The Superior University, Lahore

Assignment-I (Fall 2023)

Course Title:	Programming for AI				Course Code:	CAI601410	Credit Hours: 4
Instructor:	Prof. Rasikh Ali				Programme Name:	BSDS	
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Time Allowed:					Maximum Marks:		
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Lab-Task 11

1: Describe the difference

Task 1

Describe the difference

1. LangChain

LangChain is a platform for developing applications driven by Large Language Models (LLMs). LangChain assists in bridging LLMs with external data such as databases, APIs, memory, and tools.

Example:

If you need an LLM to respond to questions based on documents in your company, LangChain assists in orchestrating everything.

2. RAG (Retrieval-Augmented Generation)

RAG is a method in which retrieval and generation are integrated. Rather than coming up with fabricated answers, the model retrieves relevant information (retrieval) and then generates an answer (generation).

- It enhances accuracy since the LLM works with actual data and not just making assumptions from memory.

3. LLMs (Large Language Models)

LLMs are computer models trained on vast amounts of text to learn and produce human-like language.

Examples:

GPT-4, BERT, T5.

- They can respond to questions, compose essays, summarize material, and so forth.

4. FAISS (Facebook AI Similarity Search)

FAISS is a library created by Facebook to execute quick similarity search between vectors. It assists in locating the most similar documents, images, or data points extremely fast. It's usually applied when creating search systems for LLMs.

5. Vector

A vector is a numerical representation of data (such as text, images, etc.).

Example:

The word "apple" could be converted into a vector such as [0.5, -0.1, 0.3,.].

- Vectors facilitate computers to easily compare the meaning of data.

6. VectorDB (Vector Database)

A VectorDB is a database that stores vectors rather than conventional rows and columns. It enables quick searching for "similar" data points.

Examples:

Pinecone, Chroma, FAISS.

- Used in AI applications where you want to fetch similar documents or embeddings.

7. Generative AI

Generative AI is used to describe AI systems that can generate new content such as text, images, music, code, etc.

- It not only detects patterns; it creates new items based on patterns it has learned.

Example:

ChatGPT composing a poem, DALL-E generating a painting.

8. GANs (Generative Adversarial Networks)

GANs are a unique subset of Generative AI. They employ two networks (Generator and Discriminator) that are pitted against each other. The Generator attempts to generate realistic data, and the Discriminator attempts to identify fake vs real.

- Used for creating realistic images, deepfakes, etc.

Summarize the difference:

Term	Short Description (Clarifying difference)
LangChain	Framework to connect LLMs with tools, APIs, memory, and data.
RAG	Technique combining retrieval of real data + LLM generation.
LLMs	AI models trained to understand and generate human-like text.
FAISS	Library for fast similarity search among vectors.
Vector	Numeric representation of data (text, image, etc.).
VectorDB	Database that stores and searches vectors (e.g., Pinecone, FAISS).
Generative AI	AI that creates new content (text, images, music, etc.).
GANs	Two competing networks (Generator + Discriminator) to create realistic data.