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DATA MAVERICKS

DISCOVER. INNOVATE. TRANSFORM

VOLUME 2

JULY'23 - JUNE'24

2023 - 2024

Magazine of
Department of
Artificial Intelligence & Data Science



An aerial photograph of a university campus, featuring several modern, multi-story buildings with flat roofs and large windows. The campus is surrounded by dense green trees and vegetation. The sky is overcast with soft, diffused light. The text "DATA MAVERICKS" is overlaid in the center in a bold, dark blue serif font.

DATA MAVERICKS

DISCOVER. INNOVATE. TRANSFORM

VISION & MISSION

Vision

To uphold aspirants by imparting cognitive learning environment with continuous education, research and industrial collaboration to become inventive Artificial Intelligence and Data Science eminent

Mission

- Providing skill-based education to master the students in problem solving and analytical skills to enhance their niche expertise in the field Artificial Intelligence and Data Science
- Educating the students with the latest technologies to update their knowledge in the field of Intelligent computing
- Enabling students to experience content-based learning with premier quality data science education, research and industrial collaboration
- Guiding students in Artificial Intelligence based research, with an aim to have an ethical impact in the society by tackling societal grand challenges

Message from the HOD's Desk**Dr Sudha S V**PROFESSOR & HEAD
DEPARTMENT OF AI & DS

Greetings to all esteemed readers! We take great pride in showcasing the Department of Artificial Intelligence and Data Science at KPR Institute of Engineering and Technology. Since its inception in the academic year 2020 - 21, our department has been at the forefront of technological advancements and has witnessed remarkable growth. With an initial intake of 60 students for the undergraduate program B.Tech in Artificial Intelligence and Data Science, we have nurtured bright minds to become future leaders in this dynamic field.

Our department's vision is centered on producing technologically adept individuals who not only excel in their technical skills but also embrace human values and Indian ethos. We strongly believe that artificial intelligence is a pivotal source and technique that drives advancements across all domains. Through our rigorous curriculum, cutting-edge research, and industry collaborations, we empower our students to contribute to the ever-evolving world of AI.

The Department of Artificial Intelligence and Data Science takes immense pride in the accomplishments of our faculty and students. We encourage interdisciplinary learning, foster innovation, and promote a culture of curiosity and exploration. As we move forward, we aim to continue making significant contributions to the field of AI and nurture future talents who will shape the world with their skills and ethical approach.

We welcome you to explore the pages of this magazine and delve into the fascinating world of artificial intelligence and data science. Together, let us embrace the limitless possibilities that lie ahead and create a future driven by technology and human values.

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ARUNPRAVIN J S

21AD006

THE RISE OF EDGE COMPUTING: REVOLUTIONIZING DATA PROCESSING

Introduction:

In the rapidly evolving landscape of technology, edge computing has emerged as a game-changer. As the demand for real-time data processing and low-latency applications continues to soar, traditional centralized cloud computing architectures are facing limitations. Enter edge computing—a decentralized approach that brings computation and data storage closer to the edge of the network. This article explores the rise of edge computing, its benefits, and its potential to revolutionize the way we process and analyze data.

1. Definition and Core Principles:

Edge computing involves distributing computational resources to the network's edge, closer to data sources and end-users.

Its key principles include reduced latency, enhanced data privacy and security, bandwidth optimization, and improved reliability.

2. Drivers and Use Cases:

Increasing demand for real-time applications, such as IoT, autonomous vehicles, and augmented reality, is driving the adoption of edge computing.

Use cases span various industries, including healthcare, manufacturing, transportation, and smart cities, where instantaneous data processing and low latency are critical.

3. Benefits of Edge Computing:

Low Latency: By minimizing the distance between data sources and processing, edge computing enables near-instantaneous response times.

Bandwidth Optimization: Local data processing at the edge reduces the need to transmit vast amounts of raw data to the cloud, optimizing network bandwidth.

Enhanced Security and Privacy: Data remains localized and is processed closer to its source, reducing the risk of data breaches and ensuring compliance with privacy regulations.

Reliability and Resilience: Distributed computing architecture enhances system resilience, as individual edge devices can continue to operate even in the event of connectivity issues.

4. Challenges and Considerations:

Infrastructure and Scalability: Deploying edge computing infrastructure requires careful planning, as it involves a network of distributed devices with varying capabilities.

Data Management: Efficient data management and synchronization between edge devices and the cloud are vital for seamless operations.

Standardization and Interoperability: Establishing industry-wide standards and protocols is crucial to enable interoperability between different edge computing solutions.

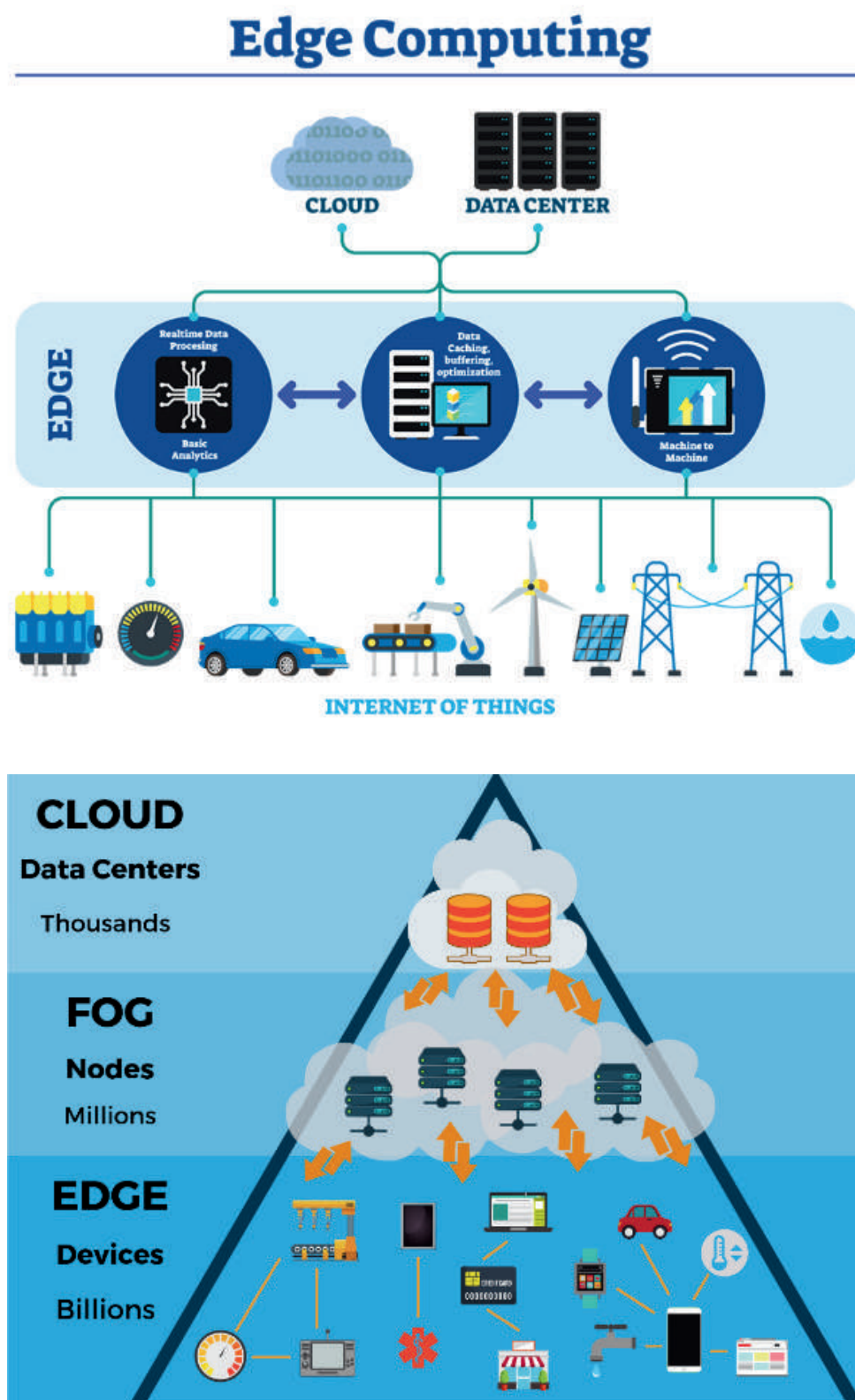
5. Future Outlook:

The proliferation of 5G networks and the Internet of Things (IoT) will fuel the growth of edge computing, enabling more connected devices and real-time applications.

The convergence of artificial intelligence (AI) and edge computing will unlock advanced capabilities, such as real-time analytics, predictive maintenance, and autonomous decision-making.

Conclusion:

As the digital landscape evolves, edge computing stands at the forefront of a data processing revolution. By bringing computation closer to data sources and end-users, this decentralized approach offers significant advantages in terms of latency, security, and reliability. As organizations embrace the potential of edge computing, we can expect a transformative impact across industries, enabling innovative applications and unlocking new frontiers of technological possibilities.





SRI BALAJI.V
21AD045

FUTURE OF QUANTUM COMPUTING

Quantum computing is a revolutionary technology that has the potential to transform computing and solve problems that are currently unsolvable using classical computers. In this article, we will discuss the future of quantum computing, its challenges, and opportunities.

Quantum computing is based on the principles of quantum mechanics, which allows quantum bits or qubits to exist in multiple states simultaneously. This property of qubits makes it possible to perform calculations at an exponential speed compared to classical bits or classical computers.

The Future of Quantum Computing:

The future of quantum computing is exciting, and there are several developments that are expected in the coming years. One of the most significant developments is the increase in the number of qubits in quantum computers. Currently, the most advanced quantum computers have around 100 qubits. However, researchers are working on developing quantum computers with thousands of qubits, which will significantly increase their computing power.

Another significant development is the development of fault-tolerant quantum computers. Currently, quantum computers are highly sensitive to errors and noise, which can cause calculations to fail. Fault-tolerant quantum computers will be able to correct these errors and perform calculations more reliably.

In addition to these technical advancements, quantum computing is also expected to have a significant impact on various fields such as cryptography, finance, healthcare, and materials science.

Challenges of Quantum Computing:

Despite the potential benefits of quantum computing, there are also several challenges that need to be addressed. One of the most significant challenges is the issue of quantum error correction. Since quantum computers are highly sensitive to errors and noise, developing a robust error correction system is essential.

Another challenge is the development of quantum algorithms for practical applications. While quantum computing has shown promise in solving specific problems such as factoring large numbers, developing quantum algorithms for real-world applications is still a significant challenge.

Opportunities of Quantum Computing:

Despite the challenges, quantum computing presents several opportunities for businesses, researchers, and governments. One of the most significant opportunities is in the field of cryptography. Quantum computers can break most of the current encryption methods used to protect sensitive information. Therefore, developing quantum-resistant encryption methods is essential to protect data and communication systems.

Another significant opportunity is in the field of drug discovery and materials science. Quantum computing can simulate complex molecular interactions, which can significantly reduce the time and cost of drug development. Similarly, quantum computing can also help researchers design new materials with specific properties, which can have significant applications in various industries.

Conclusion:

In conclusion, quantum computing is a revolutionary technology that has the potential to transform computing and solve problems that are currently unsolvable using classical computers.

While there are several challenges that need to be addressed, the future of quantum computing is exciting, and it presents several opportunities for businesses, researchers, and governments. As researchers continue to develop more advanced quantum computers and quantum algorithms, the impact of quantum computing is expected to become more significant in the coming years.



ARUN PRAVIN
21AD006

NFT (NON-FUNGIBLE TOKENS)

NFTs, or non-fungible tokens, have been making headlines in recent years as a new way of buying, selling, and trading unique digital assets. NFTs are digital assets that are verified on a blockchain, which means they can be bought and sold like any other asset, but they are unique and cannot be replicated. This has led to a lot of excitement around the potential applications of NFTs, and many people believe they could change the way we think about ownership and value in the digital world.

One area where NFTs are already being implemented is in the world of art. Many artists are now creating and selling NFTs of their digital artwork, which allows them to maintain ownership and control over their work even after it has been sold. This is a significant departure from the traditional art world, where artists often lose control of their work once it is sold.

Another area where NFTs are being used is in gaming. Game developers are now creating NFTs that represent in-game items and assets, such as weapons, skins, and virtual real estate. Players can buy and sell these NFTs on blockchain-based marketplaces, which allows them to own and control their in-game assets in a way that was never possible before.

NFTs are also being used in the music industry. Musicians can now create and sell NFTs that represent their music, which allows them to maintain ownership and control over their work. Fans can then buy and trade these NFTs, which gives them a new way to support their favorite artists.

Another area where NFTs could have a big impact is in the world of sports. Sports leagues and teams could create NFTs that represent digital collectibles, such as game highlights, player cards, and other memorabilia. Fans could then buy and trade these NFTs, which would give them a new way to show their support for their favorite teams and players.

Overall, NFTs have the potential to change the way we think about ownership and value in the digital world. They allow us to own and control digital assets in a way that was never possible before, and they give us a new way to support the creators and artists we love. As more and more industries begin to adopt NFTs, we will likely see even more exciting applications of this technology in the future.



JEEVANANTH T
22ADL03

ETHEREUM

Ethereum is a blockchain-based decentralized platform that enables the development of smart contracts and decentralized applications (dApps). It was proposed in 2013 by Vitalik Buterin and went live in 2015. Ethereum is the second-largest cryptocurrency by market capitalization, after Bitcoin. In this article, we will explore what Ethereum is, how it works, its features, and its potential for the future. What is Ethereum? Ethereum is a decentralized platform that enables the creation of smart contracts and dApps. Smart contracts are self-executing contracts that automatically execute when certain conditions are met.

They run on a decentralized blockchain network, meaning that they are not controlled by any single entity. This allows for the creation of trustless, transparent, and secure applications. Ethereum uses a token called Ether (ETH) as its native currency. ETH is used to pay transaction fees and to incentivize miners to secure the network. It can also be used as a store of value or as a means of exchange. How does Ethereum work? Ethereum is a blockchain-based platform, meaning that it uses a distributed ledger to record and verify transactions. However, unlike Bitcoin, which is primarily used as a digital currency, Ethereum is designed to be a platform for decentralized applications. These applications can be built using smart contracts, which are computer programs that automatically execute when certain conditions are met. Ethereum uses a consensus mechanism called Proof of Work (PoW) to validate transactions and secure the network. In PoW, miners compete to solve complex mathematical puzzles to validate transactions and create new blocks. The first miner to solve the puzzle gets to add the new block to the blockchain and is rewarded with new ETH. However, Ethereum is currently in the process of transitioning to a new consensus mechanism called Proof of Stake (PoS).

In PoS, validators (rather than miners) stake their ETH as collateral to verify transactions and secure the network. Validators are selected randomly to propose new blocks and are rewarded with transaction fees. The switch to PoS is expected to make Ethereum more energy-efficient and reduce its carbon footprint. Features of Ethereum: Smart Contracts: Ethereum enables the creation of smart contracts, which are self-executing contracts that automatically execute when certain conditions are met. They can be used for a wide range of applications, from financial contracts to supply chain management. Decentralized Applications: Ethereum allows for the creation of decentralized applications (dApps) that run on a decentralized network, meaning that they are not controlled by any single entity. This allows for the creation of trustless, transparent, and secure applications. Interoperability: Ethereum enables the interoperability of different blockchains through the use of smart contract

This allows for the creation of cross-chain applications that can leverage the strengths of different blockchains. Upgradability: Ethereum allows for the upgrade of the protocol through the use of hard forks. This means that the platform can be updated to incorporate new features or to fix bugs. Tokenization: Ethereum enables the creation of custom tokens on top of its blockchain. This has led to the creation of a wide range of tokens, from stablecoins to utility tokens. Future of Ethereum: Ethereum is constantly evolving, with new features and upgrades being added to the protocol. The most significant upgrade to Ethereum is the transition to PoS, which is expected to make the platform more energy-efficient and reduce its carbon footprint. Other upcoming upgrades include Ethereum 2.0, which will introduce sharding and improve scalability, and EIP 1559, which will change the way transaction fees are calculated.

Ethereum is also facing competition from other blockchain platforms, such as Polkadot and Cardano, which are designed to addressHere's some more information about:Smart Contracts:

Smart contracts are one of the key features of Ethereum. They are self-executing contracts that automatically execute when certain conditions are met. Smart contracts are written in Solidity, a

programming language specifically designed for Ethereum. They are stored on the blockchain, meaning that they cannot be altered or deleted once deployed.

Smart contracts can be used for a wide range of applications, from financial contracts to supply chain management. For example, a smart contract can be used to automate the process of buying and selling a house. The terms of the contract, such as the purchase price and the closing date, are programmed into the contract. Once the conditions of the contract are met, the contract automatically executes and the ownership of the house is transferred to the buyer.

Decentralized Applications:

Ethereum allows for the creation of decentralized applications (dApps) that run on a decentralized network. This means that they are not controlled by any single entity, making them trustless, transparent, and secure. Decentralized applications can be built using smart contracts and can be used for a wide range of applications, from financial services to social media.

One of the most popular dApps built on Ethereum is Uniswap, a decentralized exchange that allows users to trade cryptocurrencies without the need for a centralized exchange. Another popular dApp is Aave, a decentralized lending platform that allows users to borrow and lend cryptocurrencies.

Interoperability:

Ethereum enables the interoperability of different blockchains through the use of smart contracts. This allows for the creation of cross-chain applications that can leverage the strengths of different blockchains. For example, a smart contract can be used to facilitate the transfer of tokens between Ethereum and another blockchain, such as Bitcoin.

Ethereum also enables the creation of tokenized assets, such as stocks and real estate, on its blockchain. These assets can be traded on decentralized exchanges and can be used to create new financial instruments, such as tokenized bonds and derivatives.

