



Huawei HCCDA-AI certification

Trainer: Fawad Bahadur Marwat

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Training Objective & Outcomes

AI/ML Fundamentals



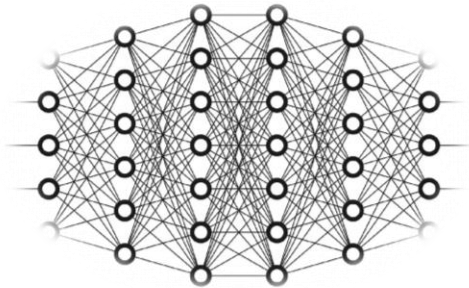
Huawei Cloud AI services



ModelArts



Deep learning frameworks



Real-world AI application development



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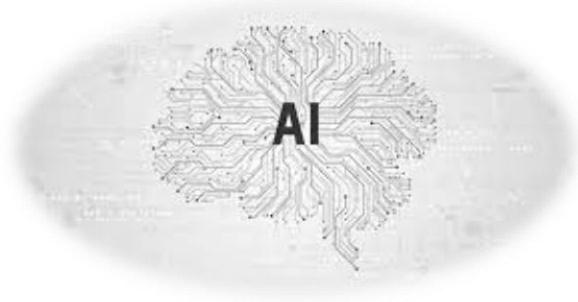
Artificial Intelligence

Definition

Computer systems capable of performing complex tasks that historically only a human could do,

Such as

- Reasoning,
- Making decisions, or
- Solving problems



Autonomous Vehicle

Artificial Intelligence

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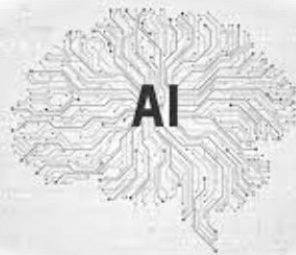


Image Recognition



Weak VS Strong AI

Weak

AI designed for a specific task and operates within a limited context.

Characteristics

- Excels at one particular function
- Does not possess consciousness or self-awareness.
- Cannot generalize beyond its trained domain.



ChatGPT



Strong

AI with human-like cognitive abilities, capable of reasoning, learning, and applying knowledge across various domains.

