1. Introduction to Artificial Intelligence

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines...

1.1. History of AI

The field of AI dates back to the 1950s with Turing’s foundational theories...

1.1.1. The Turing Test

Alan Turing proposed a test to determine whether a machine can exhibit intelligent behavior...

1.1.2. Early AI Programs

Examples include the Logic Theorist and ELIZA...

1.2. AI in the Modern Era

Recent breakthroughs in machine learning, NLP, and robotics...

2. Core Disciplines in AI

This section outlines the key subfields that contribute to AI development.

2.1. Machine Learning

Machine Learning enables systems to learn and improve without being explicitly programmed...

2.1.1. Supervised Learning

Supervised learning uses labeled data to train models...

2.1.2. Unsupervised Learning

Unsupervised learning finds hidden patterns in unlabeled data...

2.2. Natural Language Processing

NLP deals with the interaction between computers and human language...

3. Challenges and Future Directions

Despite progress, AI faces ethical, technical, and social challenges...

3.1. Bias and Fairness

Addressing algorithmic bias is critical to equitable AI systems...

3.2. Explainability

Explainable AI aims to make models transparent and understandable...

3.2.1. XAI Techniques

Examples include SHAP, LIME, and counterfactual explanations...