Upgradability:

Ethereum allows for the upgrade of the protocol through the use of hard forks. A hard fork is a change to the protocol that is not backwards-compatible with previous versions. This means that nodes that do not upgrade to the new version will be unable to participate in the network.

Hard forks are used to incorporate new features or to fix bugs in the protocol. However, they can also be contentious, as not all participants may agree on the changes being made. For example, the hard fork that created Ethereum Classic in 2016 was the result of a disagreement over the handling of a hack that resulted in the theft of millions of dollars worth of Ether.

Tokenization:

Ethereum enables the creation of custom tokens on top of its blockchain. These tokens can be used for a wide range of applications, from stablecoins to utility tokens. Stablecoins are tokens that are pegged to the value of a fiat currency, such as the US dollar, and are used as a means of exchange and as a store of value. Utility tokens are tokens that are used to access a specific service or application.

One of the most popular stablecoins on Ethereum is Tether (USDT), which is pegged to the US dollar. Another popular token is Chainlink (LINK), which is used to provide data feeds to smart contracts.

Ethereum is a decentralized platform that enables the creation of smart contracts and decentralized applications. It is designed to be a platform for decentralized finance (DeFi) and has seen explosive growth in recent years. However, Ethereum faces challenges, such as scalability and energy consumption, that must be addressed in order for it to reach its full potential. Despite these challenges, Ethereum is a key player in the blockchain industry

And it is likely to continue to play a major role in the development of blockchain technology and decentralized applications in the future. The Ethereum community is constantly working on new solutions to address its challenges, such as the upcoming Ethereum 2.0 upgrade, which will improve scalability and reduce energy consumption.

As the Ethereum ecosystem continues to evolve, it is likely that we will see new and innovative use cases emerge, such as decentralized finance, decentralized social media, and more. With its focus on decentralization, transparency, and security, Ethereum has the potential to revolutionize many aspects of our lives and create a more equitable and transparent world.





SANTHOSH KUMAR S
21AD037

5G COMMUNICATION

Introduction:

The advent of 5G communication has been touted as a game-changer in the world of wireless networking technology. With promises of faster download and upload speeds, lower latency, and the ability to connect billions of devices, 5G has the potential to revolutionize the way we live and work. In this magazine, we will explore the different aspects of 5G communication, its benefits, and challenges, and its potential impact on various industries.

5G Communication: The Next Frontier in Wireless Networking Technology

The world of wireless networking technology is undergoing a massive shift, with the emergence of 5G communication. This latest iteration of wireless networking technology has the potential to transform the way we live, work, and communicate, with faster download and upload speeds, lower latency, and the ability to connect billions of devices.

So, what exactly is 5G communication, and how does it differ from previous generations of wireless networking technology?

5G communication is the fifth generation of wireless networking technology, following 1G, 2G, 3G, and 4G. While previous generations were primarily focused on improving voice and data services for mobile phones, 5G is designed to connect a wide range of devices, including smartphones, tablets, wearables, smart homes, and autonomous vehicles.

One of the key benefits of 5G communication is its speed. 5G is designed to provide faster download and upload speeds than previous generations of wireless networking technology, with theoretical peak speeds of up to 20 Gbps. This means that you can download a full-length movie in seconds, rather than minutes or hours.

Another important feature of 5G communication is its low latency. Latency is the time it takes for a device to send and receive data over a network, and it is a critical factor for applications that require real-time communication, such as online gaming, video conferencing, and autonomous vehicles. 5G is designed to provide significantly lower latency than previous generations of wireless networking technology, with latency as low as 1 millisecond.

In addition to its speed and low latency, 5G communication is also designed to connect a massive number of devices. With the emergence of the Internet of Things (IoT), there is an increasing demand for networks that can connect billions of devices, from smart homes to industrial sensors. 5G is designed to provide the necessary bandwidth and capacity to connect these devices and enable new applications and services.

So, what are some of the potential applications of 5G communication?

One of the most promising applications of 5G communication is in the field of autonomous vehicles. With 5G's low latency and high bandwidth, it is possible to enable real-time communication between vehicles, traffic lights, and other infrastructure, which can improve safety, reduce congestion, and enhance the overall driving experience.

Another potential application of 5G communication is in the field of healthcare. With the emergence of remote healthcare and telemedicine, there is an increasing demand for networks that can provide reliable and secure communication between patients and healthcare providers. 5G is designed to provide the necessary speed and capacity to enable these applications, while also ensuring the security and privacy of patient data.

In addition to these applications, 5G communication is also expected to have a significant impact on other industries, such as manufacturing, transportation, and entertainment. With faster download and upload speeds, it is possible to enable new forms of entertainment, such as augmented reality and virtual reality, while also improving productivity and efficiency in manufacturing and transportation.

While there are many potential benefits of 5G communication, there are also some challenges that need to be addressed. One of the main challenges is the cost of deploying 5G infrastructure, which requires significant investment in new antennas, towers, and equipment. Another challenge is ensuring the security and privacy of the data transmitted over 5G networks, which requires robust encryption and authentication mechanisms.

In conclusion, 5G communication is the next frontier in wireless networking technology, with the potential to transform the way we live, work, and communicate. With its faster download and upload speeds, lower latency, and the ability to connect billions of devices, 5G is expected to enable new applications and services that were previously impossible.

Conclusion:

5G communication is poised to revolutionize the world of wireless networking technology, providing faster download and upload speeds, lower latency, and the ability to connect billions of devices. While there are still challenges to overcome, the potential benefits of 5G are significant and far-reaching. This magazine has provided an in-depth look at 5G communication, its benefits and challenges, and its potential impact on various industries. As we move forward into the future, it will be exciting to see how 5G continues to develop and shape our world.





VIGNESH KUMAR M
21AD057

NETWORK SECURITY IN A CLOUD ERA

This article is a result of me hearing this sentence uttered in a serious setting:

'We do not need networking or network security; we have all of our infrastructure in the cloud.'

This provoked me somewhat, since I disagree with everything in the above sentence. The network and network security have never been more important, especially since much of our earlier on-prem infrastructure is now running in the cloud.

I have personally had clients that have used developers to create a new CMS on one of the big cloud vendors, with the result that the infrastructure the CMS was using all ran in the same VLAN with full access between the various servers and no thought to the design of the underlying network or the security needed for the virtual network. The client's thinking was that cloud was software, so a developer was enough to create the new CMS. Suffice to say the assessment I was hired to perform on the new CMS resulted in the client having to scrap the implementation and recreate it with proper design on the network layer and implementation of security at this same layer.

Yes, network security is crucial when using cloud services. Cloud computing involves storing and processing data on remote servers that are accessible over the internet. As a result, it's important to ensure that the data and applications hosted in the cloud are secure and protected against unauthorized access or attacks.

Key considerations for multi-cloud deployments

Most of the clients I am interacting with daily are using more than one cloud vendor. Network security in a multi-cloud setting is even more important than in a single cloud environment because it involves managing security across multiple cloud platforms. Here are some key considerations for network security in a multi-cloud environment:

Centralized management: A centralized management approach can help ensure consistent security policies and configurations across all the cloud platforms. This can be achieved through tools such as a Security Information and Event Management (SIEM) system or a cloud security platform that integrates with multiple cloud providers.

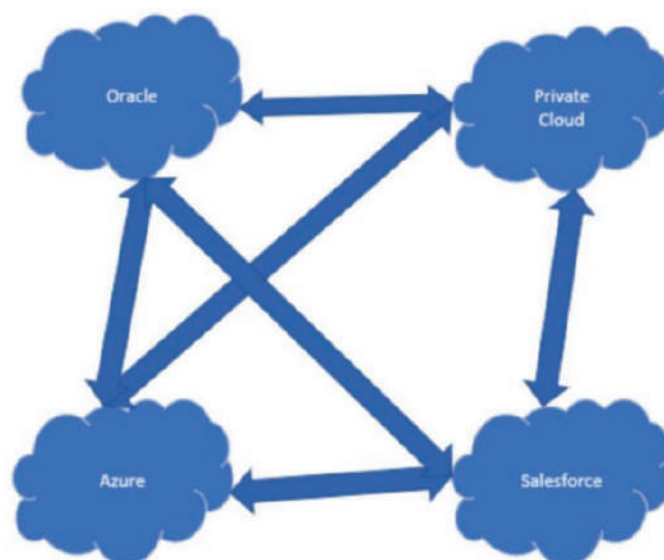
Segmentation: Segmenting networks in a multi-cloud environment can help reduce the attack surface and limit the impact of a security breach. This can be achieved through tools such as Virtual Private Clouds (VPCs), which provide isolation between different cloud resources and allow for the creation of separate network segments.

Access control: Access control is critical in a multi-cloud environment to ensure that only authorized users and devices have access to cloud resources. This can be achieved using multi-factor authentication, role-based access control, and other access control mechanisms.

Encryption: Encryption can help protect data as it moves between different cloud providers and as it's stored in the cloud. This can be achieved using Transport Layer Security (TLS) and other encryption protocols.

Monitoring and logging: Monitoring and logging can help detect security incidents and provide visibility into the security posture of the multi-cloud environment. This can be achieved through tools such as SIEM systems, which can consolidate logs and events from different cloud providers.

See the figure below:



Network security and traffic control are vital in the above setting. If there are applications that are running on top of multiple different cloud vendors, this importance is only increasing, especially if the application and its data are critical to the business environment.

Key considerations for Infrastructure-as-a-Service

I would argue that network security is important in SaaS and PaaS services as well, but here I will elaborate on the IaaS case. In an Infrastructure-as-a-Service (IaaS) setting, network security is essential for protecting the underlying infrastructure, applications, and data hosted on the cloud. Here are some key considerations for network security in an IaaS setting:

Firewall protection: A firewall can be used to restrict traffic to and from the IaaS infrastructure. This can be achieved using network security groups, which can be configured to allow or deny traffic based on a set of rules.

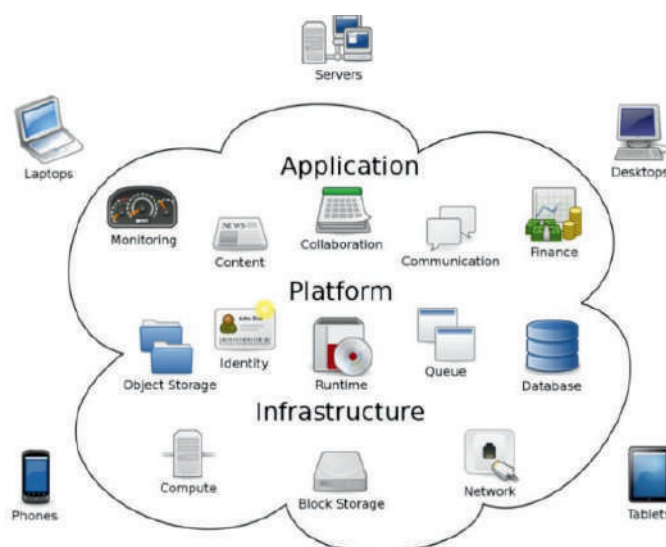
Access control: Access control is critical in an IaaS environment to ensure that only authorized users and devices have access to cloud resources. This can be achieved using multi-factor authentication, role-based access control, and other access control mechanisms.

Encryption: Encryption can help protect data as it moves between different cloud providers and as it's stored in the cloud. This can be achieved using TLS and other encryption protocols.

Network segmentation: Segmenting networks in an IaaS environment can help reduce the attack surface and limit the impact of a security breach. This can be achieved through tools such as VPCs, which provide isolation between different cloud resources and allow for the creation of separate network segments.

WHEN ADDING THE CONSIDERATION THAT AN ON-PREM NETWORKING INFRASTRUCTURE IS IMPORTANT FOR ACCESSING THE CLOUD, I SHOULD THINK THAT THE NETWORK AND NETWORK SECURITY IS BECOMING AN EVEN MORE CRITICAL COMPONENT FOR ANY BUSINESS, NOT LESS OF ONE.

See the figure below:



SOURCE: FILE:CLOUD COMPUTING.SVG – [HTTPS://EN.WIKIPEDIA.ORG](https://en.wikipedia.org)

CONSIDERING THE NUMBER OF DEVICES THAT CAN BE USED TO ACCESS CRITICAL CLOUD RESOURCES, AS WELL AS THE FACT THAT NOT ALL THESE DEVICES ARE UNDER THE CONTROL ON THE BUSINESS/ORGANIZATION, THE ONLY WAY WE CAN EXERCISE ANY FORM FOR CONTROL ON WHAT THE DEVICES ARE DOING, IS THE NETWORK LAYER.

SECURITY AT THE NETWORK LAYER IS ESSENTIAL FOR PROTECTING DATA AND PREVENTING UNAUTHORIZED ACCESS TO network resources. With zero-trust becoming more and more important in many organizations, skipping out on security at the networking layer is a monumental mistake to my mind, since the networking layer is the foundation for all of the various zero-trust steps above.



DHANUSH KUMAR M
22ADL02

TELEPORTATION

Introduction:

Teleportation, a concept deeply rooted in science fiction, has captured the imaginations of people for decades. The idea of instantly moving from one place to another without physical travel has fascinated both scientists and enthusiasts alike. In this article, we delve into the realm of teleportation, exploring its origins, the scientific principles behind it, current advancements, and the exciting possibilities it holds for the future.

Defining Teleportation

Teleportation can be broadly defined as the instantaneous transportation of an object or individual from one location to another, bypassing the traditional methods of travel. While teleportation has been a staple in works of fiction, such as "Star Trek," realizing it in the real world presents significant scientific challenges

Quantum Mechanics and Teleportation

1. Quantum Entanglement: Quantum mechanics, the branch of physics that deals with the behavior of particles at the microscopic level, plays a crucial role in understanding teleportation. Quantum entanglement, a phenomenon where two particles become intricately connected, regardless of the distance between them, forms the foundation of teleportation.

1. Quantum Teleportation Protocol: In 1993, physicists Charles Bennett and Gilles Brassard proposed a groundbreaking concept known as quantum teleportation. It involves using entangled particles to transmit the quantum state of one particle, known as the "sender," to another particle, known as the "receiver," located at a distant location. The original particle is destroyed in the process, while the receiver assumes its quantum state, effectively teleporting the information

Advancements in Teleportation

1. Quantum Teleportation of Particles: In recent years, scientists have successfully achieved quantum teleportation of particles over varying distances. In 2017, a team of Chinese scientists teleported a photon from Earth to a satellite in space, covering a distance of over 1,200 kilometers. This achievement marked a significant milestone in the development of teleportation technology.

1. Quantum Teleportation of Information: Researchers have also made progress in teleporting information encoded in quantum states. In 2020, a team of scientists from the University of Science and Technology of China successfully teleported quantum information across a distance of 27 miles (44 kilometers) using entangled photons.

Challenges and Limitations

- **Complexity of Quantum Systems:** The nature of quantum systems presents immense complexity and challenges in achieving large-scale teleportation. Ensuring the entanglement and preservation of quantum states over long distances and with multiple particles remains a significant hurdle.
- **No-Cloning Theorem:** The no-cloning theorem in quantum mechanics states that it is impossible to create an exact copy of an unknown quantum state. This poses limitations on teleporting complex systems, as complete knowledge of the system's quantum state is required for successful teleportation.
- **Energy Requirements:** The energy requirements for large-scale teleportation, considering the complexities of quantum systems, are currently beyond our technological capabilities. Overcoming this hurdle is crucial for practical implementation.

The Future of Teleportation

- **Quantum Internet:** The development of a quantum internet, where quantum information can be transmitted securely over long distances, holds immense potential for teleportation. By establishing reliable quantum communication networks, teleportation could become a reality on a larger scale.
- **Quantum Computing and Simulation:** Teleportation could find applications in quantum computing and simulation. The ability to transmit quantum states between quantum computers could enhance computational power and facilitate complex simulations in various fields, including material science, drug discovery, and cryptography.
- **Teleportation in Space Exploration:** Teleportation could revolutionize space exploration by enabling near-instantaneous communication and transportation between distant celestial bodies. It could significantly reduce travel times and enable real-time exploration and collaboration with astronauts or robotic missions in space.
- **Teleportation in Healthcare:** In the field of healthcare, teleportation could have transformative effects. Instantaneous transportation of medical supplies, organs for transplantation, or even remote surgeries performed by experts from a distance could revolutionize healthcare delivery, particularly in remote or underserved areas.
- **Teleportation in Virtual Reality:** Teleportation could enhance virtual reality experiences by allowing users to physically move within virtual environments. This would create a more immersive and realistic virtual experience, blurring the line between the real and the virtual.
- **Ethical and Societal Implications:**
 - The realization of teleportation technology raises important ethical and societal considerations that must be carefully addressed:
 - **Privacy and Security:** Teleportation of individuals or information could pose significant privacy and security risks. Safeguarding against unauthorized teleportation, potential misuse, and protecting personal information becomes paramount.
 - **Inequality and Accessibility:** Teleportation, if developed, should be accessible to all, regardless of socioeconomic status. Ensuring equitable access and preventing the exacerbation of existing inequalities must be a priority.

Cultural and Environmental Impacts: Teleportation could have profound cultural and environmental implications. The eradication of physical travel could disrupt tourism, transportation industries, and local economies. Additionally, the environmental impact of teleportation technology, including energy consumption and carbon emissions, should be carefully considered.

Conclusion

Teleportation, once confined to the realms of science fiction, continues to captivate the imagination of scientists, researchers, and enthusiasts. While significant progress has been made in teleporting particles and quantum information, achieving large-scale teleportation of complex systems remains a formidable challenge. However, ongoing advancements in quantum mechanics, the development of quantum communication networks, and breakthroughs in teleportation technology offer glimpses of a future where teleportation may become a reality. As we explore the possibilities and tackle the ethical and societal implications, teleportation stands as a symbol of humanity's ongoing quest to transcend the boundaries of space and time.





