Week - 1

Introduction to Artificial Inteligence

AI → Refers to the ability of machines to simulate human intelligence processes.

- Learning.
- Reasoning
- Problem Solving
- Perception
- Language Understanding.

Enables machines to adapt to new inputs and perform human-like task.

Key Characteristics:

learning: Improve performance biased on data.

Reasoning: Makes decisions based on rules and logic.

Perception: Interprets visual, audio, or sensory input.

learning process: Understands and generates human language

Autonomy: Performs tasks independently without constant human input.

Additional Characteristics:

Adaptability: Adjusts to changes in the environment or data.

Problem Solving: Finds optimal or near-optimal soln.

Self-Correction: Identifies and fixes its own mistakes.

Interaction: Communicates naturally with users.

Speed and Scale: Processes massive data quickly and efficiently

Why characterize AI?

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To find its

① capability → Narrow AI / General AI / Super AI

② functionality → Reactive / Limited Memory / Theory of Mind / self aware

Capability:

Narrow AI (Weak AI)

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① For Specific task

② Most common AI Today

Eg: siri, Netflix recommendations

Facial Recognition.

Industry: E-commerce

Healthcare (diagnostic tool).

Finance (Fraud detection)

General AI (Strong AI) → still a theoratical concept.

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① Theory: can perform an intellectual task a human can d.

② capability learning, adapting, reasoning and understanding accross domains.

③ Still under development.

Research projects:

① Open AI's long term Goal.

② Deep Mind's AGI research.

Potential Industries:

① Scientific discovery

② Personalized education

③ Autonomous decision-making in complex environment

Super AI (Surpass Human Inteligence)
↳ In all aspects.

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① Hypthetical Future AI

② Self aware, consious, out perform Humans.

Concerns:

① Ethical control

① AI alignment with human values.

③ Existential risk.

Industry Thoughts:

① Elon Musk, Nick Bostrom and others have warned about its impact.

② No real-world implementation yet.

Functionality:

Reactive Machines:

① Respond to current input only → no memory
② Most ~~present-day~~ past AI systems
③ cannot learn from past data or predict future actions.

Eg:

- IBM's Deep Blue (chess computer)

Used in: simple robotics, Board games AIs.

Limited Memory AI:

① Use past experiances to make descision.
② Most present-day AI systems.

Eg:

- Self-driving cars
- LLM models like chat-GPT

Industry:

- Auto-Motive
- Retail

Theory of Mind:

① Future AI goal: understand human emotions, belief, and Intentions.

② Required for advanced social interaction.

Applications:

- Emotional AI in education.
- Human-robot in caregiving.

- Currently in developmental stage

Self-aware AI:

① Hypothetical AI with consciousness and self-awareness

② Be emotionally intelligent.

③ Would understand its own existance, and status.

④ status: Philosophical debate; not achived.

⑤ Raise deep ethical and legal questions.

Lecture Taekaway: AI is classified ~~by~~ capability and Functionality,

Most current sustems being | Narrow AI + Limited Memory |