Huawei HCCDA-AI certification

Trainer: Fawad Bahadur Marwat

1

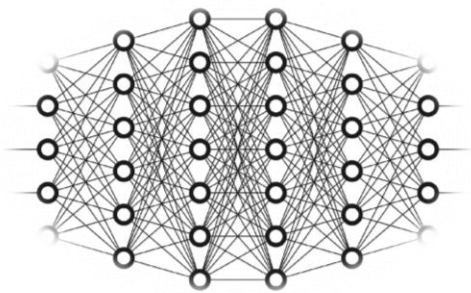
Training Objective & Outcomes

AI/ML Fundamentals

Huawei Cloud AI services

ModelArts

Deep learning frameworks



Real-world AI application development

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Artificial Intelligence

Definition

Artificial Intelligence (AI) is the simulation of human intelligence in machines that are programmed to think, learn, and make decisions.

Autonomous Vehicle

Traditional Programming	Artificial Intelligence
Rule-based	Data-driven
Fixed logic	Learns and adapts
No learning	Improves over time

Core Abilities

Perception – Understanding input (e.g., images, speech)
Reasoning – Making decisions or solving problems
Learning – Improving from data over time
Interaction – Communicating via speech, text, etc.
Autonomy – Acting independently

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Image Recognition

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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.

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Historical evolution of artificial intelligence

1

Early Foundations
(1940–1950)

2

Golden Age & Early Optimism
(1950–1970)

3

First AI Winter
(1970–1980)

4

Rise of Machine Learning
1980–1990

5

Modern AI Boom
2000–Present

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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.

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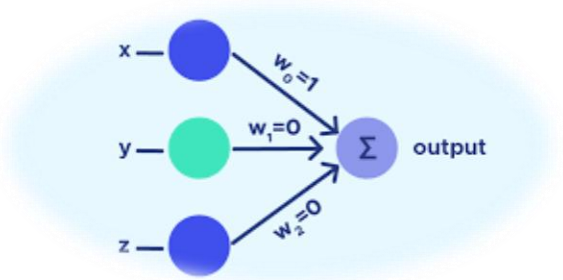
Historical evolution of artificial intelligence

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.

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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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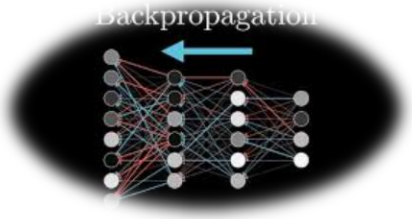
Historical evolution of artificial intelligence

Rise of Machine Learning
1980s–1990s

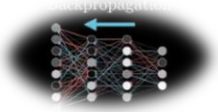


1986s
Backpropagation

(Rumelhart, Hinton, Williams) revives neural networks.

Historical evolution of artificial intelligence

Rise of Machine Learning
1980s–1990s



1986s
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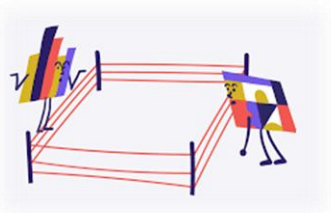

1990s
Statistical ML

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

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Historical evolution of artificial intelligence

Modern AI Boom
2000s–Present

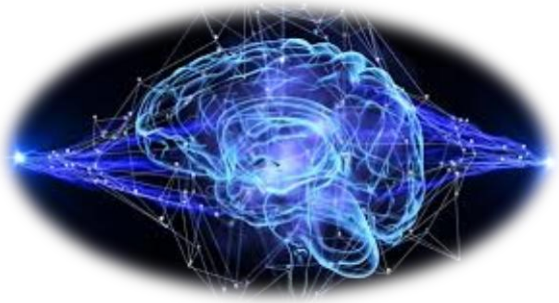
2000s
Big Data & GPUs

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.

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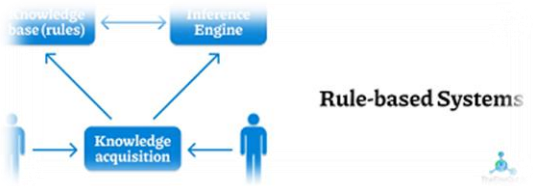
Symbolic vs Machine Learning AI

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

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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

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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

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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

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Global AI Industry Landscape

2024

$184 billion

Annual Growth Rate

2030

$826 billion

MISTRAL AI_

ANTHROP\C

amazon

OpenAI

Google

NVIDIA

Microsoft

Hugging Face

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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

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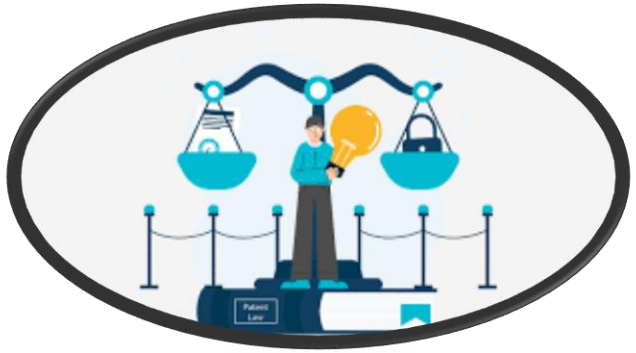
Challenges in AI Adoption

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

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Gartner Hype Cycle for Artificial Intelligence

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