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20AD004

The Role of Artificial Intelligence in Revolutionizing the Stock Market

Introduction:

Artificial Intelligence (AI) has emerged as a powerful force in transforming various industries, and the stock market is no exception. With its ability to analyse vast amounts of data, detect patterns, and make accurate predictions, AI has revolutionized how trading and investing are conducted. In this article, we will explore the significant impact of AI on the stock market, from automated trading algorithms to sentiment analysis and risk management.

1. Automated Trading Algorithms:

One of the most notable applications of AI in the stock market is the development of automated trading algorithms. These algorithms use sophisticated AI models to analyse market data, identify trends, and execute trades with minimal human intervention. By leveraging AI's ability to process vast amounts of data in real-time, these algorithms can make split-second decisions to buy or sell stocks, optimizing trading strategies and capitalizing on market opportunities. This has led to increased efficiency and improved trade execution, benefiting both institutional investors and individual traders.

2. Predictive Analytics:

AI-powered predictive analytics has become a game-changer in stock market analysis. Traditional methods of analysing financial data often rely on historical trends and statistical models. However, AI algorithms can go beyond these limitations by utilizing machine learning techniques to uncover complex patterns and relationships in large datasets. By considering a wide range of variables, including market indicators, news sentiment, and even social media trends, AI algorithms can generate highly accurate predictions about stock prices and market movements. This empowers traders and investors with valuable insights to make informed decisions and maximize their returns.

3. Sentiment Analysis:

Sentiment analysis, another application of AI, plays a crucial role in understanding and gauging market sentiment. By analysing news articles, social media posts, and other textual data, AI algorithms can determine the overall sentiment around a particular stock or market. This information can help traders and investors assess market trends and make informed decisions accordingly. Sentiment analysis also allows for the detection of unusual market behaviour, such as sudden shifts in sentiment towards a particular stock, enabling proactive risk management and strategy adjustment.

4. Risk Management:

AI has significantly enhanced risk management practices in the stock market. Through advanced machine learning algorithms, AI can analyse historical data, identify patterns of risk, and provide risk mitigation strategies. AI models can assess portfolio risk, optimize asset allocation, and generate risk-adjusted performance measures. Additionally, AI-powered algorithms can monitor market conditions, detect anomalies, and trigger risk alerts, enabling proactive risk management and minimizing potential losses. By leveraging AI's capabilities in risk analysis, investors can make more informed decisions and protect their investments

5. Market Surveillance and Compliance:

The stock market operates under strict regulations to ensure fair trading practices and prevent fraudulent activities. AI plays a crucial role in market surveillance and compliance by monitoring trading activities, detecting suspicious patterns, and identifying potential market manipulation or insider trading. AI algorithms can analyse vast amounts of trading data, flag irregularities, and provide regulators with valuable insights to investigate and take appropriate actions. This helps maintain market integrity and investor confidence.

Conclusion:

Artificial Intelligence has transformed the stock market by providing powerful tools and insights to traders, investors, and regulators. From automated trading algorithms that optimize trade execution to predictive analytics that enhance decision-making, AI has revolutionized the way the stock market operates. By leveraging AI's capabilities in sentiment analysis, risk management, and compliance, market participants can make more informed decisions, mitigate risks, and ensure fair and efficient trading practices. As AI continues to evolve, it will undoubtedly play an increasingly critical role in shaping the future of the stock market.



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THE MOST ICONIC MOMENTS IN FOOTBALL HISTORY

"Joga Bonito , the beautiful game"! Football has become an emotion for people all over the world. Football is game that emphasizes beauty and unity. Football is the greatest sport of all time. Football is second to none. This game has given a lot of players to the world who are being worshipped and praised as GODS! From Pele announcing himself on the world stage as a teenager to Maradona's infamous "Hand of God" , here are the top 5 moments in the history of football. The below moments are not ranked by order.

1.Diego Maradona's "Hand of God" Goal:



Diego Armando Maradona , who is considered the GOD of football was very cheeky in the 1986 world cup final. Maradona's legendary hand-ball goal vs the Three lions is widely considered more than just a goal . His goal won the world cup for Argentina and was praised by the fans.

2.Zidane Headbutts Marco Materazzi:



This one was built for headaches and also , this part of the article will never be favored by the Les blues . Zizou's last world cup appearance ended abruptly with a legendary incident by headbutting his opponent , Marco Materazzi which made lose the world for him and country.

3. Manchester City's Sergio Aguero Scores Last Minute:



This photo still gives goosebumps to the Manchester City fans, while it gives their city rivals recurring nightmares. The former needed to win at home to beat United to the title two seasons ago, but it was not going to plan, with the sides drawing.

Enter Sergio Aguero. The Argentine striker who converted a pass from Mario Balotelli and fired home to deliver a much anticipated Premier League crown to the club.

4. Pele's Last World Cup:



It was almost poetic that Pele started off his World Cup venture with a debut goal, and ended it also with a goal. Well, two goals. Nothing less to expect from the player whose dribbling skills led to football being called The Beautiful Game.

5. The ERA of the GOATS:



The undisputed goats of the game, Leo and Cristiano faced each other from 2008 – present and this rivalry is considered the best rivalry of the sporting world. This has created a lot of ruckus among the football community.



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The Science Behind Athlete Performance

As spectators, we often marvel at the incredible physical feats that athletes are able to perform. Whether it's a record-breaking sprint, a gravity-defying dunk, or a perfectly executed routine. From nutrition to training methods to mental preparation, there is a wealth of research that has been conducted to help athletes perform at their best. the key factors that contribute to athletic success.

Nutrition

It's no secret that what you eat has a significant impact on your physical health and performance. Athletes require a diet that is tailored to their specific needs in order to fuel their bodies for optimal performance. This means consuming a balanced mix of carbohydrates, proteins, and fats, as well as vitamins and minerals. Carbohydrates are particularly important for athletes, as they provide the energy needed for high-intensity exercise. Protein is essential for building and repairing muscles, while fats are necessary for energy storage and hormone production. Athletes also need to stay hydrated as even mild dehydration can negatively impact performance.

Training

Athletes must engage in specific training regimes to hone their skills and prepare their bodies for competition. Training can take many different forms depending on the sport but generally involves a combination of strength training, cardiovascular exercise, and skill-specific drills. Strength training is essential for building muscle mass and improving overall strength, while cardiovascular exercise improves endurance and cardiovascular health. Skill-specific drills are necessary to improve technique and master the specific skills required for the sport.

Mental Preparation

Athletic performance is not just about physical ability - mental preparation is just as important. Athletes must be able to maintain focus and composure under pressure, as well as develop effective coping strategies for dealing with stress and setbacks. Visualization techniques, meditation, and positive self-talk can all be effective tools for mental preparation. Athletes must also learn to manage their emotions effectively, as fear, anxiety, and frustration can all impact performance.

Conclusion

Athletic performance is a complex interplay of many different factors, from nutrition to training to mental preparation. By understanding these factors and incorporating them into their training regimes, athletes can optimize their performance and achieve their full potential. As sports fans, we can continue to marvel at the incredible feats of athleticism on display, knowing that they are the result of years of hard work, dedication, and scientific research.



ADITHYA S
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Exploring Different Cultures and Promoting Cultural Understanding

Introduction:

In our increasingly interconnected world, understanding and appreciating different cultures has become more important than ever. Cultures shape our identities, beliefs, values, and traditions, creating a rich tapestry of human diversity. Exploring different cultures and promoting cultural not only broadens our horizons but also fosters empathy, respect, and harmony in a global society. This article delves into the significance of cultural exploration and provides insights into how we can promote cultural understanding.



The Beauty of Diversity:

Cultural exploration allows us to celebrate the beauty of diversity. Every culture is unique, with its customs, languages, art forms, cuisine, and rituals. By immersing ourselves in different cultures, we gain a deeper appreciation for the myriad ways of human expression and existence. It teaches us that there is no single "right" way to live, broadening our perspectives and challenging stereotypes.

Breaking Down Stereotypes:

Exploring different cultures helps break down stereotypes and dispel prejudices. Stereotypes often arise from ignorance or limited exposure to diverse cultures. Engaging with different cultures allows us to challenge preconceived notions, replace stereotypes with authentic understanding, and recognize the shared humanity that underlies our differences. By breaking down stereotypes, we promote inclusivity, respect, and harmony among diverse communities.

Diversity:

Diversity is the essence of our world, encompassing a vast range of characteristics, perspectives, and experiences. It is through diversity that we can tap into the full potential of human innovation, creativity, and collaboration. In this article, we explore the significance of diversity, its benefits, and how embracing diversity can foster a more inclusive and thriving society.

Building Empathy and Tolerance:

Cultural exploration fosters empathy by enabling us to walk in someone else's shoes. It allows us to understand the historical, social, and cultural contexts that shape people's lives. By experiencing different customs, traditions, and perspectives, we develop empathy towards others and cultivate a sense of tolerance for diverse ways of living. This empathy and tolerance are essential for building bridges and fostering peaceful coexistence in an interconnected world.

Cultural Exchange and Learning:

Engaging in cultural exchange programs, travel, or even virtual interactions provides opportunities for learning and personal growth. By engaging with people from different cultures, we can learn from their experiences, gain new knowledge, and challenge our own assumptions. Cultural exchange facilitates mutual understanding and respect, encouraging us to question our biases and embrace .

Enhancing Global Communication and Collaboration:

In an increasingly globalized world, effective communication and collaboration across cultures are vital. Exploring different cultures equips us with intercultural communication skills, allowing us to navigate cultural differences respectfully and effectively. Understanding cultural nuances enhances our ability to work collaboratively in diverse teams, whether in business, academia, or social settings. It enables us to bridge cultural gaps, resolve conflicts, and foster cooperation for shared goals.

Promoting Cultural Sensitivity:

Cultural exploration goes hand in hand with promoting cultural sensitivity. It encourages us to approach different cultures with curiosity, respect, and a willingness to learn. We should strive to be mindful of cultural appropriation, stereotypes, and practices that may perpetuate cultural insensitivity. By engaging in responsible cultural exploration, we can promote mutual respect, appreciation, and ethical engagement with diverse cultures.



Conclusion:

Exploring different cultures and promoting cultural understanding is an enriching and transformative journey. It allows us to embrace diversity, break down stereotypes, and foster empathy and tolerance. By engaging in cultural exchange, learning, and promoting cultural sensitivity, we contribute to a more inclusive and harmonious global society. Let us celebrate the beauty of human diversity and embrace the power of cultural understanding to create a world that cherishes and respects the richness of every culture.



PRNAV V J
21AD026

DATA ANALYTICS

What is Data Analytics?

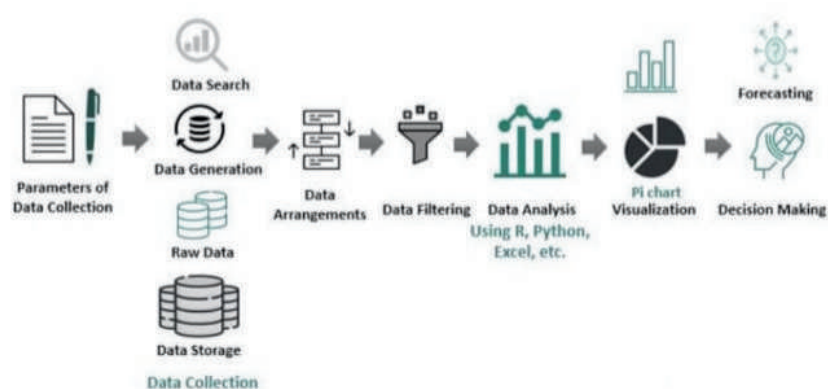
Hey, have you heard about data analytics? It's a way for businesses to analyze information to make better decisions and improve their performance. Basically, they take all this data they have, like sales numbers and customer preferences, and use it to find patterns and trends that can help them figure out what to do next.

Types of Data Analytics

There are different types of data analytics. Descriptive analytics looks at past data to see what's happened. Predictive analytics tries to predict what will happen in the future based on past data. Prescriptive analytics helps businesses make decisions about what to do to reach a certain goal.

Need of Data Analytics

In today's fast-paced and data-driven world, businesses and organizations need to make quick and informed decisions to stay competitive. This is where data analytics comes in. By using advanced techniques and tools to analyze large amounts of data, businesses can gain insights into customer behavior, market trends, and operational performance. With this information, they can make more informed decisions and optimize their strategies to achieve their goals. Data analytics is also essential for identifying and mitigating risks, detecting fraud, and improving overall efficiency. Without data analytics, businesses risk falling behind their competitors and missing out on valuable opportunities.



Challenges of Data Analytics

While data analytics offers numerous benefits to businesses, there are also some significant challenges that organizations face when implementing data analytics programs. One of the main challenges is ensuring the quality and accuracy of data. If the data being analyzed is inaccurate or incomplete, it can lead to incorrect insights and decision-making. Another challenge is finding and retaining skilled data analysts and data scientists who have the expertise to work with complex data sets and implement advanced analytics techniques. Data security is also a major concern, as sensitive information is often involved in the data analysis process. Finally, organizations may struggle to develop a data-driven culture and make data-based decisions across all levels of the organization. Addressing these challenges is crucial to the successful implementation of data analytics programs and to realizing the full potential of data-driven decision-making.

Data Analytics Life Cycle



Role of Artificial Intelligence in Data Analytics

Data Processing and Preparation : AI and ML can help with the pre-processing and preparation of data for analysis. For example, ML algorithms can be used to identify and remove data outliers, impute missing values, and standardize data formats.

Predictive Analytics : ML algorithms can be used to build predictive models that can identify patterns and trends in data. For example, these algorithms can be used to predict customer behavior, detect fraud, or forecast sales.

Natural Language Processing (NLP) : NLP is a branch of AI that focuses on understanding and processing human language. NLP algorithms can be used to analyze customer reviews, social media posts, and other unstructured data sources to gain insights into customer sentiment and behavior.

Recommender Systems Recommender systems are a type of AI that provides personalized recommendations to users based on their preferences and behavior. These systems are commonly used in e-commerce, entertainment, and other industries to provide tailored recommendations to customers.

Image and Video Analysis : AI and ML algorithms can be used to analyze visual data, such as images and videos, to identify patterns and features that humans may not be able to detect. For example, these algorithms can be used to analyze medical images to identify early signs of disease.

Top Online Certifications for Data Analytics

1. AWS Certified Data Analytics
2. CompTIA Data Analytics Plus certification
3. IBM Data Analyst Professional Certification
4. Google Data Analytics Professional Certification
5. Microsoft Certified: Power BI Data Analyst Associate
6. SAS Statistical Business Analyst Professional Certificate

Conclusion

Overall, data analytics is becoming really important for businesses who want to stay competitive. By using the data they have and analyzing it in the right way, they can make better decisions and improve their performance. AI and ML are becoming increasingly important in data analytics. They provide powerful tools for processing, analyzing, and gaining insights from large and complex datasets, which can help businesses make better decisions and improve their performance.



VAINAV S
21AD056

MEMECOINS: THE RISE OF CRYPTOCURRENCY'S HUMOROUS COUSIN

INTRODUCTION:

The world of cryptocurrency has been expanding rapidly in recent years, with new coins and tokens launching every month. While most of these projects are serious endeavors with serious goals, a new type of cryptocurrency has emerged that takes a more lighthearted approach. These coins, known as memecoins, have become increasingly popular in the crypto community, and have even gained traction in mainstream media. In this article, we will explore what memecoins are, how they work, and their potential implications for the future of cryptocurrency.

What are memecoins?

At their core, memecoins are cryptocurrencies that are based on popular internet memes. They are typically created as a joke or a parody of other cryptocurrencies, and often feature humorous or absurd branding. Memecoins are not intended to be taken seriously, but rather to provide entertainment and social commentary.

The first memecoin to gain widespread attention was Dogecoin, which was created in 2013 as a joke based on the popular "Doge" meme. Despite its humorous origins, Dogecoin quickly gained a devoted following, and has since become one of the most well-known and widely-used cryptocurrencies. Since then, dozens of other memecoins have been created, including Shiba Inu (another dog-based meme), PepeCoin (based on the "Pepe the Frog" meme), and Garlicoin (which bills itself as "the garlic bread of cryptocurrencies").

How do memecoins work?

Like other cryptocurrencies, memecoins use blockchain technology to secure and verify transactions. They are typically created using a fork of an existing cryptocurrency, and often have a fixed supply of coins to ensure scarcity. Memecoins are typically traded on decentralized exchanges (DEXs), where users can buy and sell them for other cryptocurrencies or fiat currency.

One of the unique features of memecoins is their marketing and branding. Memecoins often have humorous or absurd names and logos, and are promoted through social media and internet forums. Some memecoins even have their own memes or catchphrases that are used to promote the project. For example, Dogecoin's branding includes the iconic Shiba Inu dog, and the catchphrase "much wow, very crypto".

What are the implications of memecoins?

While memecoins are primarily intended to be a joke or a parody, they have raised some interesting questions about the future of cryptocurrency. One of the key concerns is whether memecoins are a legitimate form of investment, or simply a speculative bubble. Many memecoins have seen their value skyrocket in a short period of time, only to crash just as quickly. This has led some experts to warn that memecoins are a risky investment, and that investors should approach them with caution.

Another concern is whether memecoins could potentially undermine the credibility of cryptocurrency as a whole. Some critics argue that the proliferation of memecoins could create a situation where the line between serious and humorous cryptocurrencies becomes blurred, making it difficult for investors to differentiate between legitimate projects and scams.

