



LESSON 2:

History of AI: From Symbolic AI to Deep Learning

The journey of Artificial Intelligence (AI) spans decades, marked by periods of rapid progress, setbacks, and paradigm shifts. This lesson will explore the key milestones in AI's history, from its early symbolic approaches to today's deep learning revolution.

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The Birth of AI (1950s-1960s)

AI as a field officially began in 1956 at the Dartmouth Conference, where the term "Artificial Intelligence" was coined. This era was characterized by optimism and the belief that human-level AI was just around the corner.



1

Turing Test (1950)

Proposed by Alan Turing as a measure of machine intelligence.

2

Logic Theorist (1955)

The first AI program, developed by Allen Newell and Herbert A. Simon.

3

General Problem Solver (1957)

An early attempt at creating a universal problem-solving machine.

The Era of Symbolic AI (1960s-1980s)

This period focused on creating AI systems based on symbolic reasoning and rule-based expert systems.

Characteristics of Symbolic AI:

- Rule-based systems: Programmed with explicit rules for decision-making.
- Knowledge representation: Attempts to represent human knowledge in a form computers could use.
- Logical reasoning: Emphasis on deductive logic and formal proofs.

Notable Achievements:

1. ELIZA (1966): One of the first chatbots, simulating a psychotherapist.
2. SHRDLU (1970): A natural language understanding program.
3. Expert systems: Programs like MYCIN (1972) for medical diagnosis.

AI Winter (1970s-1980s)

Despite early optimism, AI faced significant challenges and criticism during this period, leading to reduced funding and interest.

Reasons for the AI Winter:

