AI and its Impact on Business & Society

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What is AI?

- Artificial intelligence (AI) is the capability of computational systems to perform tasks that normally require human intelligence, such as
  - learning,
  - reasoning,
  - problem-solving,
 - perception, and
  - decision-making.

AI - The Brain of the Machine

- **What is AI?** The ability of computer systems to perform tasks that typically require human intelligence.
- **Core Idea:** Making machines "smart" enough to learn, reason, problem-solve, perceive, and understand language.
- **It's not magic:** It's built on complex algorithms and vast amounts of data.

How AI "Thinks" (Simply)

- **Learning from Data:** AI systems are "trained" by feeding them huge datasets. They identify patterns and relationships within this data.
- **Pattern Recognition:** Once trained, they can recognize similar patterns in new, unseen data.
- **Prediction & Action:** Based on these patterns, they can make predictions (e.g., what movie you'll like) or take actions (e.g., steer a car).
- **Analogy:** Imagine teaching a child by showing them many examples, rather than giving explicit instructions for every single possibility.

How AI Works
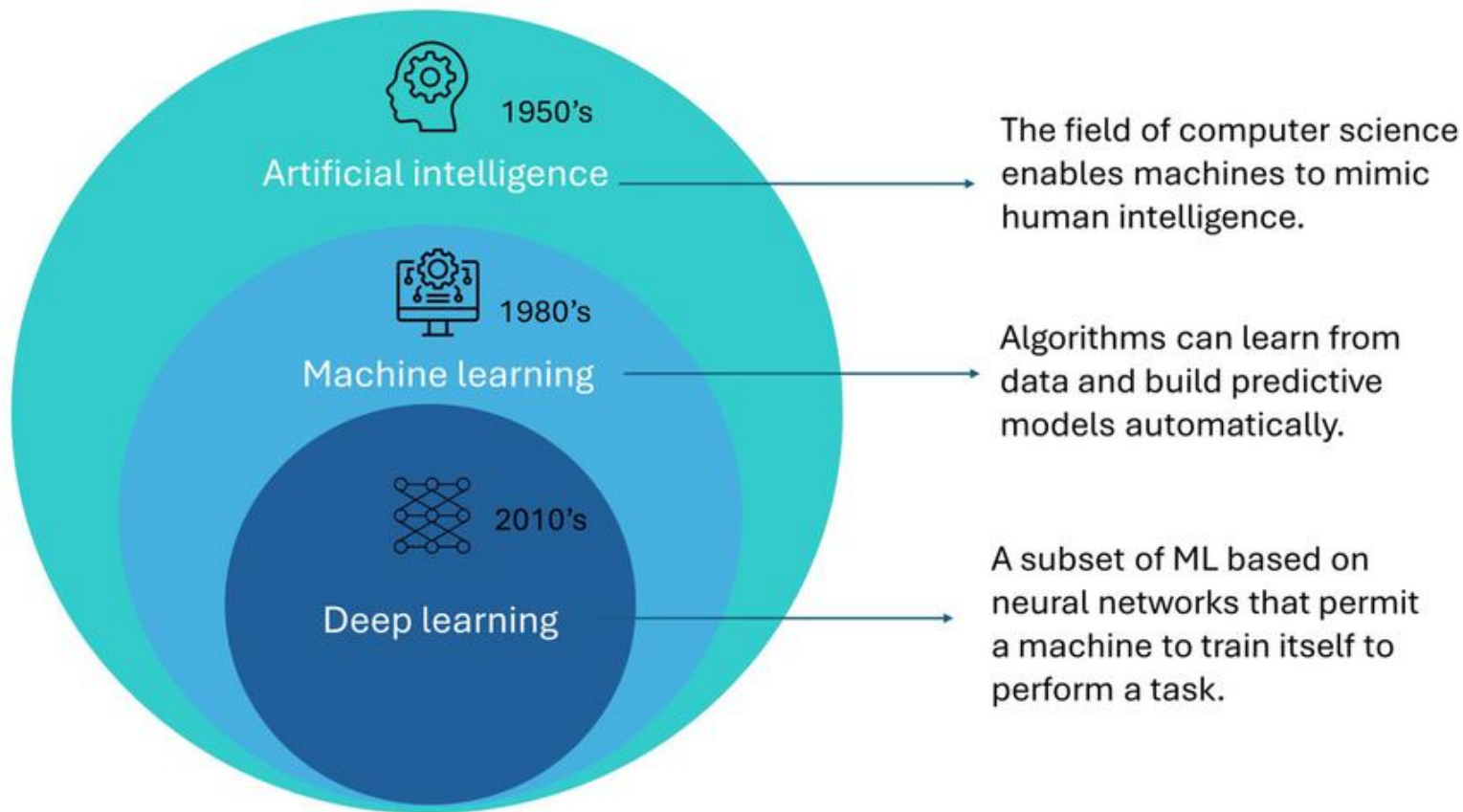
Types of Machine Learning

- **Supervised Learning:**
  - Learning from labeled data (input-output pairs). The AI is given examples of "questions" and their "correct answers."
- **Unsupervised Learning:**
  - Finding patterns and structures in unlabeled data. The AI explores the data on its own to find relationships.
- **Reinforcement Learning:**
  - Learning by trial and error, similar to how humans or animals learn. The AI receives "rewards" for desired actions and "penalties" for undesirable ones.