Despite these concerns, memecoins have become an increasingly popular part of the cryptocurrency landscape. While they may not have the same serious goals as other cryptocurrencies, memecoins have captured the attention of millions of people around the world, and have become a unique form of social commentary and entertainment. Whether memecoins will continue to thrive in the years to come remains to be seen, but they have certainly made their mark on the world of cryptocurrency.

In addition to their potential implications for the future of cryptocurrency, memecoins also have some unique characteristics that set them apart from other cryptocurrencies.

One of the defining features of memecoins is their community. Memecoins often have large and passionate fan bases, who are drawn to the coins' humorous branding and social commentary. These communities can be found on social media platforms like Reddit, Twitter, and Telegram, where users share memes, discuss price movements, and speculate about the future of the project. Some memecoins even have their own dedicated subreddits or Discord servers, where users can connect with like-minded individuals.

Another interesting aspect of memecoins is their use cases. While many cryptocurrencies are designed to be used as a medium of exchange or a store of value, memecoins often have more niche use cases. For example, Dogecoin has been used to tip content creators on social media platforms, while Garlicoin has been used to fund community-driven projects like charity fundraisers and game development. Memecoins are often used as a way to express support for a particular community or cause, rather than as a serious investment.

Despite their lighthearted nature, memecoins have also been involved in some serious events. For example, during the GameStop stock controversy in early 2021, Dogecoin became a symbol of resistance against traditional finance and Wall Street. The coin's value skyrocketed as users on social media platforms like Reddit and Twitter encouraged others to buy and hold the coin as a way to stick it to the "big guys". While the Dogecoin bubble eventually burst, the episode highlighted the potential power of memecoins as a form of collective action.

Conclusion:

memecoins are a unique and often entertaining part of the cryptocurrency landscape. While they may not have the same serious goals as other cryptocurrencies, memecoins have captured the attention of millions of people around the world, and have become a unique form of social commentary and entertainment. As the world of cryptocurrency continues to evolve, it will be interesting to see how memecoins continue to develop and what impact they will have on the broader ecosystem.





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ARTICLE ON EVOLVING DEEP LEARNING NEURAL NETWORK ARCHITECTURES

Abstract:

The deep learning being a subcategory of the machine learning follows the human instincts of learning by example to produce accurate results. The deep learning performs training to the computer frame work to directly classify the tasks from the documents available either in the form of the text, image, or the sound. Most often the deep learning utilizes the neural network to perform the accurate classification and is referred as the deep neural networks; one of the most common deep neural networks used in a broader range of applications is the convolution neural network that provides an automated way of feature extraction by learning the features directly from the images or the text unlike the machine learning that extracts the features manually. This enables the deep learning neural networks to have a state of art accuracy that mostly expels even the human performance. So the paper is to present the survey on the deep learning neural network architectures utilized in various applications for having an accurate classification with an automated feature extraction.

1. INTRODUCTION

The deep learning is a subset of the machine learning and based on the algorithms that are stimulated by the functioning of the brain and the way they are structured. The deep learning educates the computer system to produce results by training them on the previously available examples. The capability of the deep learning has enabled it to accomplish results that were impossible once upon a time. The remain as the pivotal mechanics behind most of the applications that are found nowadays such as the self-driving vehicles, voice control in consumer electronics such as the phone, Television, smart machines etc.

The computer frame work in deep learning is trained to directly classify the tasks from the documents available in the form of the image or text or sound. The deep learning models ensure a state of art accuracy and a performance the excels the humans .The deep learning was conceived in 1980s, but has become predominant only in the recent years this is because of the substantial amount data set and the computing power that is required for the training. Recently the utilization of the cloud computing has reduced the training time of the deep learning to hours from weeks. Few areas where the deep learning is prominent are automated driving, aerospace and defense, medical research, industrial automation, consumer electronics etc. The fig.1 below shows the performance of the deep learning and the older learning algorithms under various areas.

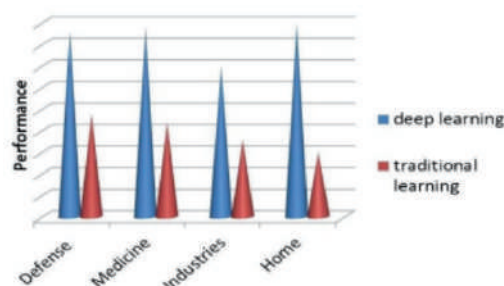


Fig 1 Performance of Deep Learning

The fig.1 present the performance of the deep learning from the huge amount of data set collected from different areas from defense to consumer devices at home. Many of the deep learning techniques utilizes the neural network architectures, to classify a data set acquired and are most probably referred as the deep neural networks. In deep neural networks the word deep points to the number of layers that are hidden, unlike traditional neural networks that can hold two or three hidden layers; the deep neural network can hold more than hundred and fifty hidden layers. This makes them capable of directly learning the features from the data itself eluding the necessity of the manual feature extraction and ensures higher accurate

shows the difference between the traditional learning and the deep learning in categorizing an object. Where the fig

2. (a) Is the classification using the traditional learning method and the fig 2. (b) Is the deep learning method that automatically learns from the data set. Fig shows how the learning algorithm identifies a desired object using the traditional learning and the deep learning.

The most popular DNN is the convolutional neural network. It convolutes the learned features and the input data and utilizes the two dimensional convolutional layers, it eludes the necessity for the manual feature extraction. The convolutional neural network works by extracting the features directly from the images. The necessary features are not pre-trained but learned in parallel during the training of the network on the collection of the images. This makes the DNN more compatible and suitable for the accurate classification of the objects.

The paper aims in presenting the survey of the evolving deep neural network architectures in various applications that are related to the speech recognition, image recognition, the natural language processing and the other applications.

The remaining paper proceeds with the literature survey presenting the evolving deep learning neural network, in various applications in section 2 and the its uses in the other application in section 3 and the conclusion in the section 4.

2. LITERATURE SURVEY

The neural network is fundamentally built to imitate the activity of the human brain. The experts reveal the deep neural network as the frame work that is composed of three layers that is the input, output and the hidden layer that is usually layered in between the input and the output layer. The deep neural network [1] is based on the concept of deep learning that is the sub section of the machine learning and utilizes the facets of the artificial intelligence to classify and order the data's, the following section provides the deep neural network architectures employed in the various areas providing a state of art accuracy

2.1. SPEECH RECOGNITION

Deng, et al [2], The author presents the review of the deep neural networks for the speech recognition by providing an optimized neural architectures that provides a better optimization and the improved ways to enhance the huge number of hyper parameters of the deep neural network with the accurate ways of preprocessing the speech for the deep neural networks and the possible ways of extracting the many number of languages at ease using the deep neural network than the Gaussian mixture model. So the author highlights the advantages of using the deep learning in the speech recognition than the GMM Peddinti, et al [3] providing a time delay deep neural network in the framing of the long temporal contexts utilizing the i-vector based network adaption. The time delay neural networks developed are viewed as the forerunner of the CNN ensuring a long term temporal dependencies from the short term features extracted from the speech, allowing a lower layer of the network to get updated with the gradient that are accumulated over every time step of the input temporal context during the back-propagation and a speedy training by the effective selection of the sub-sampling indices. Zhang et al [4], the convolutional neural network, which is the most common type of deep neural network employed in broader range of applications, are more efficient as they provide with the enhanced way of designing the spectral correlations in the acoustic features for an automated speech

speech recognition the CNN are integrated with the connection temporal classification for sequence labeling. Jaitly et al [5], Palaz, et al [6], the deep belief network for the pre-trained ANN/HMM for a continuous speech recognition in the large vocabulary is proposed in the paper and shows much improvement in the speech recognition than the GMM/HMM Manohar, et al [7] overlapping speech recognition with the acoustic Modelling utilizing the data augmentation approaches integrated with the DNN architectures, front –end speech echoing, beam forming and robust i-vector extraction enables to have a considerable improvement in the speech recognition than the traditional method with an diminished error rate. (CNN+TDNN+LSTM). The table.1 below summarizes the deep neural network architecture in the speech recognition.

Deep Neural Network in Speech Recognition	Literature	Technology used	Features
	Deng, et al [2],	DNN	Extracts many languages at ease than GMM
	Peddinti, et al [3]	TDNN+ I vector based adaption	Provides a high Speed Training
	Zhang et al [4]	CNN+CTC	Computationally effective in end to end speech recognition
	Palaz, et al [6],]	DBN+trained ANN/HMM	Continuous speech recognition for a large text
	Manohar, et al [7]	CNN+LSTM+TDNN	Improved speech recognition and diminished error rate

2.2.IMAGE RECOGNITION

Bischke et al [8], the author provides a multi tasks learning by introducing the cascaded multi task loss for the preserving of the semantic segmentation of the foot print for the building along with the deep neural networks. This method of image segmentation combining the multitask learning with the deep neural network eluding the necessity for the post –processing ensures an enhanced performance than the conventional methods. Stricker, et al [9], the image recognition using the deep convolutional network ensures

image recognition” using the three different type of convolutional neural network Alex net, VGG16 and the ResNet are done in the paper has identified that the Alex net outperforms the previous methods by a significant margin. Sun et al [11], the “DEEPID3” (GoogLeNet +VGG net) is utilized in recognizing the face by reconstructing the two architectures from the “stacked convolution and the inception layers” further the combined face identification and the verification signs are included to the intermediate as well as the final layers of the feature extraction during the process of training. Simonyan et al [12], the very deep convolution network with the depth of 16-19 weight layers are utilized in the system to recognize the images of large scale. Sainath et al [13], the author proposes the method of the “deep convolutional neural network” for the LCVSR tasks. Krizhevsky et a [14] the “Imagenet classification with the deep convolutional neural network” is proposed in the paper to reduce the over fitting in the fully connected layer He et al [15] the “deep residual learning” to reduce the complexity in the training is utilized for the image recognition with a relative enhancement in the object detection, Imagenet detection and the localization.

2.3. NATURAL LANGUAGE PROCESSING

The recent advancements in the neural network along with the deep learning have led to high performance in the various tasks associated with the NLP. The conventional methods of the natural language processing along with the DNN have caused the NLP to have an increased accuracy. Young et al [16], the author has presented a review of

the significant past, present and the future deep learning architectures in the natural language processing and provides a pavement for their evolution. Zeng, et al [17], Hasan et al [18] present the solutions for the clinical natural language processing in the “adverse drug detection from the social media and the medical image caption generation” using the deep learning neural network architectures. The table.2 below provides the over view of the deep neural network in the Image recognition and the natural language processing.

		ResNet	
	Sun et al [11],	GoogLeNet, VGG net	Reduced error rate
	Simonyan et al[12]	Very deep CNN	Better performance
	Sainath et al [13]	DCNN	Improved performance
	Krizhevsky et a[14]	Image net withDCNN	Reduces over fitting infully connected layer
	He et al [15]	DNN+DRL	Reduces complexity intraining
	Young et al [16],Hasan et al [18]	DNN +NLP	Increased accuracy

3. OTHER APPLICATIONS

In relation to the other applications the deep neural networks are employed in the detection of the bot Kudugunta, et al [19] has proposed a bot detection methodology by combining the LSTM and the deep neural network this proposed model of “deep neural network based on the contextual long short-term-memory architecture” ensures the detection of the bot in the social media such as the twitter Facebook etc. Nakazawa et al [20] proposes a “Anomaly detection and the segmentation of the wafer defect patterns utilizing the deep convolutional encoder-decoder neural network architectures in the manufacturing of the semiconductor” is done performing the training with the synthetic wafer maps with the basic patterns to make them capable of identifying the defects patterns from the real wafer maps. To detect the traffic in the web that is based on the number of people visiting the websites and the amount of the information transmitted to and fro the website Kim et al [21] employs the CLSTM and the DNN to have flawless anomaly detection with a heightened accuracy and recall. The deep neural networks finds its necessity in the medical field not only with the drug detection, but also in the identification of

the tumors Mohsen et al [22] proposesa deep neural network in into four types as the normal, sarcoma, metastatic-bct and glioblastoma. And Lee et al [23] utilizes the deep Convolutional neural network architecture in the detection and diagnosis of dental caries further Nair et al [24] utilizes the convolutional neural network in detection of the retinal alignment using the fundus images, providing an accurate , cost-effective and a comfortable solution in the retinal alignment. The table3 below provides the summaryof the survey done based on the deep neural architectures in other applications.

The survey presented bring out the essential qualities of the deep neural network in the various application that are associated with the speech recognition, image recognition, natural language processing, and the other application such as the fraud detection, disease detection etc. Though the DNN has many advantages, they require a high number of data sets for training along with the huge computational power. so the utilization of the cluster computing or the cloud computing along with the deep neural network would be ensure the training time and the power consumption by an considerable amount. The efficiency of the Deep neural networks along with the cluster /cloud computing is to be continued as the future work.

4.CONCLUSION

The paper presenting the survey of the deep learning neural networks proceeds with the different areas the deep learning neural network architectures are applied such as the in speech recognition, image recognition, natural language processing and other applications such as the bot and fraud detection, and disease diagnosis. The review presented details the deep learning neural network as the accurate way of classifying and predicting utilizing the sorting and ordering in a feature hierarchy even for the data that are unlabeled and unstructured. The automated way of feature extraction followed in the deep neural networks make them more compatible in the object detection and other applications of the computer vision compared to the traditional neural networks. So in future the paper is to proceed with the utilization of the deep neural network in the computer vision tasks such as the object classification and later with the analysis of the deep neural network efficiencies when integrated with the cloud computing.

References

1. Miikkulainen, Risto, Jason Liang, Elliot Meyerson, Aditya Rawal, Daniel Fink, Olivier Francon, Bala Raju et al. "Evolving deep neural networks." In *Artificial Intelligence in the Age of Neural Networks and Brain Computing*, pp. 293-312. Academic Press, 2019.
2. Deng, Li, Geoffrey Hinton, and Brian Kingsbury. "New types of deep neural network learning for speech recognition and related applications: An overview." In *2013 IEEE International Conference on Acoustics, Speech and Signal Processing*, pp. 8599-8603. IEEE, 2013.
3. Peddinti, Vijayaditya, Daniel Povey, and Sanjeev Khudanpur. "A time delay neural network architecture for efficient modeling of long temporal contexts." In *Sixteenth Annual Conference of the International Speech Communication Association*. 2015.
4. Zhang, Ying, Mohammad Pezeshki, Philémon Brakel, Saizheng Zhang, Cesar Laurent Yoshua Bengio, and Aaron Courville. "Towards end-to-end speech recognition with deep convolutional neural networks." *arXivpreprint arXiv:1701.02720* (2017).
5. Jaitly, Navdeep, Patrick Nguyen, Andrew Senior, and Vincent Vanhoucke. "Application of pretrained deep neural networks to large vocabulary speech recognition." In *Thirteenth Annual Conference of the International Speech Communication Association*. 2012.
6. Palaz, Dimitri, Mathew Magimai Doss, and Ronan Collobert. "Convolutional neural networks-based continuous speech recognition using raw speech signal." In *2015 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 4295-4299. IEEE, 2015.
7. Manohar, Vimal, Szu-Jui Chen, Zhiqi Wang, Yusuke Fujita, Shinji Watanabe, and Sanjeev Khudanpur. "Acoustic Modeling for Overlapping Speech Recognition: Jhu Chime-5 Challenge System." In *ICASSP 2019-2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 6665-6669. IEEE, 2019.
8. Bischke, Benjamin, Patrick Helber, Joachim Folz, Damian Borth, and Andreas Dengel. "Multi-task learning for segmentation of building footprints with deep neural networks." In *2019 IEEE International Conference on Image Processing (ICIP)*, pp. 1480-1484. IEEE, 2019.
9. Stricker, Didier. "Multi-font Printed Amharic Character Image Recognition: Deep Learning Techniques." In *Advances of Science and Technology: 6th EAI International Conference, ICAST 2018, Bahir Dar, Ethiopia, October 5-7, 2018, Proceedings*, vol. 274, p. 322. Springer, 2019.
10. Fu, Y., and C. Aldrich. "Flotation froth image recognition with convolutional neural networks." *Minerals Engineering* 132 (2019): 183-190.
11. Sun, Yi, Ding Liang, Xiaogang Wang, and Xiaoou Tang. "Deepid3: Face recognition with very deep



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NEUROMORPHIC

ABSTRACT:

Compared with von Neumann's computer architecture, neuromorphic systems offer more unique and novel solutions to the artificial intelligence discipline. Inspired by biology, this novel system has implemented the theory of human brain modeling by connecting feigned neurons and synapses to reveal the new neuroscience concepts. Many researchers have vastly invested in neuro inspired models, algorithms, learning approaches, operation systems for the exploration of the neuromorphic system and have implemented many corresponding applications. Recently, some researchers have demonstrated the capabilities of Hopfield algorithms in some large-scale notable hardware projects and seen significant progression. This paper presents a comprehensive review and focuses extensively on the Hopfield algorithm's model and its potential advancement in new research applications. Towards the end, we conclude with a broad discussion and a viable plan for the latest application prospects to facilitate developers with a better understanding of the aforementioned model in accordance to build their own artificial intelligence projects.

INTRODUCTION:

NOWADAYS, neuromorphic computing has become a popular architecture of choice instead of von Neumann computing architecture for applications such as cognitive processing. Based on highly connected synthetic neurons and synapses to build biologically inspired methods, which to achieve theoretical neuroscientific models and challenging machine learning techniques using. The von Neumann architecture is the computing standard predominantly for machines. However, it has significant differences in organizational structure, power requirements, and processing capabilities relative to the working model of the human brain [1]. Therefore, neuromorphic calculations have emerged in recent years as an auxiliary architecture for the von Neumann system. Neuromorphic calculations are applied to create a programming framework. The system can learn and create applications from these computations to simulate neuromorphic functions. These can be defined as neuro-inspired models, algorithms and learning methods, hardware and equipment, support systems and applications.