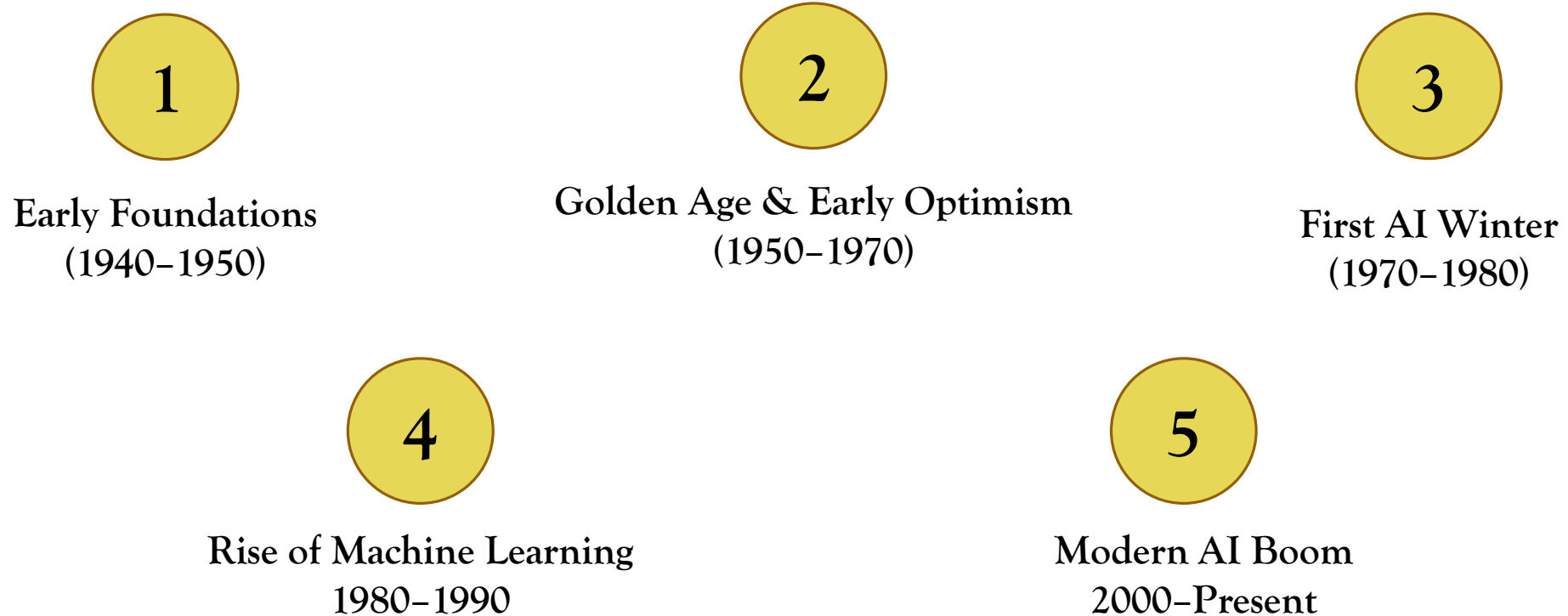
Characteristics

- Can perform any intellectual task a human can.
- Possesses self-awareness, consciousness, and understanding.
- Adapts to new situations without explicit programming.

Current Status: Does not yet exist; remains theoretical.



Historical evolution of artificial intelligence



Historical evolution of artificial intelligence

Early Foundations (1940s–1950s)



1943

McCulloch & Pitts

Propose a computational model of neural networks, laying groundwork for AI.

Historical evolution of artificial intelligence

Early Foundations (1940s–1950s)



1943

McCulloch & Pitts



1950

Alan Turing

Publishes "computing machinery and intelligence",
introducing the turing test for machine intelligence.



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Historical evolution of artificial intelligence

Early Foundations (1940s–1950s)



1943
McCulloch & Pitts



1950
Alan Turing

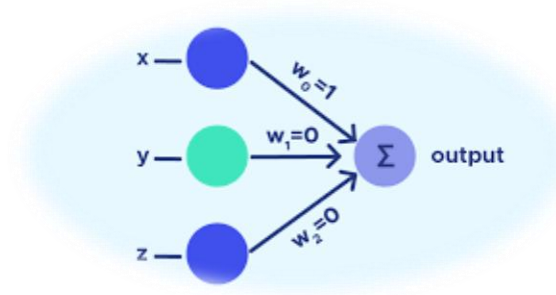


1956
Dartmouth conference

Coins the term "Artificial Intelligence" and establishes
ai as a field.

Historical evolution of artificial intelligence

Golden Age & Early Optimism (1950s–1970s)



1956–1969

Logic-Based AI: Programs like Logic Theorist (Newell & Simon) prove mathematical theorems.

ELIZA (1966): Early chatbot simulating a psychotherapist (Joseph Weizenbaum).

Perceptrons (1957): Frank Rosenblatt's early neural network model.

Historical evolution of artificial intelligence

Golden Age & Early Optimism
(1950s–1970s)



1969
Shakey the Robot

First general-purpose mobile robot using logic and planning.

Historical evolution of artificial intelligence

First AI Winter
(1970s–1980s)



1970
Marvin Minsky

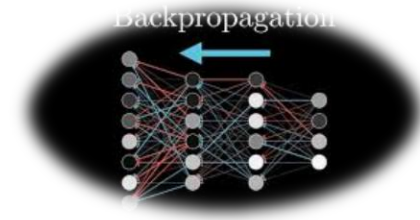
Expert Systems (e.g., MYCIN for medical diagnosis) gain traction using rule-based logic.

Japan's Fifth Generation Project (1982) reignites interest but eventually stalls.

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Historical evolution of artificial intelligence

Rise of Machine Learning
1980s–1990s

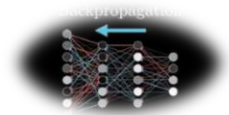


1986s
Backpropagation

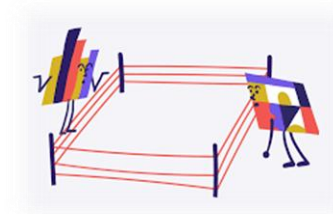
(Rumelhart, Hinton, Williams) revives neural networks.

Historical evolution of artificial intelligence

Rise of Machine Learning 1980s–1990s



1986s
Backpropagation



1990s
Statistical ML

(e.g., SVMs, Bayesian networks) replaces symbolic AI in many domains..



Historical evolution of artificial intelligence

Modern AI Boom
2000s–Present



2000s
Big Data & GPUs

Cheap storage and parallel computing enable training complex models.

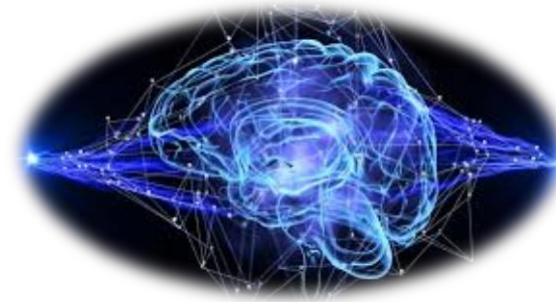
Historical evolution of artificial intelligence

Modern AI Boom 2000s–Present



2000s

Big Data & GPUs



2010s

Deep Learning Revolution

2012: AlexNet (Hinton et al.) dominates ImageNet, popularizing CNNs.

