

Introduction to AI

- **AI** as simulation of human intelligence by computer systems.
- **History:** Early development in the 1950s.
- **Examples of AI:**
 - Voice assistants
 - Recommendation systems
 - Autonomous vehicles

Applications of AI

- **Facial recognition:** Identifying individuals in images/videos.
- **Self-driving cars:** Process sensor data to navigate roads.
- **Image detection:** Recognizing and classifying objects in images.
- **Chatbots:** Simulates conversations with users.

Practical Applications

- **Sentiment analysis:** Rating text reviews as positive/negative.
- **Chatbot programming:** Assisting online customers.
- **Image recognition:** Identifying shapes in images based on patterns.

Key Concepts

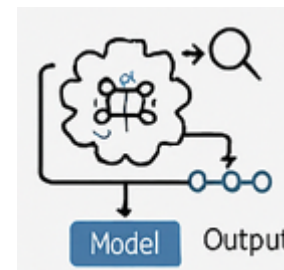
Key Concepts



- **AI:** Turing's idea of AI.
- **Machine Learning (ML):** A type of AI that enables learning from data.
- **Neural Networks:** A type of ML inspired by the human brain.
- **Rules:** Specific conditions or instructions.
- **Turing Test:** A measure of a machine's ability to exhibit human-like intelligence.

Machine Learning

- ML:** A subset of AI that improves from experience.
- Training data:** Collected data used to train ML models.
- Supervised learning:** Uses labelled data to learn.
- Unsupervised learning:** Finds patterns in unlabelled data.
- Strengths:**
- Solves complex problems
 - Adaptability
- Weaknesses:**
- Requires large datasets
 - Issues with explainability



Vocabulary

- Machine learning:** Inferring behaviour from data.
- Neural network:** An assembly of interconnected units inspired by the human brain.
- Ethics:** Morality in conduct and decision making.
- Turing test:** A measure of human-like interaction.
- Rule:** A condition or instruction for solving a problem.

What is AI

What AI is: AI mimics human intelligence in machines.

Types of AI: Rule-based vs. Data-driven AI.

AI Applications: Examples like self-driving cars and virtual assistants.

Benefits & Issues: AI can make tasks easier, but it also presents challenges like job displacement and bias.

Data Learning

Machine Learning (ML): The process by which computers learn from data.

Classification: A way of sorting data into categories using labelled examples.

Supervised Learning: When a model is trained with labelled data to predict outcomes.

Bias in Bias Out

• **Bias in Data:** How biased data can result in biased AI models.

• **Training Data:** The importance of using diverse and fair data to train AI models.

• **Impact on Predictions:** How data bias can affect the accuracy and fairness of a model.

Decision Trees



What Decision Trees Are: A method of making decisions based on data.

How Decision Trees Work: Using questions and answers to predict outcomes.

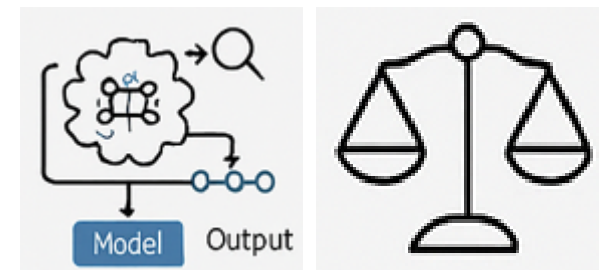
Training Decision Trees: How data is used to create decision trees that classify information.

Problem Solving

AI Project Lifecycle: Stages of developing an AI system.

Model Testing: The process of checking a model's accuracy.

User-Centred Design: Designing AI with the user's needs in mind.



Vocabulary

- **AI:** Artificial Intelligence
- **Data-driven:** AI systems that learn from data.
- **Rule-based:** AI systems based on predefined rules.
- **ML:** Machine Learning
- **Classification:** Sorting data into groups.
- **Supervised Learning:** Learning from labelled examples.

What is AI

- AI:** AI is when computers simulate human thinking and learning to solve problems.
- Machine Learning:** A method where computers learn from data without being explicitly programmed.
- Deep Learning:** A subset of machine learning using neural networks to analyse complex patterns.

Robotics

Robotics:

•Robotics involves designing machines (robots) that can perform tasks autonomously.

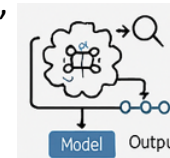
•**Applications:** Industrial robots, medical robots, autonomous vehicles.

Key Components:

•**Sensors:** Detect the environment.

•**Actuators:** Enable movement (motors, hydraulic systems).

•**End Effectors:** Tools used for specific tasks (e.g., grippers, welding torches)



Future AI

Healthcare: Personalized medicine and robotic surgeries.

Smart Cities: AI for urban planning, energy efficiency, and traffic management.

Space Exploration: AI for autonomous spacecraft and planetary missions.

Applications

Virtual assistants, recommendation systems (e.g., Netflix, Spotify)

Robotics, self-driving cars

AI in everyday tools like Siri and Alexa

User Interface: Where users interact with the system.

Inference Engine: The decision-making part that applies logic to data.

Knowledge Base: A repository of expert information and rules.



Ethics

•**Bias:** AI can be unfair if trained on biased data, leading to unjust outcomes.

•**Accountability:** Ensuring that there's a clear responsibility for AI decisions.

•**Privacy:** Protecting personal data collected by AI systems.

Ethical Dilemmas:

•Facial recognition and privacy concerns.

•Bias in AI, particularly in job recruitment and law enforcement.

•Ensuring fairness in AI systems to avoid discriminatory practices.



Vocabulary

Artificial Intelligence (AI): Machines simulating human intelligence.

Machine Learning (ML): Computers learning from data without explicit programming.

Deep Learning: A subset of ML using neural networks to recognize patterns.

Expert Systems: AI programs that replicate human expertise for decision-making.

Robotics: The field of AI focused on designing robots that perform tasks autonomously.

Generative AI: AI that creates new content such as text, images, and videos.