Name : Jayesh Bhagyesh Gajbhar
Unity ID : jgajbha

Answer 1

1. Artificial Intelligence (AI)

Definition:
AI is the broad field of computer science focused on creating systems capable of performing tasks that typically require human intelligence. This includes tasks such as understanding natural language, recognizing patterns, problem-solving, and decision-making.

Key Characteristics:

- Encompasses a wide range of techniques and approaches.
- Includes both symbolic AI (rule-based systems) and subfields like machine learning and robotics.

Example:
AI includes expert systems, natural language processing (NLP), and autonomous vehicles.

2. Machine Learning (ML)

Definition:
ML is a subset of AI that involves teaching computers to learn from data. Instead of being explicitly programmed, ML algorithms identify patterns and make predictions or decisions based on data.

Key Characteristics:

- Requires a large amount of data for training.
- Includes supervised, unsupervised, and reinforcement learning.

Example:

Spam filters in email services use ML algorithms to detect and block unwanted messages.

3. Deep Learning (DL)

Definition:
DL is a subset of ML that uses neural networks with many layers (hence "deep"). It is particularly effective for tasks like image recognition, speech processing, and natural language understanding.

Key Characteristics:

- Requires vast amounts of data and computational power.
- Architectures include convolutional neural networks (CNNs) and recurrent neural networks (RNNs).

Example:
Image recognition systems in autonomous cars use DL to identify pedestrians and other objects on the road.

4. Large Language Models (LLM)

Definition:
LLMs are a type of deep learning model specifically designed for understanding and generating human language. They are trained on massive datasets of text to predict and generate coherent, contextually relevant text.

Key Characteristics:

- Often built on transformer architecture.
- Capable of performing a wide range of NLP tasks, such as translation, summarization, and question-answering.

Example:

OpenAI's GPT-3 is a well-known LLM that can generate human-like text based on prompts.

5. Generative AI

Definition:
Generative AI refers to algorithms that can create new content, such as text, images, music, or videos. It often leverages techniques from DL, especially in models like Generative Adversarial Networks (GANs) and LLMs.

Key Characteristics:

- Focused on generating new, synthetic data that mimics real data.
- Can be used for creative tasks like art generation, text completion, or synthetic voice creation.

Example:
AI models that create realistic images of non-existent people or complete a sentence based on a given prompt are examples of generative AI.

Summary of Differences:

- **AI** is the broadest concept, encompassing any technology that mimics human intelligence.
- **ML** is a subset of AI that focuses on learning from data.
- **DL** is a more specific subset of ML that uses complex neural networks.
- **LLM** is a type of DL model specifically designed for language-related tasks.
- **Generative AI** is a branch of AI that focuses on creating new content, often leveraging DL techniques.

Answer 2

Model	Developer	Architecture	Capabilities	Training Data	Key Features	Model Parameters
GPT-3.5/4o	OpenAI	Transformer	Text generation, summarization, translation, coding, dialogue	Internet-scale data, books, articles, code	Advanced reasoning, coding, and multiturn dialogue capabilities	1.8 trillion
Gemini	Google DeepMind	Transformer-based	Multimodal capabilities (text, image, etc.), natural language understanding	Large-scale datasets including text and images	Designed for synergy across various AI disciplines	1 trillion +
LLaMA	Meta	Transformer	Text generation, research-focused tasks	Curated text data from diverse sources	Open weights available, fine-tunable for specific tasks	70 billion
Claude v1.5	Anthropic	Transformer	Dialogue, safe AI interactions, language comprehension	Text data with a focus on ethical considerations	Emphasizes safety, alignment, and responsible AI use	137 billion
Gemma 2	Meta	Transformer-based	Language understanding, summarization, general NLP tasks	Large-scale text data	Combines features from LLaMA and other models, focus on efficiency and safety	9 billion

Mistral	Mistral AI	Transformer	Text generation, reasoning, creative writing	Text data from diverse domains	Efficient, smaller model architecture, focuses on European languages	7 billion
Qwen2	Alibaba Cloud	Transformer-based	Multimodal (text, image, speech), dialogue systems, natural language generation	Internet-scale data, enterprise-specific datasets	Designed for business applications, strong in multilingual tasks	72 billion
Phi3	Google Deepmind	Transformer-based	Text completion, summarization, dialogue, coding	Broad dataset including code, text	Specialized in coherent text generation, built on advanced deep learning techniques	8 billion
PaLM	Google Research	Transformer-based	Text generation, reasoning, language comprehension	Diverse internet-scale text data	Multitask learning, supports reasoning and code generation	540 billion
Falcon	TII (Technology Innovation Institute)	Transformer	Text generation, translation, summarization, dialogue	Curated datasets from diverse internet sources	Open weights available, fine-tuned for multilingual and creative tasks	40 billion

Answer 3

3 Major Points from Eric Schmidt's Speech:

1. **The Role of AI in Society:**

Eric Schmidt emphasizes the transformative impact of AI on various sectors, including healthcare, education, and economics. He argues that AI is not just a technological advancement but a societal change that will redefine how we live and work. AI's ability to process and analyze vast amounts of data has the potential to revolutionize decision-making processes and solve complex global challenges.

2. **Ethical Considerations and AI Governance:**

Schmidt discusses the importance of ethical frameworks and governance structures in the development and deployment of AI technologies. He stresses that while AI offers enormous benefits, it also poses risks, particularly in areas like privacy, bias, and security. He calls for responsible AI development, where ethical considerations are integrated from the outset, and governance frameworks are established to ensure AI benefits society as a whole.

3. **The Need for Collaboration Between Public and Private Sectors:**

Schmidt highlights the importance of collaboration between governments, academia, and the private sector in advancing AI research and development. He believes that innovation in AI requires not just technological expertise but also policy-making, regulatory support, and societal acceptance. He advocates for a collaborative approach to harness the full potential of AI while addressing its challenges.

Question:

- **How can global governance frameworks be effectively implemented to manage the ethical challenges posed by AI, especially in countries with differing regulations and societal values?**

This question arises from Schmidt's emphasis on the need for ethical AI governance and the challenges that come with implementing these frameworks globally, considering the diverse regulatory environments and cultural values around the world.

Answer 4

Colab Notebook link:

https://colab.research.google.com/drive/1aApMSoZtZxvFdIjD46oSw80UmLSAcdAl?usp=sharing