

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING (IT3201)

(Sem: 6th (Section B and E))
Lecture 1-3

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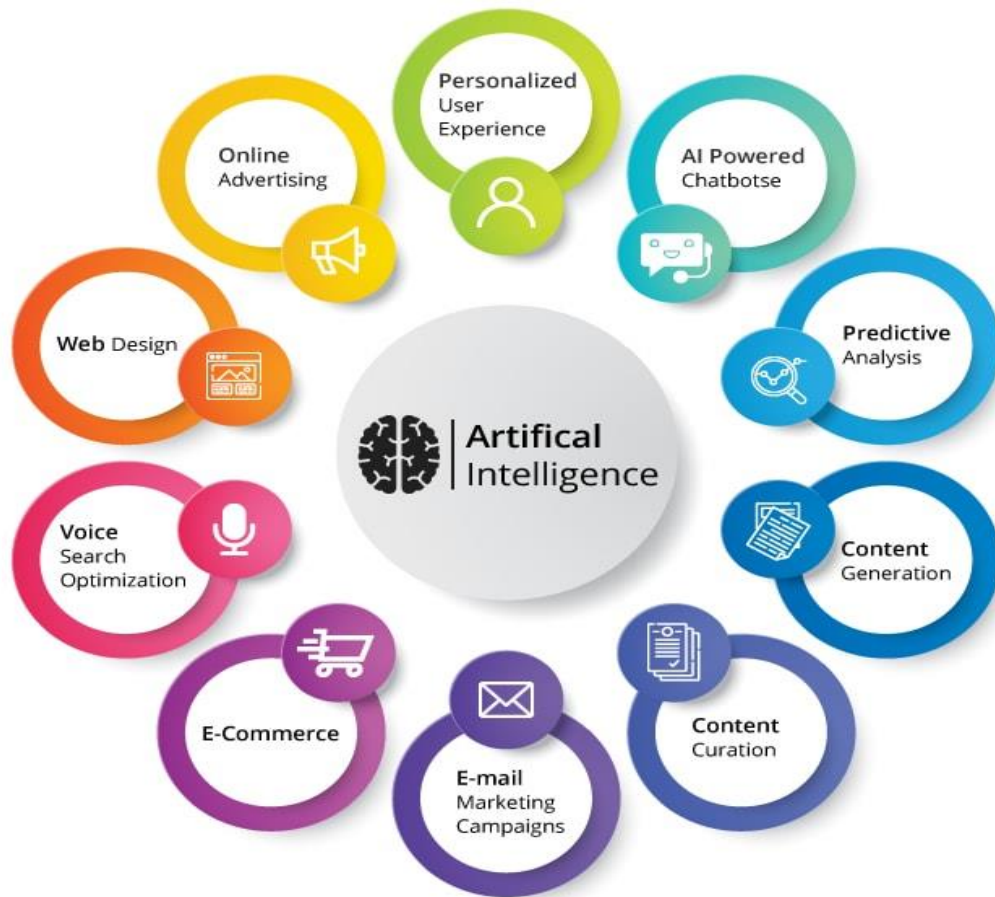
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Introduction to Artificial Intelligence