The basic problem with neuromorphic calculations is how to structure the neural network model. The composition of biological neurons is usually composed of cell bodies, axon, and dendrites. The neuron models implemented by each component of the specified model are divided into five groups, based on the type of model being distinguished by biologically and computationally driven.

The rest of the paper is organized as follows: Section II introduces the details of Hopfield algorithm. Section III extends to discrete Hopfield network architecture and hardware implementation. Section IV describes the learning method in Hopfield algorithm. Section V presents and compares the applications of Hopfield algorithm and shows the application development details. Section VI discusses some of the research open challenges and future trends in the Hopfield

algorithm. Section VII summarizes the entire discussion of hardware research on Hopfield algorithms and hardware implementation.

HOPFIELD ALGORITHM:

The Hopfield network is an important algorithm in the history of neural network development. Professor J.J Hopfield [45], a physicist at the California Institute of Technology, proposed in 1982 that it is a single-layer feedback neural network. Hopfield neural network is the simplest and most applicable model in feedback networks [46], because it has the function of associative memory [47], which can accurately identify the object and accurately identify digital signals even if they are contaminated by noise.

According to the discrete or continuous output of the network, the Hopfield network is divided into two types: discrete Hopfield neural network (DHNN) and continuous Hopfield neural network (CHNN) [49]. Discrete Hopfield Neural Network (DHNN): The output of a neuron takes only 1 and 0, which is respectively indicating the neuron in an activation and inhibition state [50]. Continuous Hopfield Neural Network (CHNN) of topology structure is identical to the DHNN. But the difference is whether its activation function is a discrete step function [51] or a continuous function of sigmoid. Due to the structural characteristics of discrete Hopfield network, the output data is equal to the mode size and dimension of the input. Meanwhile, it is the neurons that take binary values (1, -1) or (1, 0) as input and output. The synaptic weight between neuron i and neuron j is W_{ij} . So for a Hopfield neural network with N numbers of neurons, the weight for the matrix is $N \times N$ size. Its unique associative memory process is through a series of the iterative process until the system is stable.

Moreover, Hopfield network can convert analog signals into a digital format that is to realise associative memory, signal estimation and combination optimization applications. This solution is similar to the method of the human first layer to achieve signal processing. So, it belongs to the neuromorphic calculation. Due to the algorithm stability of output digital signal, Hopfield neural can withstand the redundant input of analog signal noise or variable. This situation is in contrast to the interface circuit between the traditional analog transmission medium and the digital computing device. It takes the speed advantage of the analog circuit and the noise reduction ability of the digital circuit into account.

DISCRETE HOPFIELD NETWORK:

Hopfield algorithm as a single-layer fully interconnected feedback network that includes symmetric synaptic connections to stores information on the connections between neurons. It is forming a discrete neural network that is characterized by parallel processing, fault tolerance and trainability.

Discrete Hopfield network of function that simulates the memory of biological neural network is often called associative memory network. Associative memory (AM) is an integral part of neural network theory, and it is a significant function in artificial intelligence and other fields that are used for pattern recognition, image restoration, intelligent control, optimal computation and optical information processing. It mainly uses the good fault tolerance of neural networks to restore incomplete, defaced and distorted input samples achieve complete prototypes, which are suitable for recognition, classification purposes.

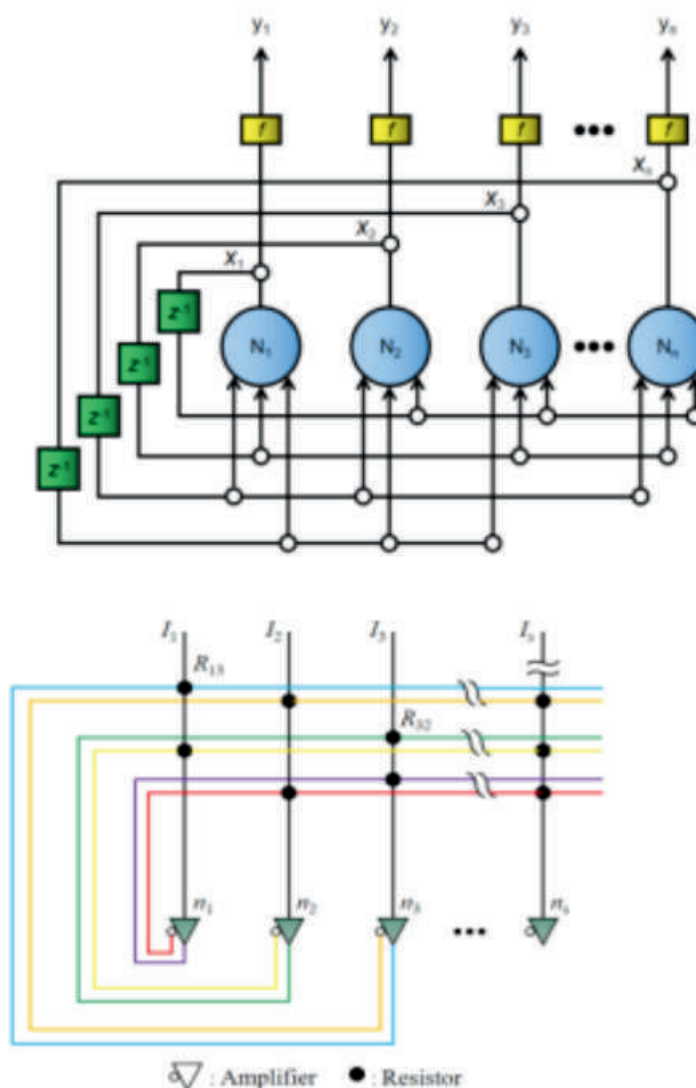
The discrete Hopfield neural network (DHNN) which is also known as a feedback neural network is fully connected network architecture and is shown in Fig 1. The circles represent neurons, and the output of each neuron as the input of other neurons, which means that the input of each neuron comes from other neurons. In the end, other neurons will return the output data to themselves. At this time, each neuron the input and output has a delay z^{-1} . In the Hopfield neural network each neuron is of the same model, and x represents the neuron output at the current time, and y represents the neuron output at the next time. So, in the time t , the output of x in the neuron i can be expressed as: $x_i(t) = \sum_{j=1}^N w_{ij} y_j(t)$ (1) In the time $t+1$, the output of y in the neuron i can be expressed as: $y_i(t+1) = f(x_i(t))$ (2) Where $f(\cdot)$ is the transfer function: $f(a) = +1 \ a \geq 0 \ -1 \ a < 0$ (3) Converting the network structure into a circuit topology. Hopfield neural networks are equivalent to amplified electronic circuits. Input data for each electronic component (neuron), including constant external current input, and feedback connections that to link with other electronic components [92]. each electronic component is based on amplifiers. It includes a non-inverting amplifier and an inverting amplifier (depending on the positive and negative weight of the connection to select corresponding output needs) [93].

All states are feedback to the input of the circuit through the bias current I_s ($S=1,2,3,..., N$) [94]. At the connection point of each neuron, there is has a resistor, which represents the impedance R_{ij} ($R_{ij} = 1/W_{ij}$) connected to other neurons [95], and the constant W_{ij} represents the network weight between neuron i and neuron j . For the bias current calculation is shown in the following: $I_i = \sum_{j=1}^S x_j r_{ij} = \sum_{j=1}^S x_j w_{ij}$.

LEARNING METHOD:

The neural network learning method can be classified by event sequence and time series . This occurrence is due to the asynchronous timestamps, where the sequence of events depend on the network dynamics, and the time-series is deterministic [97]. For instance, in the RNN (recurrent

neural network) architecture of the Backpropagation Through Time Algorithm (BPTT), Forward propagation is calculated each time in sequence order, while the Backpropagation delivers the accumulated residuals starting from the last time sequence number through the multiple layers . In contrast, the event information can be captured based on the event sequence method, thereby, adjusting the time steps of the conditional intensity function . On the other hand, the Hopfield algorithm training is based on the dynamics evolving in discrete time with time steps to discrete learning . According to different learning environments, neural network learning methods can be divided into supervised learning and unsupervised learning [100]. In supervised learning, the data of the training samples are loaded to the network input end. Meanwhile, the corresponding expected output is compared with the network results to achieve the difference value. So, it is to adjust the connection strength on the weights and converge to a certain weight after repeated training [102]. If the sample situation is changed, then weights can be modified to adapt to the new environment after training . Neural network models using supervised learning include back-propagation networks , perceptrons , etc. In unsupervised learning, the network is directly placed into the environment without giving standard samples, and the learning and the working combined as a stage . At this point, the learning rule transformation is based on the evolved equation of connection weight . The classic example of unsupervised learning is the Hebb learning rule



methods that to enabling information storage and processing is reflected in network connections . In 1949, D.O. Hebb proposed the "synaptic correction" on the learning mechanism of neural networks by psychology hypothesis . Its means when neuron i and neuron j are excited at the same time, the connection strength between the two neurons should be enhanced. For example, in animal experiments when a bell rings, a neuron is excited, and at the same time the appearance of food will stimulate the other nearby neurons, then the connection between these two neurons will be strengthened, so that there is a relationship between these two things connected. On the contrary, if two neurons are always unable to stimulate simultaneously, the connection between them will become weaker . The neuron stores the learned knowledge on the connection weights of the network. From the biological field, when the A cell's neuron axon is close enough to B cells, it repeatedly and continuously stimulates to cell B. At this point, the connection between the two cells will be strengthened. This means one or two cells in A or B will produce some kind of growth process or metabolic change, thereby enhancing the stimulation effect of cell A into cell B [115]. The Hebb learning rule can be mathematically expressed as follows: $W_{ij}(t+1) = W_{ij}(t) + a * y_i * y_j$ (5) The W_{ij} represents the connection weight of neuron j to neuron i, y_i and y_j represent the output of two neurons, 'a' is a constant representing the learning rate. If y_i and y_j are activated at the same time, that means y_i and y_j are positive, and the W_{ij} will increase. If y_i is activated and y_j is inhibited, that means y_i is positive and y_j is negative, then W_{ij} will decrease. This equation shows that the change in weight W_{ij} is proportional to the product of the transfer function values on both sides of the synapse. This is an unsupervised learning rule, which does not require any information from object outputs.

APPLICATIONS :

In daily life, character recognition has high practical application value in the postal , transportation and document management process [130], such as the recognition of car numbers and license plates in transportation systems . However, the images captured in the natural environment are often blurred due to the limitations of camera hardware [111], or unclear by the font is occluded and worn out. At these points, the complete information of the character cannot be obtain and identification of noisy characters become a key issue . At present, there are several methods for character recognition, which are mainly divided into a neural network [133], probability statistical [134], and fuzzy recognition [135]. The traditional character recognition method cannot recognize well under the condition of noise interference. However, the discrete Hopfield neural network has the function of associative memory, which is reasonable for anti-noise processing . By applying this function, characters can be recognized and satisfactory recognition results can be achieved. Besides, the convergence calculation becomes fast for processing.

CONCLUSION:

Although neuromorphic computing has gained widespread attention in recent years, however, it is still considered to be in the infancy stage. The existing solutions mostly focus on a single application at the hardware or software level, and majority of them are only suitable for handling limited applications. In addition, there are many software-based neural network

applications that has been deployed, but hardwarebased neural network design has been the key to the neuromorphic design. Convention neural network circuit implementation is thought of time consuming and inconvenient. In order to apply a simple and fast design method to neural network hardware, which can optimise and manufacture neuromorphic computing systems, needs to systematically unificate the requirements of the software calculation process. Furthermore, it can process and improves the final softwarelevel application indicators to quantify hardware attributes. Finally,a testable solution for a specification component can be achieved. In this study, we have attempted to give an overview of work that has been carried out in the hardware implementation field on neural networks.



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21AD049

EMPOWERING WOMEN FOR A MORE EQUAL FUTURE

Introduction:

Gender equality and women's empowerment have become crucial issues in our society. Women around the world have long faced various forms of discrimination and oppression, hindering their progress and potential. However, over the years, remarkable movements and initiatives have emerged to promote gender equality, empower women, and create a more inclusive and just society. This article explores the significance of these movements and their impact on the quest for gender equality.



Historical Context:

To understand the importance of women's empowerment movements, it is essential to acknowledge the historical struggles women have faced. Throughout centuries, women have fought against systemic biases, limited opportunities, and cultural stereotypes that have undermined their rights and abilities. Movements like suffrage, feminism, and women's rights activism have laid the groundwork for today's efforts towards gender equality.

MOVEMENTS FOR WOMEN EMPOWERMENT:

Feminism:

The feminist movement, spanning multiple waves, has been instrumental in advocating for gender equality. It challenges patriarchal norms, fights against gender-based violence, promotes reproductive rights, and strives for equal economic and political opportunities for women.

Women's Leadership Initiatives:

Various organizations and initiatives focus on empowering women in leadership positions. They provide mentorship, networking opportunities, and skill development programs to enhance women's representation and influence in traditionally male-dominated fields.

Economic Empowerment:

Promoting women's economic empowerment is vital for achieving gender equality. Efforts are being made to close the gender pay gap, improve access to quality education and vocational training, and support women entrepreneurs through funding and business development resources. By enhancing financial independence, women gain greater control over their lives and contribute to economic growth.

Education and Health:

Access to quality education and healthcare is crucial for women's empowerment. Efforts are being made to ensure equal educational opportunities, eradicate gender-based violence in educational settings, and promote comprehensive sexual and reproductive health services. Educated and healthy women are better equipped to make informed decisions, pursue their goals, and contribute positively to society.

Challenging Gender Stereotypes:

Societal expectations and stereotypes often limit women's choices and opportunities. Women's empowerment movements challenge these norms by promoting inclusivity and gender-neutral environments. They advocate for breaking stereotypes related to career choices, parenting roles, and societal expectations, thus fostering a more inclusive and supportive society for all.

Intersectionality:

Gender equality movements recognize the importance of intersectionality, which refers to the interconnected nature of social categories such as gender, race, class, sexuality, and disability. Intersectional feminism acknowledges that women's experiences of oppression and discrimination differ based on their unique identities and strives to address these multiple forms of marginalization.

Media Representation:

Media plays a significant role in shaping societal perceptions and attitudes towards gender roles. Women's empowerment movements strive for more diverse and accurate representations of women in media, challenging harmful stereotypes and promoting positive role models. They also address issues such as body image standards, objectification, and the underrepresentation of women in various fields.

Global Efforts:

Women's empowerment movements have gained momentum globally, with organizations like UN Women, Global Fund for Women, and Women Deliver working towards gender equality on a global scale. International agreements, such as the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) and the Sustainable Development Goals (SDGs), provide frameworks for addressing gender disparities and promoting women's rights.

Youth Engagement:

Young people play a crucial role in driving change and shaping the future of gender equality. Youth-led movements and organizations focus on empowering young women, addressing gender biases in education, advocating for comprehensive sexuality education, and promoting gender-equitable relationships among young people.

Male Engagement:

Achieving gender equality requires the involvement of men as allies and advocates. Men's engagement in women's empowerment movements helps challenge toxic masculinity, promotes gender-equitable attitudes, and dismantles patriarchal structures that perpetuate inequality. Initiatives like "HeForShe" encourage men to actively participate in dismantling gender stereotypes and promoting women's rights.

Conclusion:

Gender equality and women's empowerment movements are crucial for building a fair and inclusive society. By challenging systemic barriers, advocating for women's rights, and promoting equal opportunities, these movements pave the way for progress. However, the journey towards gender equality is ongoing, requiring continuous efforts from individuals, communities, and institutions. Together, we can create a world where women and men have equal rights, opportunities, and the freedom to fulfill their potential.



SANJAY R
22ADL05

THE FUTURE OF SPACE TRAVEL

Introduction

The allure of space has captivated human imagination for centuries. From the first steps on the Moon to the inception of the International Space Station, our quest to explore the cosmos has been driven by curiosity, scientific discovery, and the pursuit of new frontiers. However, as technology advances at an unprecedented pace, the future of space travel holds even greater promise. In this article, we will delve into the possibilities and advancements that await us, envisioning a future where space travel becomes more accessible, sustainable, and transformative than ever before.

Advancements in Spacecraft Technology

The future of space travel will witness significant advancements in spacecraft technology. The development of reusable rockets, such as SpaceX's Falcon 9 and Blue Origin's New Shepard, will revolutionize the industry by drastically reducing launch costs. These reusable vehicles will make space more accessible to both governments and private companies, fostering a new era of space exploration and commercial activities. Moreover, ongoing research and development in propulsion systems, such as ion propulsion and nuclear propulsion, hold the potential for faster and more efficient interplanetary travel. These technologies could significantly shorten travel times to Mars and other celestial destinations, making crewed missions and colonization efforts more viable.

Sustainable Space Habitats:

Building sustainable space habitats will be crucial for long-duration missions and establishing a presence beyond Earth. Scientists and engineers are exploring innovative approaches to creating self-sustaining habitats that rely on closed-loop systems for food production, water recycling, and waste management. These habitats will provide a semblance of Earth's environment, allowing astronauts to thrive in space for extended periods and enabling the colonization of other planets. Additionally, advancements in 3D printing technology will play a vital role in constructing habitats using local resources found on celestial bodies. This approach, known as in-situ resource utilization (ISRU), will reduce the reliance on Earth for construction materials and pave the way for self-sustaining off-world settlements..

Mining Resources in Space:

The future of space travel includes the exploration and utilization of extraterrestrial resources. Asteroids, for example, contain valuable metals, minerals, and even water ice. Mining these resources in space could provide a sustainable source of raw materials for space habitats, fuel for spacecraft, and even precious resources for Earth. Companies like Planetary Resources and Deep Space Industries are already pioneering asteroid mining technologies. In the coming years, we can expect to see more missions aimed at surveying, prospecting, and extracting resources from asteroids, opening up new economic opportunities and fueling further space exploration endeavors.

