Different types of AI

Estimated time: 10 minutes

Introduction

Artificial intelligence (AI) encompasses a range of systems designed to mimic, enhance, or exceed human capabilities. AI can be categorized based on its capabilities and functionalities. Understanding these types and their capabilities highlights the diverse applications and potential of AI technologies.

Objectives

After completing this reading, you will be able to:

- Explain the types of artificial intelligence based on their functionalities.

- Explore the capabilities of each type of artificial intelligence.

AI types

1. **Diagnostic/descriptive AI**

   Diagnostic or descriptive AI focuses on assessing the correctness of behavior by analyzing historical data to understand what happened and why. This type of AI is instrumental in identifying patterns and trends, performing comparative analyses, and conducting root cause analyses.

   Capabilities:

   Scenario planning: Helps in creating different future scenarios based on historical data.

   Pattern/trends recognition: Identifies recurring patterns and trends within data sets.

   Comparative analysis: Compares various data points to find correlations and insights.

   Root cause analysis: Determines the underlying reasons behind specific outcomes.

2. **Predictive AI**

   Predictive AI is concerned with forecasting future outcomes based on historical and current data. This type of AI is used extensively in predicting customer behavior, market trends, and other forward-looking insights.

   Capabilities:

   Forecasting: Predicts future trends and events.

   Clustering and classification: Groups similar data points and classifies them into predefined categories.

   Propensity model: Assesses the likelihood of specific outcomes based on current data.

   Decision trees: Utilize a tree-like model of decisions to predict outcomes.

3. **Prescriptive AI**

   Prescriptive AI focuses on determining the optimal course of action by providing recommendations based on data analysis. It goes beyond prediction by suggesting actions that can help achieve desired outcomes.

   Capabilities:

   Personalization: Tailors recommendations and experiences to individual needs.

   Optimization: Identifies the most efficient ways to achieve goals.

   Fraud prevention: Detects and prevents fraudulent activities through analysis.

   Next best action recommendation: Provides actionable insights on the next steps to take.

4. **Generative/cognitive AI**

   Generative or cognitive AI is involved in producing various types of content, such as code, articles, images, and more. This type of AI mimics human creativity and cognitive processes to automate and assist in content creation.

   Capabilities:

   Advises: Offers expert advice and recommendations.

   Creates: Produces new content, such as text, images, and code.

   Protects: Enhances security measures through intelligent analysis.

   Assists: Provides assistance in various tasks, improving efficiency.

   Automates: Automates repetitive tasks to save time and resources.

5. **Reactive AI**

   Reactive AI systems are designed to respond to specific inputs with predetermined responses. They do not have memory or the ability to learn from past experiences, making them suitable for tasks that require immediate reactions.

   Capabilities:

Rule-based actions: Executes specific actions based on predefined rules.

Instant responses: Provides immediate responses to inputs.

Static data analysis: Analyzes current data without considering past interactions.

6. **Limited memory AI:**

Limited memory AI systems have the ability to use past experiences to inform current decisions. They can learn from historical data to improve their performance over time. This type of AI is commonly used in autonomous vehicles and recommendation systems.

Capabilities:

Learning from data: Uses historical data to make informed decisions.

Pattern recognition: Identifies patterns over time to improve accuracy.

Adaptive responses: Adapts responses based on previous interactions.

7. **Theory of Mind AI:**

Theory of Mind AI is an advanced type of AI that aims to understand human emotions, beliefs, and intentions. It is still in the research stage and seeks to interact more naturally with humans by comprehending their mental states.

Capabilities:

Emotion recognition: Identifies and responds to human emotions.

Social interaction: Engages in more natural and human-like interactions.

Intent prediction: Predicts human intentions based on context and behavior.

8. **Self-aware AI:**

Self-aware AI represents the most advanced form of AI, which has its own consciousness and self-awareness. This type of AI can understand and react to its own emotions and states. It remains a theoretical concept and has not yet been realized.

Capabilities:

Self-diagnosis: Evaluates its own performance and health.

Autonomous learning: Learns independently without human intervention.

Adaptive behavior: Adjusts behavior based on self-awareness.

9. **Narrow AI (Weak AI):**

Narrow AI is designed to perform a specific task or a limited range of tasks. It excels in a single area but lacks generalization capabilities. Most current AI applications fall under this category.

Capabilities:

Task specialization: Excels in performing specific tasks.

High accuracy: Achieves high performance in its designated area.

Efficiency: Operates efficiently within its scope of specialization.

10. **General AI (Strong AI):**

General AI, like human intelligence, can understand, learn, and apply knowledge across a wide range of tasks. It can also transfer knowledge from one domain to another and adapt to new situations autonomously.

Capabilities:

Cross-domain learning: Applies knowledge across various domains.

Autonomous decision making: Makes decisions independently in diverse scenarios.

Human-like understanding: Understands and processes information similar to humans.

Summary:

In this reading, you learned about the following:

- The different types of AI include:

    - **Diagnostic/descriptive AI:** Focuses on assessing the correctness of behavior by analyzing historical data to understand what happened and why.

    - **Predictive AI:** Concerned with forecasting future outcomes based on historical and current data.

    - **Prescriptive AI:** Focuses on determining the optimal course of action by providing recommendations based on data analysis.

    - **Generative/cognitive AI:** Involved in producing various types of content, such as code, articles, images, and more.

    - **Reactive AI:** Designed to respond to specific inputs with predetermined responses.

    - **Limited memory AI:** Have the ability to use past experiences to inform current decisions.

    - **Theory of Mind AI:** Advanced type of AI that aims to understand human emotions, beliefs, and intentions.

- Self-aware AI: Represents the most advanced form of AI, which has its own consciousness and self-awareness.

- Narrow AI (Weak AI): Designed to perform a specific task or a limited range of tasks.

- General AI (Strong AI): Can understand, learn, and apply knowledge across a wide range of tasks like human intelligence.