What is artificial intelligence?

Artificial intelligence (AI) is the theory and development of computer systems capable of performing tasks that historically required human intelligence, such as recognizing speech, making decisions, and identifying patterns.

What is an AI Agent?

An AI agent is a software program that can interact with its environment, collect data and use that data to perform self-directed tasks that meet predetermined goals. Humans set goals, but an AI agent independently chooses the best actions it needs to perform to achieve those goals.

Types of Agents in AI?

There are 4 types of AI Agents Simple Reflex Agents, Model-Based Reflex Agents, Goal-Based Agents, Utility-Based Agents.

What are Simple Reflex Agents?

Simple reflex agents act solely on the current percept using predefined condition–action rules, without storing or considering any history. They are fast and easy to implement, making them suitable for fully observable, stable environments with clear and simple rules. However, they tend to fail in dynamic or partially observable situations because they lack memory and deeper reasoning capabilities.

What is Model-Based Reflex Agents?

Model-based reflex agents enhance the simple reflex approach by maintaining an internal state or model of the world, that tracks aspects of the environment not directly observable at each moment. This enables them to deal with partial observability and dynamic changes more effectively, although their decisions are still largely reactive and dependent on the accuracy of the model they maintain.

What is Goal-Based Agents?

Goal-based agents select actions by considering future states relative to explicit goals. They are capable of planning sequences of actions to reach these goals rather than just reacting to the current state which enables more flexible and intelligent problem-solving. However, they require well-defined goals and effective planning algorithms to perform well in complex domains.

What is Utility-Based Agents?

Utility-based agents extend goal-based reasoning by considering not only whether a goal is met but also how valuable or desirable a particular outcome is. They use a utility function to quantify preferences and make trade-offs between competing objectives, enabling nuanced decision-making in uncertain or resource-limited situations. Designing an appropriate utility function is crucial for their effectiveness.

What is Machine learning?

Machine learning is a branch of Artificial Intelligence that focuses on developing models and algorithms that let computers learn from data without being explicitly programmed for every task. In simple words, ML teaches the systems to think and understand like humans by learning from the data.

Types of Machine Learning?
There are 3 types of machine learning Supervised Learning, Unsupervised Learning, Reinforcement Learning.

- **Supervised Learning:** Trains models on labelled data to predict or classify new, unseen data.

- **Unsupervised Learning:** Finds patterns or groups in unlabelled data, like clustering or dimensionality reduction.

- **Reinforcement Learning:** Learns through trial and error to maximize rewards, ideal for decision-making tasks.

What is the process of Machine learning?

Machine learning process consists of 6 steps Data Input, Algorithms, Model Training, Feedback loop, Experience and Iteration, Evaluation and Generalization.

1. **Data Input:** Machine needs data like text, images or numbers to analyze. Good quality and enough quantity of data are important for effective learning.

2. **Algorithms**: Algorithms are mathematical methods that help the machine find patterns in data. Different algorithms help different tasks such as classification or regression.

3. **Model Training**: During training, the machine adjusts its internal settings to better predict outcomes. It learns by reducing the difference between its predictions and actual results.

4. **Feedback Loop**: Machine compares its predictions with true outcomes and uses this feedback to correct errors. Techniques like gradient descent help it update and improve.

5. **Experience and Iteration**: Machine repeats training many times with data helps in refining its predictions with each pass, more data and iterations improve accuracy.

6. **Evaluation and Generalization**: Model is tested on unseen data to ensure it performs well on real-world tasks.