Interplanetary Travel and Colonization:

The future holds ambitious plans for crewed missions to Mars and other celestial bodies. Mars, being the most Earth-like planet in our solar system, has captivated scientists and space agencies for decades.

With ongoing research and advancements in propulsion, life support systems, and robotics, manned missions to Mars are becoming a realistic goal. Additionally, the establishment of permanent human settlements on Mars and the Moon is gaining traction. These colonies will serve as stepping stones for further exploration and provide valuable insights into the challenges of living in harsh extraterrestrial environments. Such endeavors will require international cooperation, as nations unite in the pursuit of humanity's collective future beyond Earth.

Searching for Extraterrestrial Life:

The search for extraterrestrial life will continue to be a driving force in space exploration. Probing the oceans of Jupiter's moon Europa, investigating the subsurface of Mars, and studying the atmospheres of exoplanets will provide crucial data to assess the potential habitability of these celestial bodies.

Furthermore, advancements in telescopes and observational techniques will enhance our ability to detect biosignatures—indicators of life—on exoplanets. Missions like NASA's James Webb Space Telescope will enable detailed observations of distant planets, bringing us closer to answering the age-old question: Are we alone in the universe?

Conclusion:

In conclusion, the future of space travel is poised to be a remarkable chapter in the history of human exploration. With advancements in technology, the emergence of private space companies, and increasing international collaboration, we are on the cusp of a new era in space exploration. As we look ahead, it is crucial to prioritize sustainability, safety, and inclusivity to ensure that space travel benefits humanity as a whole. By embracing innovative solutions, fostering scientific curiosity, and pushing the boundaries of our understanding, we have the potential to unlock the mysteries of the universe and forge a brighter future for generations to come. Let us embark on this journey with wonder and determination, as we continue to push the boundaries of what is possible in the vast expanse of space.



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22ADL04

Artificial Intelligence and its Role in Near Future

Abstract:

AI technology has long history which is actively and constantly changing and growing. It focuses on intelligent agents, which contains devices that perceive environment and based on which takes actions in order to maximize goal success chances. In this paper, we will explain the modern AI basics and various representative applications of AI. In context of modern digitalized world, Artificial Intelligence (AI) is the property of machines, computer programs and systems to perform the intellectual and creative functions of a person, independently find ways to solve problems, be able to draw conclusions and make decisions. Most artificial intelligence systems have the ability to learn, which allows people to improve their performance over time. The recent research on AI tools, including machine learning, deep learning and predictive analysis intended toward increasing the planning, learning, reasoning, thinking and action taking ability. Furthermore, it will explore the future predictions for artificial intelligence to solve it within next decades.

Introduction

The term intelligence refers to the ability to acquire and apply different skills and knowledge to solve a given problem. In addition, intelligence is also concerned with the use of general mental capability to solve, reason, and learning various situations. Intelligence is integrated with various cognitive functions such as; language, attention, planning, memory, perception. The evolution of intelligence can basically be studied about in the last ten years. Intelligence involves both Human and Artificial Intelligence. In this case, critical human intelligence is concerned with solving problems, reasoning and learning. Furthermore, humans have simple complex behaviors which they can easily learn in their entire life.

1) Which of these and in what level can today's artificial intelligence do?

Today's Artificial Intelligence (robotics) has the capabilities to imitate human intelligence, performing various tasks that require thinking and learning, solve problems and make various decisions. Artificial Intelligence software or programs that are inserted into robots, computers, or other related systems which then necessary thinking ability. However, much of the current Artificial Intelligence systems (robotics) are still under debate as they still need more research on their way of solving tasks. Therefore Artificial Intelligence machines or systems should be in position to perform the required tasks without exercising errors. In addition, Robotics should be in position to perform various tasks without any human control or assistance. Today's artificial intelligence such as robotic cars are highly progressing with high performance capabilities such as controlling traffic, minimizing their speed, making from self-driving cars to the SIRI, the artificial intelligence is rapidly progressing. The current attention towards portraying the artificial intelligence in robots for developing the humanlike characteristics considerably increases the human dependence towards the technology. In addition, the artificial intelligence (AI) ability towards effectively performing every narrower and cognitive task considerably increases the people's dependence towards the technology. Artificial intelligence (AI) tools having the ability to process huge amounts of data by computers can give those who control them and analyze all the information. Today, this considerably increases the threat which makes someone's ability to extract and analyze data in a massive way. Recently, Artificial intelligence is reflected as the artificial representation of human brain which tries to simulate their learning process with the aim of mimicking the human brain power. It is necessary to reassure everyone that artificial intelligence equal to that of human brain which is unable to be created. Till now, we operate only part of our capabilities. As currently, the level of knowledge is rapidly developing, it takes only a part of the human brain.

As the potential of human brain is incommensurably higher than we can now imagine and prove. Within human brain, there are approximately 100 trillion electrically conducting cells or neurons, which provide an incredible computing power to perform the tasks rapidly and efficiently. It is analyzed from the research that till now computer has the ability to perform the tasks of multiplication of 134,341 by 989,999 in an efficient manner but still unable to perform the things like the learning and changing the understanding of world and recognition of human faces.

2) Where does the human intelligence differ from AI?

Artificial Intelligence refers to the potential of computer controlled machines/robots towards performing tasks that are almost or similar to human beings. In this case, Artificial Intelligence is used to develop various robots that have human intellectual characteristics, behaviors, learning from past experience, have abilities to sense, and abilities to making predications and determine meaning of certain situation. Robotic technology is largely trending in the current life which has gained popularity in various sectors such as industries, hospitals, schools, military, music, gaming, quantum science and many others. Artificial Intelligence is an efficient means that make computers and software control robotic thinking with expert systems that significantly illustrate the intelligent behavior, learning and effectively advice users. In general, AI is basically known as the ability or potential of robotics to decide, solve problems and reason. There are various innovations of Artificial Intelligence, for example robotic cars which don't require a driver to control or supervise them. In addition, artificially intelligent technology (robots) involves smart machines that process a large amount of data that a human being can't be in position to perform.

By so robotics are assuming repetitive duties that require creativity and knowledge base. Furthermore, Artificial Intelligence (AI) is the combination of various technologies that give chance to robotics to understand, learn, perceive or complete human activities on their own. In this case, Artificial Intelligence programs (robots) are built for a specific purpose such as learning, acting and understating whereas humans intelligence is basically concerned with various abilities of multitasking. In general, an Artificial Intelligence tool is majorly concerned with emphasizing robotics which portrays human behaviors. But however, Artificial Intelligence may fail out at some points due to differences in human brain and computers. In brief, Artificial Intelligence has the potential to mimic human character or behaviors. Furthermore, Artificial intelligence is currently partially developed with-out advanced abilities to learn on their own but instead given commands to act on. This will be the ultimate future of artificial intelligence, where the AI machines will be recognized the human behavior and emotions and will train their kernel as per it.

3) Why cant we tell that todays AI is as clever as human beings?

Generally, there are various paths towards building the intelligent machines that enables the humans to build the super-intelligent machines and provide ability to machines towards redesigning their own programming in order to increase their intelligence level, which is usually considered as the intelligence explosion. In contrast, the shielded human hunt is basically the emotion. The breakthrough of AI technology can frighten the humanity in a way that machine are unable to effectively transmit the emotions. So, there may be possibility that AI can support us with the tasks and functions which usually not involves the feelings and emotion. Till now, AI machines are not able to control their process, for which they need the intelligence and mind of human beings. But AI development with same pace may cause threat to the humanity, because the self-learning ability may cause the AI machines to learn destructive things, which may cause killing of humanity in a drastic way. In general, there exist various characteristics which distinguish human level intelligence with Artificial intelligence and they include the following. Thinking ability; it can be both positive as well as negative because of having emotions, which are not with AI machines. The lack of machines emotion may lead to destructive in a situation where emotions are required. Russell Stuart believes that machines would be able to think in a weak manner. In general, there are things that computers cannot do, regardless of how they are programmed and certain ways of designing intelligent programs are doomed to failure sooner or later. What was later called the Turing Test, proposed that a machine be able to converse before an interrogation for five minutes for the year 2000 and in fact, it was partly achieved.

It is concluded then, that the machines can actually think, although they can never have a sense of humor, fall in love, learn from experience, know how to distinguish the good from the bad and other attitudes of the human. Artificial Intelligence: A Modern Approach dedicates its last chapter to wonder what would happen if machines capable of thinking were conceived.

4) Give a comprehensive survey of what can today's AI subfields do?

Today's artificial intelligence is creeping into our daily lives by using the GPS navigation and check-scanning machines. The use of artificial intelligence (AI) in business contributes to the potentialization of various areas of daily life such as customer service, finance, sales and marketing, administration and technical processes in various sectors. Undoubtedly, over the next few years, digital efforts will no longer be isolated projects or initiatives in companies, but the adoption of technologies such as AI at all levels and processes of companies will be a reality to increase their competitiveness. AI begins to integrate into the activities of business. It is important to consider that it has not arrived to replace human tasks, but to complement them and allow people to develop their potential and creativity to the maximum. Introduction of new technologies is a tool for the prevention and fight against corruption, the traceability of electronic actions, and the security that surrounds their management favors confidence in management. This essay will prove how artificial intelligence can improve efficiency. The role of this paper is to explore where we are today and what will be the ultimate future of AI technology, if we continuously applied in every field. Further, we will analyse the potential AI techniques and their potential benefits for improving the system.

5) What is missing to today's AI still to be called human level intelligence?

Humans are different from Artificial Intelligence machine physically in a sense that human race usually experiences the same physical features while the machines takes several forms and shapes. The trans-humanist vision analysis exhibits us to believe that brains are principally the computers. AI reports are the silicon based machines, which was controlled by using the algorithm that reinforces entire internet business. AI believes that once the computers have adequate advanced algorithms, then they will be capable to replicate and enhance the human mind.

This algorithm will not essentially result in the AGI but may also lean towards applied artificial intelligence. The algorithm tuned through Turing process can also significantly define and passed it. Eugene Grossman Test; Grossman tests the Turing test and concluded that it has 33% fooling, which intended him to propose test that should rely on AI

in order to efficiently solve the particular tasks that was quite near to AGI. He also concluded that it is not possible for AI machines to be much efficient than that of human because they always acts human actors to work the AI machine.

6) What are open challenges?

Challenges of AI technology include the following. Within near future, the artificial intelligence goals were to affect the society from law and economics in several technical terms including security, verification, validity, and control. The major short-term threats of Artificial Intelligence include the devastating race of arms in fatal autonomous weapons and full dependence of our life on technology will eventually lead to unemployment problem, social discrimination and power inequality in societies. Long term use of robotics will create a big challenge includes to human beings as they will take over the world. In addition, with in a given period of time, AI will become better in solving tasks compared to human beings hence loss of jobs.

For example drivers will be ruled over by robotic cars, tellers will be out competed by robotic tellers and many others. As a result of Artificial Intelligence out competing humans will create a big challenge on human thinking. But in the positive side, the AI technology advancement can also considerably aid for eradicating the disease, war and poverty level. Rapid research of Artificial intelligence in robotics is reflected as the large existential threats that are faced by the humanity. Artificial intelligence is simply the next wave of automation, which considerably allows the machines to do tasks that previously required attention and human intelligence. In the short term it can replace people, but above all, it changes the nature of the work that humans do. In the long run, automation creates more and different types of jobs, which is why not everyone has jobs today.

Further, challenges include the large dependence of people towards technology for their work. This considerably increases several psychological, physical and mental issues. In order hand, it considerably reduces the unemployment, economic and power balance and disability. It is believed that until the end of 2021, there will be the beginning of a disruptive tidal wave of artificially intelligent robots in our daily life, such solutions powered by cognitive or artificial intelligencetechnology will significantly displace the jobs, with the great impact felt in logistics, transportation, consumer services and educational process. Furthermore, it can considerably increase the privacy, security and authenticity issues within the society.

7) Which levels will it reach and which issues will be solved in next decades?

In this case, it is more likely that Artificial Intelligence innovations will strongly emerge in conceivable future. In next decades, the future of AI will be concerned on improving speech, voice, video conferencing and face recognition. Further, Artificial Intelligence will aid for providing the personal assistances and fully automate systems, which will provide assistance in monitoring and surveillance, performing heavy workloads and many others. In addition, the future of Artificial Intelligence technology such as robotics will be ensuring self-driven cars, delivery robots and many others. With the great improvement in computer versions and legged locomotion, the robots within environments will become more practical hence helping in agriculture and other service settings. In addition, the robotics will improve on the service delivery hence reducing domestic chores. The development of search engines will lead to significant synthesize and improvement of the quality of information. Furthermore, Artificial Intelligence tool will improve the medical and bio-logical system hence reducing the complexity and volume of information challenges concerned human abilities.

Artificial intelligence will be used in the algorithm that materializes various systems and programs. Artificial intelligence will consist of specific hardware and software which intends to imitate the way of human brain performance. Recent research on AI considerably provide the potential effects on organization and industries, for example, the AI technology will be aiming at improving the area of data science to almost 9.6%, business intelligence to 7.8%, patient and health care to about 6.3%, speech recognition 5.3%, computer vision 5.6%, improve defense and aerospace system to about 5.3% and natural language processing to about 5.1%. The role of Artificial Intelligence tools on product manufacturing operations will lead to toward employment, flexibility and responsive chain of supply

2. Conclusion

In this way, artificial intelligence can achieve great discoveries and advances for humanity due to its multiple possibilities. Most artificial intelligence systems have the ability to learn, which allows people to improve their performance over time. The adoption of AI outside the technology sector is at an early or experimental stage. The evidence suggests that AI can provide real value to our lives. AI bases its operation on accessing huge amounts of information, processing it, analyzing it and, according to its operation algorithms, executing tasks to solve certain problems.



SUNIL V
21AD051

WEB 3.0

Introduction

The internet has gone through various transformations over the years, from Web 1.0 to Web 2.0 and now to Web 3.0. Web 3.0 is the next evolution of the internet that promises to offer a more decentralized, secure, and autonomous web experience. In this article, we will explore the innovations and creativity that come with Web 3.0, and how it is set to revolutionize the way we interact and do business on the internet.

What is Web 3.0?

Web 3.0 is also known as the decentralized web, and it is a term used to describe the next evolution of the internet. The internet has been through two major transformations, with Web 1.0 being a static web where users were only able to access information, and Web 2.0 being a dynamic web that allowed users to interact with each other and create and share content.

Web 3.0 promises to take the internet to the next level by introducing decentralized technology such as blockchain and decentralized applications (dApps) that enable users to have more control over their data and online activities.

Decentralized Applications (dApps)

dApps are applications that run on a decentralized network, and they are built on blockchain technology. Unlike traditional applications, dApps are not controlled by a central authority, and they are not hosted on a centralized server. Instead, they are hosted on a decentralized network, and users interact with them through a decentralized interface.

One of the benefits of dApps is that they offer users more control over their data and activities. Since they are not hosted on a centralized server, users are not at the mercy of a central authority, and they can be sure that their data is secure and cannot be manipulated.

Decentralized Finance (DeFi)

Decentralized Finance (DeFi) is an area of Web 3.0 that is set to revolutionize the way we do finance. DeFi is a financial system that is built on a decentralized network, and it offers users a more transparent, secure, and accessible financial system.

With DeFi, users can access financial services such as lending, borrowing, and trading without the need for a middleman. This is made possible by smart contracts, which are self-executing contracts that automatically execute when certain conditions are met.

One of the benefits of DeFi is that it offers users more control over their financial activities. Since it is built on a decentralized network, users are not at the mercy of a central authority, and they can be sure that their transactions are secure and cannot be manipulated.

Decentralized Social Networks

Social networks have become an integral part of our lives, and they have revolutionized the way we communicate and interact with each other. However, social networks have been criticized for their centralized nature, where users' data is controlled by a central authority.

Web 3.0 promises to change this by introducing decentralized social networks that are built on a decentralized network. These social networks offer users more control over their data and activities, and they are not controlled by a central authority.

One of the benefits of decentralized social networks is that they offer users more privacy and security. Since they are not controlled by a central authority, users can be sure that their data is secure and cannot be manipulated.

he Future of Web 3.0

Web 3.0 is set to revolutionize the way we interact and do business on the internet. With decentralized technology such as blockchain and dApps, users will have more control over their data and activities, and they will be able to interact with each other and do business without the need for a middleman.

The future of Web 3.0 is bright, and we can expect to see more innovations and creativity as developers and entrepreneurs explore the potential of this new frontier. Here are some potential areas where we can see Web 3.0 making a significant impact:

Decentralized Governance

Web 3.0 can transform the way governance works, making it more transparent, decentralized, and participatory. With blockchain technology, we can create decentralized voting systems that are transparent and secure, enabling people to participate in decision-making processes without the need for intermediaries. This technology can also help in creating decentralized systems for managing public goods such as energy, water, and transportation. The possibilities are endless, and we can expect to see more experimentation and innovation in this area in the coming years.

Decentralized Marketplaces

Decentralized marketplaces are platforms that allow users to buy and sell goods and services without intermediaries. These platforms are built on blockchain technology, and they offer users more control over their activities and transactions.

Decentralized marketplaces can help reduce costs, increase transparency, and improve efficiency in the market. They also eliminate the need for intermediaries, which can result in lower fees and more direct interactions between buyers and sellers.

Decentralized marketplaces can also help small businesses and individuals access global markets, which can be challenging in a traditional marketplace. We can expect to see more growth and innovation in decentralized marketplaces in the future.

