power dynamics between platforms and content creators. Content creators in Web 2.0 must have faith in platforms not censoring them. Your information is stored on the Blockchain in Web3. When you choose to walk away from a platform, your reputation can also be carried along with you.

Organizations that are decentralized and autonomous (DAOs)

Protection against potential harm or danger. Web 3.0 is susceptible to various attacks, such as hard fork, 51% attack, DDoS, DNS hijack, and sniping bots, due to the trustless nature of blockchain technology. Common frauds, such as personalized advertisements, might be effective in the updated setting as well.

BY

Mr.Ganesh V – IV CSE

Mr. Partheepan R – III CSE,

AV1:HISTORY& FUTURE

What is the AV1 video codec?

AV1 is a codec created by the Alliance for Open Media, a group of various companies in the technology industry. Its key advantages include being royalty-free, allowing companies to use it in their software without any cost, and offering significant cost savings compared to VP9 and H264. In 2018, Facebook Engineering conducted tests and found that the AV1 reference encoder achieved 34% higher data compression than libvpx-vp9, 46.2% higher compression than x264 High profile, and 50.3% higher compression than x264 Main profile. For individuals with slower internet connections, they may experience better quality than usual, while those with faster connections can achieve a higher bitrate at the same speed.

The Media Tek Dimensity 1000 became the initial smartphone chipset to offer AV1 decode support, allowing for resolutions of up to 4K at 60 frames per second. The Nvidia Geforce 3000 series supported decoding, the latest Nvidia Geforce 4000 series supports both encoding and decoding, and Samsung's Exynos 2100/2200 both support AV1 decode as well. Backing for AV1 decode in Chromecast HD is gradually increasing within the industry.

Furthermore, YouTube on desktop also has AV1 support, and you can activate it in your account preferences if you have a browser that is compatible. Indeed, the company has created its own silicon for encoding AV1 video to be utilized in data centers for YouTube. The chip, known as "Argos", is a second-generation Video Coding Unit (VCU) that processes uploaded videos on the platform into different compression formats and tailor them for various screen sizes. Google states that the new Argos VCU they developed is capable of processing videos 20 times faster. 33 times more effectively than traditional servers.

The Origin of AV1

Understanding the reason for the creation of AV1 is also crucial. Google developed VP9 as a codec that is free of royalties and available for anyone to use, allowing it to be utilized on any platform or service without additional costs. YouTube utilized the codec on any compatible device.

Back video-on-demand services like Netflix, Twitch, and Vimeo have embraced it because it translates to significant cost savings for Google through decreased bandwidth usage.

Nonetheless, Google started developing VP10, the next version of VP9, as it is motivated to use more efficient compression algorithms in order to decrease the amount of bandwidth its data centers consume. A slight improvement in video compression per video can lead to significant cost reductions and a significant enhancement in user satisfaction when considering billions of video minutes. Google stated they would introduce VP10 in 2016 and follow up with updates every 18 months for consistent advancement. Google eventually began releasing code for VP10, but the company ultimately cancelled VP10 and established the Alliance for Open Media (AOMedia) instead. The Alliance for Open Media is comprised of a variety of companies, ranging from processor designers like AMD and Intel to browser developers such as Google and Microsoft, as well as streaming and videoconferencing services like Netflix and YouTube.

The comparison between AV1 and HEVC/H265

The main contrast between AV1 and HEVC (High-Efficiency Video Coding), also called H.265, lies in the licensing. To enable a product for HEVC support, licenses must be obtained from four patent pools (MPEG LA, HEVC Advance, Technicolor, and Velos Media) and various other companies, some of which do not have standard offerings. Instead of providing usual licensing terms, they insist on you negotiating terms.

The upcoming prospects of AV1 technology

AV1 is expected to lead the way in high-quality compressed video playback, as an increasing number of devices are enabling hardware decoding. With only one desktop browser supporting HEVC and Internet Explorer no longer available, AV1 is poised to become the future go-to codec as the successor to VP9. As support continues to increase, expect to see more and more devices using AV1. Experiment flags related to AV2 are present on the AOM repository, along with a "starting point for AV2 research" added last year, indicating future iterations.

BY
Mr. Azaarudeen A – III CSE,
Mr. Kaviraj C – IV CSE.