2014: GANs (Generative Adversarial Networks) emerge.

2017: Transformer architecture (Vaswani et al.) revolutionizes NLP (later used in GPT, BERT).



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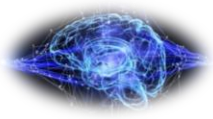
Historical evolution of artificial intelligence

Modern AI Boom 2000s–Present



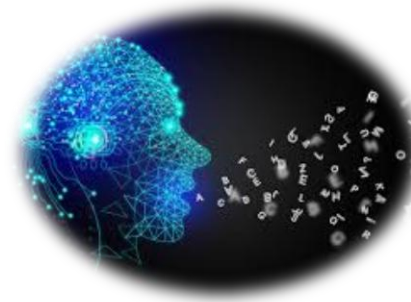
2000s

Big Data & GPUs



2010s

Deep Learning Revolution



2020s

Generative AI

ChatGPT (2022), DALL-E, and multimodal models blur lines between human/machine creativity.



Symbolic vs Machine Learning AI

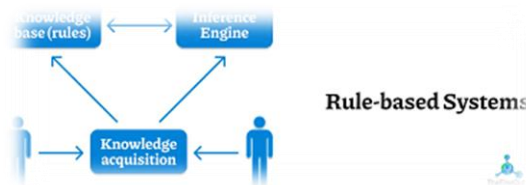
Symbolic AI

1. Uses predefined rules and knowledge representation
2. Relies on human expertise and logic
3. Suitable for well-defined problems

Examples



Logic Based



Rule-based systems

Machine Learning AI

1. Learns from data and identifies patterns
2. Improves performance over time
3. Suitable for complex, data-driven problems

Examples



Image Recognition



Natural Language Processing

Key Domains in AI

Natural Language Processing



NLP deals with the interaction b/w **computers** and **human** (natural) language.

- Natural Language Understanding
- Natural Language Generation
- Speech Recognition
- Machine Translation etc.

Computer Vision



Computer Vision enables computers to **see**, **interpret** and **understand** the visual world.

- Image classification
- Object Detection
- Object Tracking
- Facial Recognition etc.

Robotics



Robotics is a **multidisciplinary** field that integrates AI with **Physical** machines (robots) to enable them to perform tasks, often autonomously in the real world.

- Perception
- Motion Planning
- Manipulation
- Human-robot interaction

Artificial Intelligence in Different Fields

Healthcare

- Disease prediction
- Medical imaging
- AI in diagnostics

Example: Cancer detection using DL models



Agriculture

- Crop yield prediction
- Pest and disease detection using drones
- Soil and weather analysis

Example: AI image analysis for plant diseases



Finance

- Fraud detection
- Credit scoring
- Algorithmic trading

Example: Real-time transaction monitoring



Manufacturing

- Predictive maintenance
- Robotics in assembly lines
- Defect detection
- Example: AI visual inspection systems



Conti...

Education

- Adaptive learning systems
- Automated grading
- Virtual tutors

Example: AI-based learning apps



Cybersecurity

- Threat detection
- Anomaly detection
- Automated response systems.

Example: AI identifying malware patterns



Transportation

- Self-driving technology
- Traffic prediction
- Route optimization

Example: Tesla Autopilot, Google Maps traffic forecasting



Manufacturing

- Content recommendations
- AI-generated content (music, art)
- Deepfake technology

Example: Netflix & YouTube recommendations



Global AI Industry Landscape



Artificial Intelligence Trends

Generative AI



Creates new content

Text, images, music, code

Based on models like GPT, DALL-E, Sora

Large Language Models



Trained on massive text data

Understand and generate human-like language

Example: GPT-4, Claude, Gemini

Edge AI



AI than runs on device (not cloud)

Low latency, privacy-friendly, work offline

Example: AI in phones, smart cameras, wearables

Agentic AI



AI systems that take initiative, act autonomously

Goal-directed, can plan, adapt and execute

Example: AI agents managing tasks, self-improving bots

Challenges in AI Adoption

Data

- Garbage in, Garbage out
- Siloed Data
- Data Scarcity
- Privacy Concerns



Cost and ROI Justification

- Significant Upfront Investment
- Uncertain ROI
- Operational Costs
- Talent Acquisition



Regulation and Compliance

- Evolving Landscape
- Ethical Concerns
- "Black Box" Problem



Gartner Hype Cycle for Artificial Intelligence