Decentralized Cloud Computing

Cloud computing has become a ubiquitous technology in the modern world, with many businesses relying on cloud services to manage their operations. However, the centralized nature of cloud computing has its drawbacks, including security and privacy concerns.

Web 3.0 promises to change this by introducing decentralized cloud computing. This technology will enable users to store their data on a decentralized network, eliminating the need for centralized cloud providers.

Decentralized cloud computing can help reduce costs, increase security, and offer users more control over their data. We can expect to see more growth and innovation in this area in the coming years.

Conclusion

Web 3.0 is set to revolutionize the way we interact and do business on the internet. With decentralized technology such as blockchain and dApps, we can expect to see more innovation and creativity in areas such as finance, social networks, governance, marketplaces, and cloud computing.

Web 3.0 promises to offer users more control over their data and activities, and it will help create a more transparent, secure, and autonomous web experience. The possibilities are endless, and we can expect to see more growth and innovation in the years to come as we move towards a more decentralized future.





SAMAR K
21AD035

DEEPPFAKE: The New Age of Synthetic Media

I. INTRODUCTION

Deepfakes are synthetic media that use deep learning algorithms to create hyper-realistic images and videos that can be used to manipulate public opinion or deceive individuals. The term "deepfake" is a combination of "deep learning" and "fake," and it refers to a specific type of synthetic media that uses AI to manipulate images and videos.

Deepfakes have become a popular tool for creating fake news and propaganda, and they pose a significant threat to the integrity of information and media in the digital age. This article will explore the history, technology, and implications of deepfakes, as well as potential solutions to combat their harmful effects.

II. WHAT ARE DEEPPFAKES?

Deepfakes are synthetic media that use deep learning algorithms to create hyper-realistic images and videos. These algorithms use large datasets to learn patterns and characteristics that can be used to create convincing digital representations of individuals or events. Deepfakes can be created using various techniques, such as facial re-enactment, voice synthesis, and generative adversarial networks (GANs).

Facial re-enactment involves mapping a target face onto a source face in a video, allowing the target face to mimic the source's expressions and movements. Voice synthesis uses text-to-speech algorithms to create synthetic speech that mimics the target's voice. GANs use two neural networks to generate synthetic media that is indistinguishable from real media.

The technology behind deepfakes has become increasingly sophisticated over the years, making it easier for individuals to create convincing synthetic media. This has led to an increase in the use of deepfakes for malicious purposes, such as spreading fake news, political propaganda, and revenge porn.



III. HISTORY OF DEEPPFAKES

The term "deepfake" was coined in 2017 by a Reddit user who used deep learning algorithms to create realistic pornographic videos featuring celebrities. This sparked widespread concern about the potential misuse of deepfakes, and led to increased research and development of countermeasures.

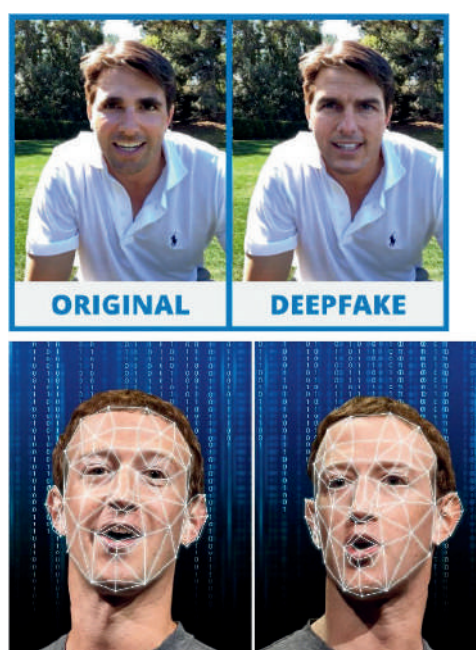
The use of synthetic media for entertainment and artistic purposes is not new, however. Hollywood has been using CGI technology to create hyper-realistic special effects in movies for decades. However, the accessibility and affordability of deep learning algorithms have made it easier for individuals to create convincing synthetic media on their own, outside of traditional media industries.

IV. IMPLICATIONS OF DEEPFAKES

Deepfakes have significant implications for the integrity of information and media in the digital age. They can be used to manipulate public opinion, deceive individuals, and spread false information on a massive scale. This has the potential to undermine trust in media and institutions, and cause significant harm to individuals and society as a whole.

One of the most significant implications of deepfakes is the potential for political manipulation. Deepfakes can be used to create convincing videos of politicians or other public figures saying or doing things they never actually said or did. This has the potential to sway public opinion and influence elections, as we saw in the 2016 US presidential election.

Another concern is the use of deepfakes for revenge porn. Deepfakes can be used to create realistic videos or images of individuals engaged in sexual acts, without their consent. This has the potential to cause significant harm to individuals, and can be used as a form of cyberbullying or harassment.



IV. POTENTIAL SOLUTIONS TO DEEPFAKES

There are several potential solutions to combat the harmful effects of deepfakes. One approach is to increase public awareness of the potential for deepfakes and educate individuals on how to spot them. This can include developing tools and resources that help individuals identify fake media, such as deepfake detectors and fact-checking services.

Another approach is to develop countermeasures that can be used to detect and remove deepfakes from the internet. This can include the use of digital watermarks and other forms of authentication that can be used to verify the authenticity of media. Some researchers are also developing algorithms that can detect deepfakes by analysing subtle cues, such as changes in lighting or inconsistencies in facial expressions.

Another potential solution is to develop regulations and laws that can be used to deter the creation and dissemination of deepfakes. This can include criminalizing the creation and distribution of deepfakes without consent, as well as developing international agreements that can be used to prosecute individuals who create or distribute deepfakes across borders.

Finally, some experts believe that the development of synthetic media technology itself could be the ultimate solution to deepfakes. By developing more sophisticated AI algorithms and deep learning techniques, researchers may be able to create synthetic media that is indistinguishable from real media, making it impossible to create convincing deepfakes.

V. CONCLUSION

Deepfakes represent a significant threat to the integrity of information and media in the digital age. They have the potential to undermine trust in media and institutions, and cause significant harm to individuals and society as a whole. As deepfake technology continues to advance, it is important that we develop effective solutions to combat their harmful effects.

This may include increasing public awareness of the potential for deepfakes, developing tools and resources that can be used to identify and remove fake media, and developing regulations and laws that can be used to deter the creation and dissemination of deepfakes. Ultimately, the development of synthetic media technology may be the key to defeating deepfakes once and for all.

REFERENCES

- [1] Chesney, R., & Citron, D. K. (2019). Deepfakes and the New Disinformation War: The Coming Age of Post-Truth Geopolitics. *Foreign Affairs*, 98, 147. <https://www.foreignaffairs.com/articles/2018-12-11/deepfakes-and-new-disinformation-war>
- [2] Hao, K. (2019, October 9). The looming danger of deepfakes. *MIT Technology Review*. <https://www.technologyreview.com/2019/10/09/132213/the-looming-danger-of-deepfakes/>
- [3] Metz, C. (2018, February 13). As AI makes more fake video and audio, we need new ways to detect them. *Wired*. <https://www.wired.com/story/future-of-fake-news-artificial-intelligence/>
- [4] Rosenbaum, E. (2020, January 28). Deepfake: The war on truth. *BBC Future*. <https://www.bbc.com/future/article/20200127-deepfakes-what-next-for-fake-news-and-artificial-intelligence>



RAGAVI V
21AD002

Open Source Software and Its Security: Harnessing the Power of Transparency

Introduction

Open source software (OSS) has revolutionized the digital landscape, empowering developers and users worldwide with free access to source code, collaborative communities, and endless possibilities. However, concerns about security often arise when discussing open source solutions. In this article, we will explore the concept of open source software, shed light on its security aspects, and highlight the key advantages it brings to the table.

Understanding Open Source Software

Open source software refers to software whose source code is freely available, allowing users to view, modify, and distribute it according to the terms of its license. This openness fosters a collaborative environment where developers can contribute improvements, fix bugs, and enhance the software's functionality.

The Security Paradigm

Contrary to popular belief, open source software is not inherently less secure than proprietary alternatives. In fact, the transparency that comes with open source development often leads to robust security practices and improved software reliability. Here are some key aspects highlighting the security benefits of open source software:

- 1. Increased Transparency:** With open source software, the source code is open to scrutiny by anyone. This transparency means that potential security vulnerabilities can be identified and fixed more rapidly than in closed-source systems. Numerous eyes from the global developer community can examine the code, reducing the likelihood of undetected vulnerabilities or malicious backdoors.
- 2. Rapid Bug Fixes:** When a vulnerability is identified in open source software, the collaborative nature of the community can expedite the process of finding a solution. Developers can quickly analyze and patch the code, minimizing the window of opportunity for potential attackers to exploit the vulnerability.
- 3. Community-driven Auditing:** Open source projects often benefit from an active and diverse community of developers and users. This community acts as an ongoing auditing force, continuously reviewing and testing the software. This collective effort leads to increased software quality and security over time.
- 4. Trust through Peer Review:** The peer review process inherent in open source development instills trust in the software. Security-conscious developers can scrutinize the code, ensuring that it adheres to best practices and security standards. This approach fosters a culture of accountability and quality assurance within the open source community.
- 5. Customizability and Control:** Open source software provides users with the ability to customize and validate the security measures implemented within the software. Organizations can audit the code, tailor security configurations to their specific needs, and verify that no suspicious or malicious functionality is present.

Challenges and Mitigations

While open source software offers numerous security advantages, it is not immune to challenges. Some common concerns include:

- 1. Lack of Expertise:** Organizations may lack the in-house expertise required to assess the security of open source software effectively. Engaging with skilled professionals or security-focused communities can help mitigate this challenge.
- 2. Dependency Management:** Open source software often relies on various libraries and dependencies, which can introduce vulnerabilities. Implementing a robust dependency management process, including regular updates and vulnerability monitoring, is essential to mitigate this risk.
- 3. Trust in the Supply Chain:** Trusting the source of open source software is crucial. Organizations should obtain software from trusted repositories, verify digital signatures, and ensure the integrity of the packages they download.

Conclusion

Open source software offers a compelling security proposition, driven by transparency, collaboration, and a global community of contributors. While challenges exist, they can be effectively addressed through proper governance, community engagement, and security-conscious practices. Embracing open source software not only provides access to innovative solutions but also contributes to the collective security of the digital ecosystem. By understanding and harnessing the power of transparency, organizations can confidently adopt open source software while maintaining a strong security posture.



FARIQ RAHMAN F
21AD012

Artificial General Intelligence and the Future of the Human Race

Artificial Intelligence is all around us. It manages your investments, makes the subway run on time, diagnoses medical conditions, searches the internet, solves enormous systems of equations, and beats human players at chess and Jeopardy. However, this “narrow AI,” designed for solving specific, narrow problems, is something distinctly different from Artificial General Intelligence, or “AGI,” true thinking machines with human-like general intelligence (Wang, Goertzel, & Franklin, 2008, p. v).

While AGI is not rigidly defined, it is often envisioned as being self-aware and capable of complex thought, and has been a staple of science fiction, appearing prominently in popular films such as 2001: A Space Odyssey, Terminator, and I, Robot. In each of these films, the machines go beyond their original programmed purpose and become violent threats to humans. This is a possibility which has been pondered extensively by those working in the field of AGI research. Thinkers like Ray Kurzweil, Ben Goertzel, and Hugo De Garis think that we are entering into a world of extremely intelligent machines (Kurzweil 2005; Goertzel & Pennachin, 2007; De Garis, 2008).

This article will discuss some of the ideas that researchers have on how AGI relates to the wellbeing of humans, including how the machines can help us and how they could potentially harm us.

“Narrow AI is already used by the militaries of first world countries for war purposes.”

One scenario in which generally intelligent machines go bad and become a threat is if they end up in bad hands. Such machines, in the hands of small, politically motivated terrorist groups or large military organizations, could be used as weapons. AGI could offer such groups the ability to spy, gather, and synthesize information, as well as strategize attacks against the rest of the population. Developers of AGI will have little knowledge of whose hands their technology will end up in; they could unknowingly be constructing deadly weapons to be used against humanity. Of course, such threats are not imaginary future possibilities. Narrow AI is already used by the militaries of first world countries for war purposes.

Consider drones such as the Northrop Grumman X-47B, an Unmanned Combat Aerial Vehicle that is being tested by the US Navy (DefenseTech.org, 2011). That’s right, there is no pilot. Of course, the drone can be given orders, but the exact way in which those orders are carried out will be left up to the drone’s Narrow AI system. Whether such systems will ever be extended toward general intelligence is currently unknown. However, the US military has shown interest in producing and controlling generally intelligent killing machines as well, as made evident by a paper called “Governing Lethal Behavior” by Ronald C. Arkin.

The paper was commissioned by the U.S. Army Research Office and provides theory and formalisms for the implementation of a lethal AGI machine (Arkin, 2008). The paper describes a way in which a machine can be restricted to “ethical” behavior determined by the creator. The author optimistically hopes that his proposed formalisms may lead to generally intelligent battle drones that are more ethical in battle than humans are, yet the ability to define “ethical actions” remains the privilege of the machines’ engineers (Arkin, 2008, p.62). Due to the potential for AGI to be used as a weapon, the production of such machines carries many of the same moral ramifications as the production of other weapons.

Another threat to humanity is the possibility that a good machine, one specifically created to be benevolent, may go bad, as was the case with Hal 9000 in 2001: A Space Odyssey. Evolutionary and learning algorithms may lead to a system that is essentially a black box, something so complicated that experts may be unable to understand its inner workings completely. As with humans, such machines may have extremely complex psychologies, so the potential for malevolence is non-zero (Goertzel & Pennachin, 2007).

Even if special constraints are placed on the behavior of such systems, rules like “do not kill” could potentially be overwritten after successive updates initiated by the AGI system itself (Singularity Institute for Artificial Intelligence [SIAI], 2001, para. 2). Such a scenario may become greatly feared by the public, leading to what one researcher calls “The Artilect War.” In Hugo De Garis’ essay,

"The Artilect War: A Bitter Controversy Concerning Whether Humanity Should Build Godlike Massively Intelligent Machines," he proposes that humans will gain the capacity to construct massively intelligent machines called Artilects and that humans will fight over whether or not to construct them. He postulates the emergence of three major camps: "Cosmists" who want to build artilects, "Cyborgs" who want to become artilects, and "Terrans" who are opposed to the construction of artilects (De Garis, 2008). De Garis outlines the social climate that will lead to the Artilect War. "The 'species dominance' debate has already started," De Garis argues. "The fundamental question is whether humanity should build artilects or not. The issue will dominate our global politics this century, and may lead to a major war killing billions of people" (De Garis, 2008, p. 440). De Garis' argument is understandable, though not completely convincing. Kurzweil argues that there won't be many Terrans.

Instead, he claims that just about everyone will be using technology to improve their own abilities, that there will be no fine distinction between machines and us. The other possibility that De Gargis neglects is that the artilects may be created before would-be-terrans are even aware of the possibility of their construction. The specificity of De Gargis' predictions seems too narrow and the array of alternative possibilities is not sufficiently explored in his essay.

As with humans, such machines may have extremely complex psychologies, so the potential for malevolence is non-zero

If AGI is developed, there are many benefits which would likely follow: it could lead to exponential advances in every scientific field. Grad students would no longer have to be worked to death since machines could do much of the epistemic labor. AGI could also be applied to fields which require an extraordinary amount of training.

Doctors and other professionals could be replaced by efficient machines that don't get tired, don't require extensive training, and make fewer mistakes. In the future, access to cheap medical care could become the norm. One of the most optimistic futurists of our time, Ray Kurzweil, believes that exponential advancements in technology will lead to a technological Singularity, an intelligence explosion likely owed to the development of something called Seed AI. The term Seed AI is used for any intelligent system that is capable of very rapid exponential gains in its intelligence. Seed AI is imagined to be capable of modifying its own programming to construct a smarter self; this updated version would then be even better at programming, thus being capable of creating even smarter subsequent updates, and so on (SIAI, 2001, para. 2). This leads to an infinite feedback loop of intelligence. But will the result be the god-like Artilects which haunt the dreams of many science fiction writers or will it be the hoped-for Singularity that Kurzweil predicts?

Kurzweil has a very good track record when it comes to predicting future technological trends. When Kurzweil published *The Age of Intelligent Machines* in 1990, he accurately predicted that computers would outmatch the world's greatest human chess player by 1998, which happened in 1997. He also predicted the rise in popularity of the internet as well as cell phones (Kurzweil, 1990). In his more recent book, *The Singularity is Near*, Kurzweil predicts that by 2020, PCs will have the same raw processing power as a human brain, by 2030, humans will be able to upload their minds onto computers, and by 2045, the Singularity will emerge as computers become smarter and more capable than humans (2005). While Kurzweil acknowledges that there is much uncertainty about the details, he embraces the possibility of a Singularity and argues that it offers us many benefits and will likely be friendly. Kurzweil also claims that we have gradually been merging with machines and that this process will continue. In a video interview with Big Think, Kurzweil states:

"Just about everyone will be using technology to improve their own abilities, that there will be no fine distinction between machines and us."

If you talk to a biological human, they will have lots of non-biological processes going on in their body and brain. Those computers will be out on the clouds, and the thinking of that "person" isn't even just in their body and brain even in the non-biological portion, it's out on the cloud. So it's going to be all mixed up, there's not going to be a clear distinction between human and machine. (Big Think, 2011)

Kurzweil believes that the vast majority of humans will gladly merge with the machines and become cyborgs. Of course, Kurzweil's predictions are highly speculative and often criticized.

