

Science and Technology Class 12

18th August, 2023 at 1:00 PM

ARTIFICIAL INTELLIGENCE (01:15 PM)

- AI refers to the simulation of human-like intelligence in machines.
- It enables them to perform tasks such as learning, problem solving, and decision making among others.
- The term **narrow AI (or weak AI)** refers to AI systems designed to perform tasks.
- **General AI or strong AI** would have the ability to perform any intellectual tasks that a human can do.
- There are no known examples of general AI in existence.

AI TECHNOLOGIES (01:28 PM)

- **1) Computer Vision -**
- Technologies that allow machines to interpret and understand visual information from the world around them.
- It has applications in image recognition, facial recognition, self-driving cars etc.
- **2) Natural language processing**
- It enables machines to understand and interpret human languages.
- It has applications for voice assistance, chatbots, and language translation.
- **For ex-** Large language models that are designed to understand and generate human-like texts.
- **3) Expert systems-**
- Computer programs that use a knowledge base and reasoning algorithms to provide expert-level advice in a specific domain such as medicine, law, or finance.
- **4) Machine Learning-**
- A type of AI that allows machines to learn from data and improve their performance over time.
- It involves the use of algorithms that can automatically improve themselves by learning from the data they are fed.
- **Deep learning Neural networks** are modelled after the structure and functions of the human brain. They are capable of learning complex patterns, and relationships in data making them well-suited for a wide range of applications.
- **Generative AI** refers to a class of AI algorithms that are capable of generating new data such as texts, code, images, audio and video.
- E.g. Chat GPT, GPT 4, Dall-E, Bard (Google)

CHALLENGES (02:06 PM)

- **Biases-**
- AI systems can be biased if they are trained on biased data or designed with biases.
- This can lead to discriminatory outcomes such as hiring, lending, and criminal justice systems.
- **Transparency and accountability-**
- If an AI commits a mistake then who should be held accountable?
- It is important to ensure that AI systems are transparent and can be explained to stakeholders.

- **Data Security and Privacy-**
- AI systems rely on vast amounts of data.
- It is important to ensure that this data is handled securely and in compliance with privacy regulations.
- **Unethical uses-**
- Possible misuse such as the use of deep fakes to cause social disharmony, and mass surveillance on citizens among others.
- There is a fear that an intelligence explosion may lead to a **super-intelligent AI**.
- It is crucial to ensure that this superintelligence is good for humankind.
- **Unemployment**
- AI has the potential to automate many tasks and change the nature of work across various industries.
- Some jobs are especially vulnerable- customer service, logistics jobs, data entry jobs, accounting jobs etc.

BLOCKCHAIN TECHNOLOGY AND CRYPTOCURRENCIES (02:48 PM)

- Blockchain technology is a **decentralised and distributed ledger system** that securely records and verifies transactions.
- It enables transparent and immutable storage of data making it highly secure and tamper-proof.
- **The key features are the following-**
- **Decentralisation-** It operates on peer to peer basis with no central authority controlling the system.
- **Distributed ledger-** No single entity has control over the entire system making it highly resilient to failures and attacks.
- **Security and cryptography-** Transactions recorded are secured using cryptographic algorithms. For ex- Each block contains a cryptographic hash that ensures the integrity and immutability of data.
- **Consensus mechanism-** Blockchain networks use a consensus mechanism to agree on the validity of transactions. Popular mechanisms include proof of work and proof of stake.
- Blockchains were designed for cryptocurrencies such as bitcoin and ether but they have applications beyond cryptocurrencies.
- **For e.g.**
- Supply chain management such as Walmart.
- Healthcare
- Intellectual Property
- Voting systems
- Land record management
- Banking and Finance among many others.

CHALLENGES IN BLOCKCHAIN TECHNOLOGY (03:31 PM)

- **Scalability-**
- Blockchain networks face challenges in handling a large number of transactions.
- **High energy consumption-**
- Some blockchain networks based on proof of work are not considered environmentally friendly because of high power consumption.
- **Interoperability** between different blockchain networks is a challenge.
- As blockchain technology evolves there is a need to establish regulatory frameworks to address legal, privacy and compliance issues.
- It is a relatively new technology and **complex** for many users.
- Designing a blockchain requires **technical expertise**, lack of skilled workforce can be a challenge.

CRYPTOCURRENCY (03:48 PM)

- They are a type of digital currency that uses cryptographic principles for transactions and anti-counterfeiting.
- They are not issued by any central authority and work on a peer-to-peer distributed ledger called a blockchain.
- E.g. Bitcoin, Ether etc
- **There are many benefits-**
- Impossible to counterfeit.
- No central authority.
- Peer-to-Peer network.
- Safety of Blockchain technology among others.
- New cryptocurrencies can be mined in a proof-of-work blockchain which is called crypto-mining.

THE TOPIC OF THE NEXT CLASS- DEFENSE TECHNOLOGY