Types of AI: From Narrow to Super

- **Artificial Narrow Intelligence (ANI) / Weak AI:**
- Designed for a specific task.
- Most AI we encounter today falls into this category.
- *Examples:* Voice assistants (Siri, Alexa), spam filters, recommendation algorithms, chess-playing computers.

Types of AI: From Narrow to Super

- **Artificial General Intelligence (AGI) / Strong AI:**
- Hypothetical AI that possesses human-level cognitive abilities across a wide range of tasks.
- Can learn, understand, and apply knowledge flexibly like a human.
- *Currently theoretical.*

Types of AI: From Narrow to Super

- **Artificial Super Intelligence (ASI):**
- Hypothetical AI that surpasses human intelligence in virtually every field.
- Would be vastly smarter than the best human minds.
- *Purely speculative at this point.*

AI in Our Daily Life: Examples You Use

- **Voice Assistants:** Siri, Google Assistant, Alexa – helping with reminders, searches, smart home control.

- **Recommendation Systems:** Netflix, Spotify, Amazon – suggesting content or products based on your past behavior.

AI in Our Daily Life: Examples You Use

- **Email Spam Filters:** Automatically identifying and isolating unwanted emails.
- **GPS Navigation:** Real-time traffic updates and optimal route suggestions.
- **Facial Recognition:** Unlocking phones, tagging photos on social media.

AI's Impact on Healthcare

- **Diagnosis:** Analyzing medical images (X-rays, MRIs) to detect diseases like cancer with high accuracy.
- **Drug Discovery:** Accelerating the research and development of new medicines.
- **Personalized Treatment:** Tailoring treatment plans based on a patient's genetic makeup and medical history.
- **Robotic Surgery:** Assisting surgeons with precision and minimally invasive procedures.

AI's Impact on Society

- AI is improving access to essential services in Bangladesh by supporting
  - digital finance (bKash, Nagad),
  - smart agriculture (crop disease detection, weather forecasting)
  - healthcare (telemedicine, diagnostic support).
- In education, AI-enabled learning platforms help
  - personalize learning
  - expand access in rural areas
  - e-governance initiatives

AI and Its Impact on Business

- Improves productivity through automation
- Enhances decision-making with data insights
- Personalizes customer experience and marketing
- Reduces operational costs and errors
- Supports innovation in products and services

AI and Its Impact on Business

- Customer Support: Chatbots handle customer queries 24/7
- Marketing: AI recommends personalized ads and content
- Sales: Demand forecasting and dynamic pricing
- Operations: Predictive maintenance and process automation
- Finance: Fraud detection and credit risk analysis
- HR: Resume screening and employee performance analysis

AI's Impact on Agriculture

- Crop Monitoring: Detects diseases, pests, and nutrient deficiencies using drones and sensors
- Precision Farming: Optimizes irrigation, fertilizer, and pesticide use
- Yield Prediction: Uses AI models to forecast crop output accurately
- Supply Chain Management: Tracks and predicts demand, reduces post-harvest losses
- Climate Adaptation: Provides weather forecasts and disaster alerts
- Farm Machinery Automation: AI-powered tractors and harvesters improve efficiency

Social Challenges and Risks of AI

- Automation threatens low- and semi-skilled jobs, especially in garments and service sectors.
- The digital divide between urban–rural areas, men–women, and rich–poor groups may widen due to unequal access to AI technologies.
- Weak data protection laws raise concerns about privacy, and surveillance
- Might misuse of personal data, while biased AI systems risk reinforcing existing social inequalities.

Machine Learning (ML) - AI's Learning Engine

- **ML is a subset of AI.** It's how AI systems learn without being explicitly programmed for every scenario.
- **How it learns:** By analyzing vast amounts of data and identifying patterns.
- **Think of it like:** Teaching a child to recognize a cat by showing them many pictures of cats, rather than giving them a list of rules.
- **Key Idea:** The more data, the "smarter" the ML model can become.