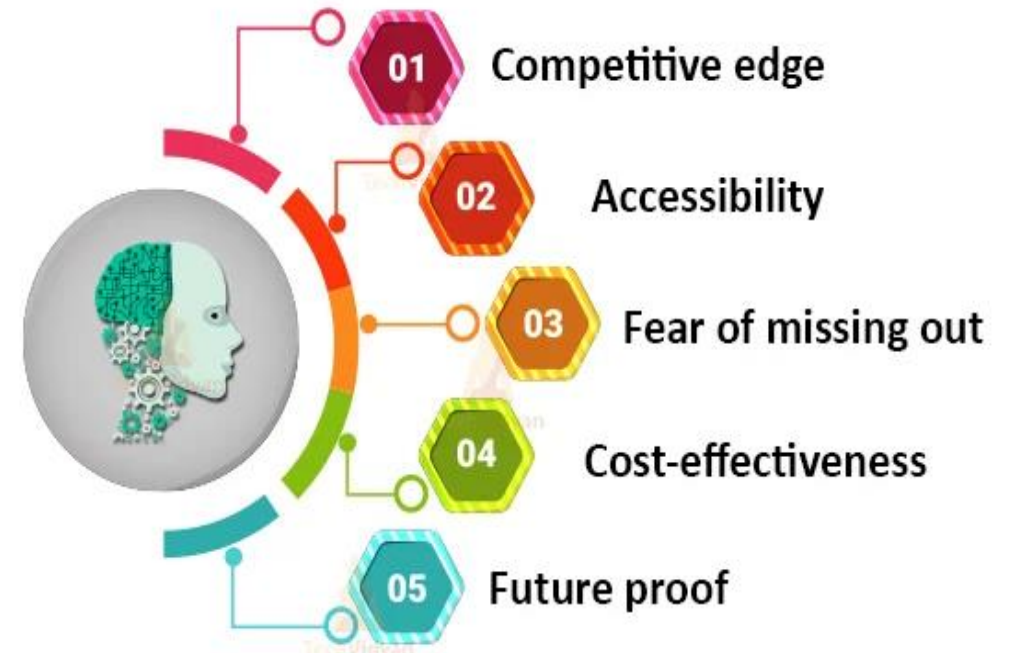
- Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think and learn like humans.
- The ultimate goal of AI is to create systems that can perform tasks that normally require human intelligence, such as problem-solving, understanding natural language, speech recognition, visual perception, and decision-making.

Application of Artificial Intelligence

Need of Artificial Intelligence



Need for Artificial Intelligence



AI can be classified into two main types

Narrow AI (Weak AI): This type of AI is designed and trained for a particular task. It excels in performing a specific function but lacks the broad cognitive abilities of human intelligence.

Examples include virtual personal assistants, image and speech recognition systems, and recommendation algorithms

AI can be classified into two main types

General AI (Strong AI): This represents a level of AI that can understand, learn, and apply knowledge across different domains, similar to human intelligence. General AI has the ability to adapt to new tasks and learn from experience, displaying a high level of cognitive abilities. Achieving true general AI remains a significant challenge and is an area of ongoing research.

An example of a system that approaches a broader understanding of tasks is OpenAI's GPT-3 (Generative Pre-trained Transformer 3).

Key components and techniques within AI

Machine Learning (ML): A subset of AI that focuses on the development of algorithms and statistical models that enable computers to improve their performance on a task through experience. Types of machine learning include supervised learning, unsupervised learning, and reinforcement learning.

Deep Learning: A specialized form of machine learning that involves neural networks with many layers (deep neural networks). Deep learning has proven highly effective in tasks such as image and speech recognition, natural language processing, and playing strategic games.

Key components and techniques within AI

- **Natural Language Processing (NLP):** A field of AI that focuses on the interaction between computers and humans using natural language. NLP enables machines to understand, interpret, and generate human language, facilitating communication between humans and computers.
- **Computer Vision:** This area of AI involves giving machines the ability to interpret and understand visual information from the world, such as images and videos. Computer vision is used in applications like facial recognition, object detection, and autonomous vehicles.

Key components and techniques within AI

- **Robotics:** AI plays a crucial role in robotics by enabling machines to perceive their environment, make decisions, and carry out actions. This includes tasks like navigation, manipulation, and interaction with the physical world.

Abridged history of AI

- 1943 McCulloch & Pitts: Boolean circuit model of brain
- 1950 Turing's "Computing Machinery and Intelligence"
- 1956 Dartmouth meeting: "Artificial Intelligence" adopted
- 1958 Early AI programs, including Samuel's checkers program, Newell & Simon's Logic Theorist, Gelernter's Geometry Engine
- 1965 Robinson's complete algorithm for logical reasoning
- 1966—73 AI discovers computational complexity
Neural network research almost disappears
- 1969—79 Early development of knowledge-based systems
- 1980-- AI becomes an industry
- 1986-- Neural networks return to popularity
- 1987-- AI becomes a science
- 1995-- The emergence of intelligent agents