If any possibility exists that AGI will lead to a non-friendly Singularity, humans should proceed with caution. In a paper titled "Should Humanity Build a Global AI Nanny to Delay the Singularity Until It's Better Understood?" by AGI researcher and developer, Ben Goertzel, he argues in favor of constructing an intelligent but limited system designed with the sole purpose of delaying or preventing the development of a Singularity until we know how to create it in a positive way (2012).

AGI is, perhaps, not far from reality. Ben Goertzel is currently constructing something called Novamente. It's an integrative approach to AGI, and thus it brings together aspects of many prior AI projects and paradigms, including symbolic, probabilistic, and evolutionary programming as well as reinforcement learning approaches (Goertzel & Pennachin, 2007). Novamente is a learning computer, starting off like a child, useless, uneducated, with little information or cognitive ability, but eventually, it will grow up and learn about the world it inhabits about itself and about how it thinks. Goertzel's hope is that Novamente will be a huge breakthrough in AGI (Goertzel & Pennachin, 2007). Something like Novamente, which will be capable of learning and modifying its own software, could potentially lead to human level intelligence

The exact future of AGI is still obscured in mystery. However, it is not merely science fiction, nor is it an insane fantasy of mad scientists. While most AI research is currently focused on narrow AI, there exists a small group of serious scientists concerned with the more difficult problem of creating AGI. This ambitious work is as deserving of attention and respect as the other great scientific endeavors of our time.

The consequences of this work may drastically affect the future of humanity, thus the claims made by these experts are deserving of realistic skepticism and well-thought out objections whenever they are applicable. The result of creating AGI or putting AGI in the hands of dangerous people could be severe. However, the

benefits of creating friendly human-level intelligence may lead to exponential advances in many different fields, a greater understanding of how minds work, and a better world for the masses



Figure 1. The exact future of AGI is still obscured in mystery. However, it is not merely science fiction, nor is it an insane fantasy of mad scientists.



PARTHIV AKILESH
20AD029

FEDERATED LEARNING

Federated learning is a new approach to machine learning that allows multiple devices to collaborate on a shared model without sharing their private data with each other or with a central server. This approach enables machine learning on decentralized systems, such as IoT devices, smartphones, and edge computing devices, and has several advantages over traditional machine learning. One of the main advantages is data privacy, as the data remains on the client devices and only the updates are sent to the central server. Another advantage is scalability, as each device trains the model locally, reducing the communication overhead. Federated learning is a promising new field, with many innovative applications and use cases yet to be explored. As the field continues to grow, we can expect to see more exciting advancements in the future.

RAMAKRISHNAN S
22AD036



ABOUT THE DEPARTMENT WHICH I LIKED:

There are several advantages to having a department with access to Mac computers when it comes to artificial intelligence (AI) and data science. Firstly, Macs are known for their excellent hardware and software integration, which means they can handle complex computing tasks with ease. This is especially important when working with large datasets or running complex AI algorithms. Additionally, Macs are well-suited for developing software applications, including those related to AI and data science. Their intuitive user interface and built-in development tools make it easy for developers to create and test new algorithms, which can lead to faster and more efficient research. Finally, the Mac operating system is known for its security and stability, which is crucial when working with sensitive data. Overall, having Mac computers in a department focused on AI and data science can help increase productivity, efficiency, and security, ultimately leading to better research outcomes.



NIVETHA A
20AD028

FRIENDSHIP

**In the realm of friendship, let words take flight,
Where hearts are bound, like stars in the night.
With words I weave, a tapestry of grace,
A poem to honor this cherished space.**

**Friends, the gems that sparkle bright,
Guiding us through life's darkest night.
In laughter and tears, they're always near,
With comforting words and a listening ear.**

**Together we dance in the meadows of joy,
No distance or time could ever destroy.
Through ups and downs, they lend a hand,
A sturdy pillar on which we can stand.**

**Friends are the melody that colors our days,
Their presence, a symphony that never decays.
Through secrets shared and dreams pursued,
They lift us up when we're feeling subdued.**

**In their embrace, we find solace and peace,
A shelter where all worries cease.
They see us truly, flaws and all,
Yet still, by our side, they stand tall.**

**In the garden of friendship, we sow seeds,
Nurturing bonds that meet all our needs.
With trust as the soil and love as the rain,
The roots grow deeper, unbreakable chain.**

**So let us celebrate these friendships dear,
For they bring light and banish all fear.
With grateful hearts, let's raise our voice,
To friends, our blessings, our souls' true choice.**



KISHORE KUMAR K
20AD024

HUMANITY

Savoring the wealth of happiness as the humanity is long forgotten. Cries of people not heard as pleasure & leisure is sought often.

No point in stooping as low as playing with other feelings,
just to attain something worth nothing.

The dominance continues till the end of the breathe, Justice is nothing but a word of hope hanging around the edge of cliff.

TIME

Imagine there is a bank that credits to your account each morning with 86,400. It carries over no balance from day to day. Every evening the bank debits whatever part of the balance you failed to use during the day. What would draw out every cent! Each one of us have such a bank. Its name is "Time". Every morning it credits to your account 86,400 seconds. Every night it writes off whatever you failed to invest for a good purpose. It carries over no balance. Every day it opens a new account for you. Each night it burns the remains of the day. If you fail to use the day deposits, the loss is yours. You must live in the present on today's deposits. Invest it so as to get from it the utmost in health, happiness and wealth.

The clock is running.....

Use the most of the time because you can never get it back.

SUREKA P
20AD056





HITHESH N
20AD017

BLOCKCHAIN - BASED VOTING SYSTEM

Blockchain technology has been hailed as a game-changer in various fields, and it has the potential to revolutionize the way we vote by providing a secure and tamper-proof system that can be used for both online and offline voting. Blockchain-based voting systems can eliminate the need for intermediaries, reduce the risk of fraud, and increase voter participation.

One of the main advantages of blockchain-based voting systems is that they can provide a transparent and secure way to conduct elections. The blockchain is a distributed ledger that records transactions and makes it difficult to manipulate or alter data. This means that votes can be securely recorded and counted in a way that is transparent and tamper-proof.

In addition to providing security and transparency, blockchain-based voting systems can also reduce the risk of fraud. The blockchain is designed to prevent double-spending, which means that it is very difficult to manipulate the data on the blockchain. This makes it very difficult for someone to tamper with the votes and manipulate the outcome of an election.

Another advantage of blockchain-based voting systems is that they can increase voter participation. By providing a more accessible and convenient way to vote, more people may be encouraged to participate in the electoral process. This could lead to higher voter turnout and a more representative democracy.

Blockchain-based online voting can be conducted remotely without reputational or legal risks. Voters can participate in the election from anywhere in the world as long as they have an internet connection. This is particularly useful for people who are unable to travel to a polling station or are living overseas. However, there are concerns about the security guarantees required for safe online elections.

One of the main concerns with blockchain-based voting systems is the security of the system. While blockchain technology provides a secure and tamper-proof system, it is not immune to hacking or other cyber attacks. Therefore, it is important to ensure that the system is properly secured and that appropriate security measures are in place.



HITHESH N
20AD017

அன்புடன்

மழையின்துயரத்தில் மருந்தாகி நின்றாய்,
பூமிமேடையில் இருந்து என்னை திரும்பவில்லையே.
புதுவெள்ளம்தேடி சென்றபோது,
நீர்மழைக்கு அமைவது தெரியவில்லையே.

அன்பைக்கூறாமல் அழகிய நாட்கள் கடந்து,
என்உயிரை வாழ்க்கையில் நீ மிஞ்ச வாயில்லையே.
அதுவேநீ என்னை பாதித்து விட்டு,
என்உள்ளத்தை வலியுறுத்தி விட்டாயே.

உன்னைப்பற்றி என் உயிர் மகிழும்,
உன்னைப்பார்த்த முதல் நாள் மேகம் மின்னும்.
உன்னைஅறிய என் வாழ்க்கை மட்டும்போற்றுவேன்,
உன்கருவியில் பிரிந்ததை அடக்க முடியவில்லையே.

என்மனதை அழுத்தி வாழ்க்கை தருமாறு,
உனக்குஅதிகமான மனம் போற்றுவேன்.
என்னைப்பார்த்து உன்னைப் பற்றி என் நெஞ்சத்தை மிரட



HARSHITAA G
21AD017

IMBRICATE CRYPTOGRAPHY

Introduction to Cryptography :

Security and privacy are critical for electronic communication and e business. Network security measures are needed to protect data during its transmission. Cryptography plays a vital role in network security as it allows two parties to exchange sensitive information in a secured manner. The word cryptography means covered writing (covered for crypto and writing for graphy). It involves the use of a secret key known only to the participants of the secure communication: If A wants to send a message to B, he encrypts the original message X by the encryption algorithm using the key agreed upon by them. The encrypted message is transmitted through the communication media and the key is transmitted through a secured media like RF cable, fibre, etc. The receiver decrypts the original message from the encrypted message using the same key and the decryptor. A cryptanalyst may try to capture the message and the key. If he fails to do so, the encryption algorithm is successful.

CRYPTOGRAPHY:

When it comes to the security of any important data, the first solution what strikes is encoding the actual data in some form which is private to the user/users only. In technical terms, the simplest solution is Cryptography.

What is cryptography?

Cryptography is the art of achieving security by encoding messages to make them non-understandable to others. Forming an intelligible message into unintelligible one and then retransforming that message back to its original form is Cryptography.

There are two types of cryptography:

- Asymmetric Cryptography
- Symmetric Cryptography

If the sender and the receiver use different keys, its called asymmetric or multiple-key, public-key encryption.

If the sender and the receiver use the same key, it is called symmetric or single-key, secret-key or conventional encryption.

Encryption: It is the technique of converting original text into coded text using particular key.

Decryption: It is the technique of converting coded text into original text using some key.

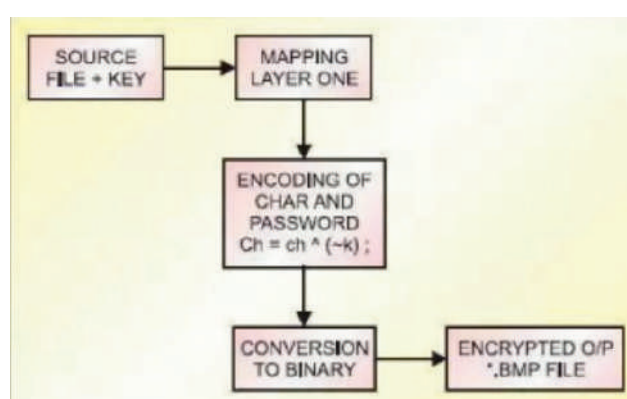
Whereas the original text known as plain text and coded text is known as cipher text.

What is Imbricate cryptography?

Imbricate cryptography is a new technique that uses the layered approach designed by us. It is a type of symmetric cryptography in which the key is implanted in the message, so the message cannot be recovered without using the correct key. Here the message and the key are inwardly plaited.

It involves layers of encryption and decryption. Since the key is of variable length of the users choice, it cannot be found by permutation and combination. Moreover, the output transmitted as a bitmap file perplexes the cracker. Thus the encrypted file can be sent across the network of interest.

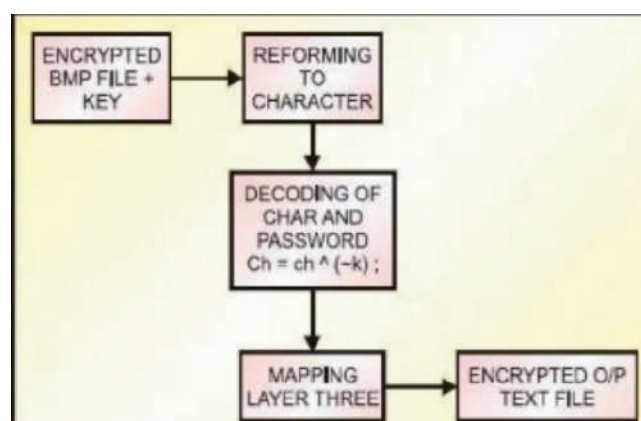
Implementation is done by us for the message involving text but the algorithm is extensible to any media. Simplicity, user-orientation and compatibility are the key features of the algorithm.



Imbricate Cryptography – encryption

Algorithm for decryption :

1. Get the bitmap file and the key from the user.
2. Read the binary values from the file and convert back into characters. This is the end of layer-1.
3. From the password (key) received from the user, decode each character with successive character of the key.
4. The formula for encoding is:
 $char_new = (char_old) \text{ XOR } (\sim key[i]);$
 This is the end of layer-2.
5. Choose a mapping character for each character using the table in the reverse order.
6. Replace the original character with the mapping character. This is the end of layer-3.
7. Write the decrypted character in the output file.



Imbricate Cryptography – decryption

System performance:

Any person who wants to crack this system must:

- 1. Know that the binary values in the bitmap represent ASCII value of the encrypted character.**
- 2. Read the binary values from the bitmap file and convert them into characters.**
- 3. To break the second layer, find the logic that the key is XORed with the characters. (The key should be known.) But finding the key, which is transmitted over a secured channel, is not possible.**
- 4. Then find the mapping characters to break the first layer. Use of the permutation and combination method for finding the key is impossible. Hence the system performance is good.**

Advantages of the system:

1. Confidentiality.

No user can access the message without using the correct key.

2. Simplicity.

The system can be implemented (only for text messaging) through a very simple ,C program given at the end of this article.

3. Security.

The system is secure because the key is sent through a secret medium and the message cannot be recovered without the key.

4. Protection. It is provided by the key as it controls the access to the message.

5. Incorporated key.

Many cryptography techniques use the key for only access control. Our system integrates the key with the message, so the message can be separated from the key only if the correct key is produced.

Imbricate cryptography involves layers of encryption and decryption. Since the key is of variable length of the users choice, it cannot be found by permutation and combination. Moreover, the output transmitted as a bitmap file perplexes the cracker.

Thus the encrypted file can be sent across the network of interest.

Applications:

Identification and Authentication:

Identification and authentication are two widely used applications of imbricate cryptography.

Identification is the process of verifying someones or somethings identity. Authentication merely determines whether that person or entity is authorized for whatever is in question. For this purpose Digital signatures are used.

Certification:

Its a scheme by which trusted agents such as certifying authorities vouch for unknown agents, such as users. The trusted agents issue vouchers called certificates which each have some inherent meaning. Certification technology was developed to make identification and authentication possible on a large scale.

Personal Use:

Privacy is perhaps the most obvious application of imbricate cryptography. Privacy is the state or quality of being secluded from the view and or presence of others. Imbricate cryptography can be used to implement privacy simply by encrypting the information intended to remain private. In order for someone to read this private data, one must first decrypt it. Note that sometimes information is not supposed to be accessed by anyone, and in these cases, the information may be stored in such a way that reversing the process is virtually impossible.

Passwords:

Passwords are not typically kept on a host or server in plaintext, but are generally encrypted using some sort of hash scheme. In the Windows NT case, all passwords are hashed using the MD4 algorithm, resulting in a 128- bit (16-byte) hash value.

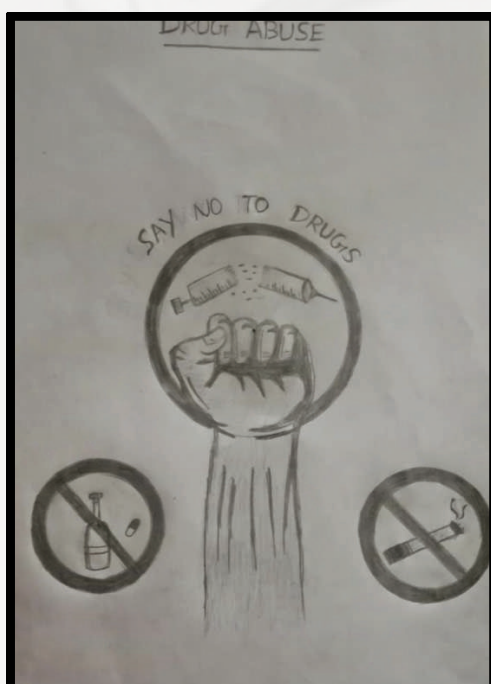
ARTISTS FLAIR



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21AD034

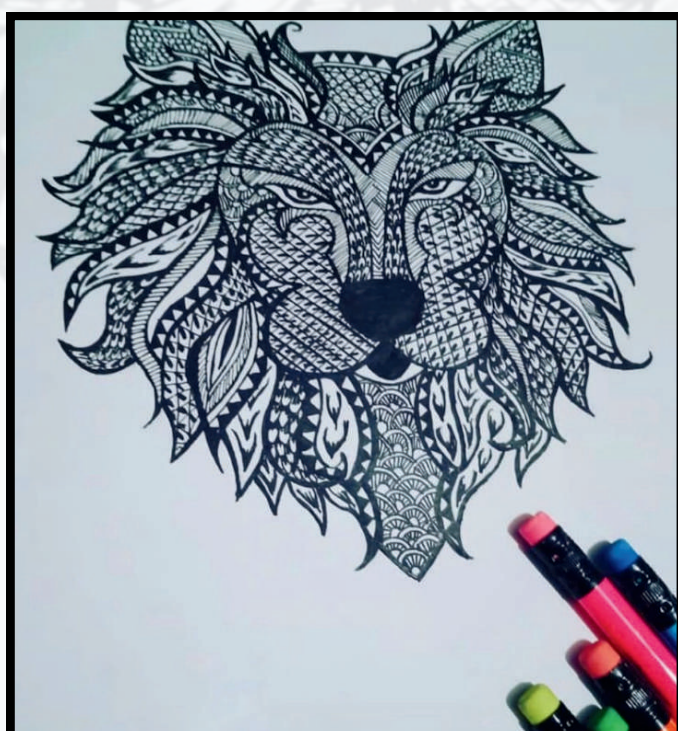


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