Agentic AI vs. Generative AI
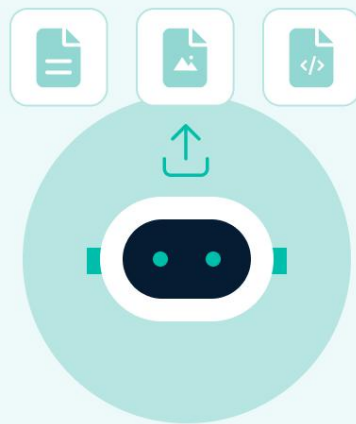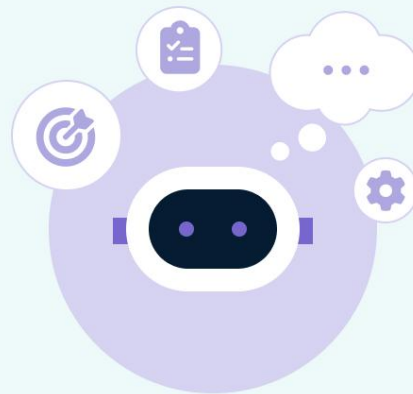
Generative AI vs Agentic AI

Generative AI

- Generative AI is designed to create content.
- It excels at generating text, images, audio, and even code based on patterns learned from vast datasets.
- Popular models include OpenAI's ChatGPT and DALL·E, and Google's Gemini.

Key Characteristics of Generative AI

- **Content Creation**: Generates new text, images, or other media.
- **Pattern Recognition**: Learns from existing datasets to produce relevant and coherent outputs.
- **Conversational Abilities:** Can engage in human-like dialogue, making it valuable for chatbots, marketing, and creative application
- **Limited Autonomy**: While generative AI can produce intelligent responses, it does not independently decide or act beyond its given instructions.

Use Cases of Generative AI

- **Content generation** for marketing, blogs, and social media.
- **Customer support** chatbots that provide automated responses.
- **Design assistance** in generating images, layouts, and creative assets.
- **Code writing** to help developers automate repetitive programming tasks.

AI in Creative Fields (Generative AI)

- **Generative AI:** A type of AI that can create new, original content.
- **Text Generation:** Writing articles, stories, poems, or even code (e.g., ChatGPT).
- **Image Generation:** Creating realistic or artistic images from text descriptions (e.g., DALL-E, Midjourney).
- **Music Composition:** Generating new melodies and compositions.
- **Challenges:** Ethical questions around originality, copyright, and potential misuse (e.g., deepfakes).

Agentic AI

- Agentic AI, on the other hand, goes beyond content generation to actively plan, execute, and adapt based on goals.

- Instead of passively responding to prompts, agentic AI operates with a degree of autonomy, making decisions and taking actions to complete complex workflows.

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Key Characteristics:

- **Goal-Oriented:** Works towards achieving specific objectives autonomously.
- **Decision-Making Abilities:** Evaluates multiple options and selects the best course of action.
- **Process Automation:** Can handle multi-step workflows with minimal human intervention.
- **Adaptive Learning:** Continuously refines its approach based on new data and feedback.

Use cases of Agentic AI?

- Enterprise automation, streamlining business operations such as HR, finance, and IT workflows.
- AI-driven project management that autonomously assigns and tracks tasks.
- Supply chain optimization, making real-time decisions to adjust logistics and inventory.
- Cybersecurity threat detection that actively responds to security breaches.

Ethical Concerns in Generative AI

- Uses large-scale data, often without explicit user consent
- Raises concerns about data privacy and surveillance
- Challenges accountability when AI decisions cause harm
- Risk of over-reliance on AI for critical decision-making

Bias and Fairness in Generative AI

- AI models learn bias from historical and social data
- Can reinforce gender, racial, and cultural stereotypes
- Under-representation of developing countries and local languages
- Biased outputs can lead to unfair or discriminatory outcomes

Misinformation and Misuse Risks

- Can generate false, misleading, or fabricated content
- Enables deepfakes, fake news, and identity manipulation
- Difficult to distinguish AI-generated content from real content
- Risks to public trust, journalism, and democratic processes

Responsible AI Frameworks and Limitations

- Need for transparency and explainability in AI systems
- Human-in-the-loop decision-making for critical applications
- Ethical guidelines: fairness, accountability, safety, and inclusiveness
- Limitations: lack of true understanding, context awareness, and moral judgment

AI FAIR Principles

- F – **Fairness**: Ensure AI decisions do not discriminate or reinforce bias
- A – **Accountability**: Developers and organizations take responsibility for AI outcomes
- I – **Interpretability**: AI models should be understandable and explainable to humans
- R – **Reliability**: AI systems must perform consistently and safely in real-world settings

Summary

- **Social impacts** are mixed: improved efficiency and access on one side, but risks of job displacement and inequality on the other
- **Limitations**: data bias, misinformation, lack of transparency, and weak contextual understanding of local realities
- **Ethical concerns:** involve data privacy, surveillance, fairness, and unequal access to AI technologies
- **Potential** to support Bangladesh's development through better services in healthcare, agriculture, education, and governance

Thank You