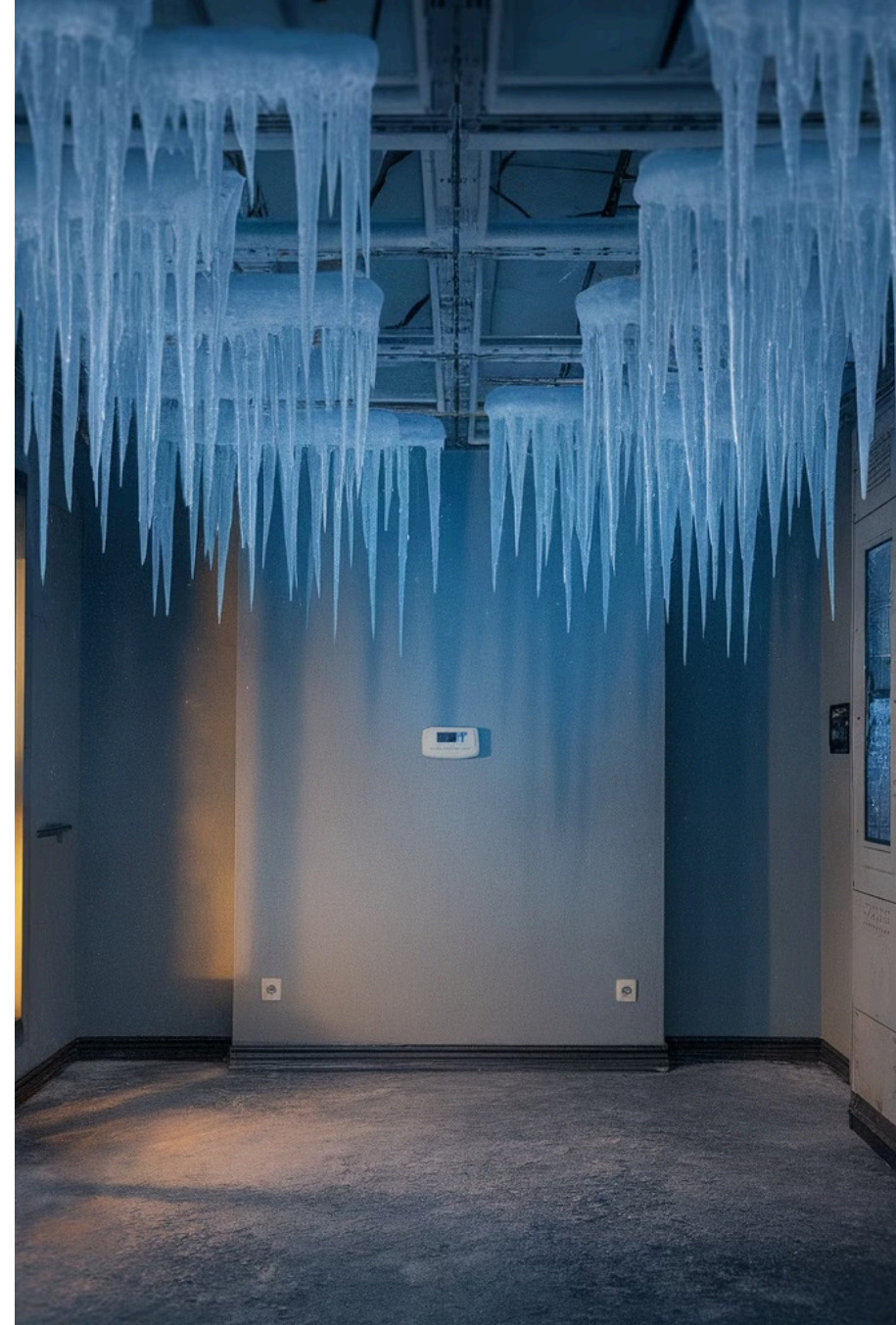
Limitations of existing computing power

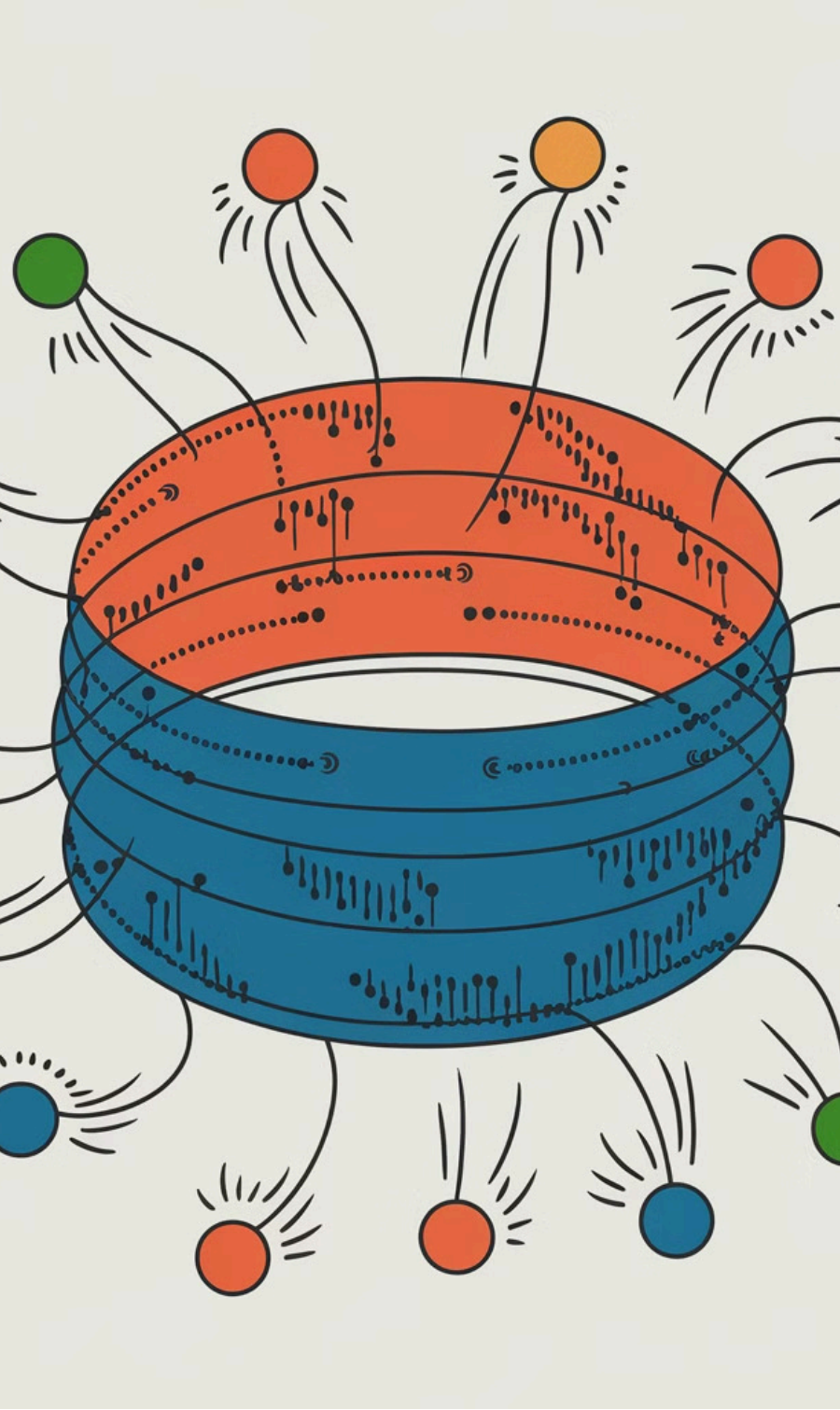
Real-World Complexity

Complexity of real-world problems

Overpromising

Overpromising and underdelivering on AI capabilities





The Rise of Machine Learning (1980s-2000s)

As symbolic AI faced limitations, researchers began exploring approaches based on learning from data.

1

Neural Networks

Renewed interest in artificial neural networks.

2

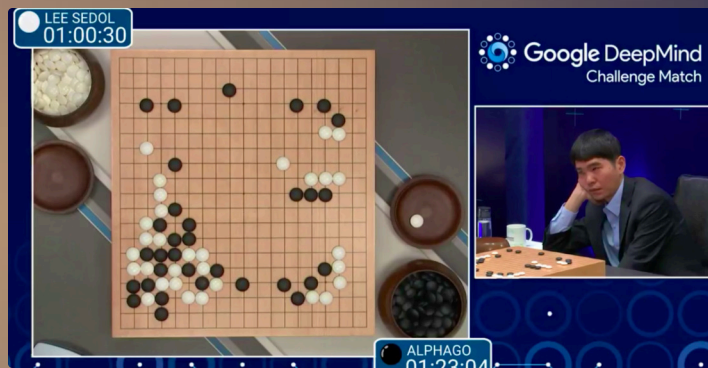
Decision Trees

Introduction of algorithms like ID3 for machine learning.

3

Support Vector Machines

A new approach to classification problems.



The Deep Learning Revolution (2000s-Present)

Advancements in computing power and the availability of big data led to the resurgence of neural networks in the form of deep learning.

1

ImageNet Competition (2012)

Deep learning model achieves breakthrough performance in image recognition.

2

AlphaGo (2016)

DeepMind's AI defeats world champion in the game of Go.

3

Transformer Architecture (2017)

Introduction of attention mechanisms, leading to breakthroughs in natural language processing.



AI in the Present Day

Today, AI is a rapidly evolving field with applications across various domains.



Large Language Models

GPT-3 and its successors pushing the boundaries of natural language understanding and generation.



Reinforcement Learning

AI systems learning through interaction with environments.



AI Ethics and Fairness

Growing focus on the ethical implications and potential biases in AI systems.

The Future of AI and Takeaways

The Future of AI

As we look to the future, several key areas of development are emerging:

1. Artificial General Intelligence (AGI): The ongoing quest for human-level AI.
2. AI-Human Collaboration: Developing AI systems that work alongside humans rather than replacing them.
3. Explainable AI: Making AI decision-making processes more transparent and interpretable.

Takeaways

The history of AI is a testament to human ingenuity and perseverance. From its symbolic beginnings to today's deep learning models, AI has evolved dramatically. Understanding this history provides valuable context for current developments and future possibilities in the field.

1. Evolution of Approaches: Recognize how AI methodologies have shifted over time.
2. Technological Dependencies: Understand how advancements in computing power and data availability have driven AI progress.
3. Recurring Themes: Identify patterns in AI development, including cycles of hype and disappointment.