The Superior University, Lahore

Assignment-I (Fall 2023)

Course Title:	PAI LAB				Course Code:	CPR601260	Credit Hours:	1
Instructor:					Programme Name:	BS Data Science		
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Time Allowed:					Maximum Marks:			
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Lab-Task 11

Complete the following questions :

Task 11

Lab 11 Task: AI Concepts Explained

1. LangChain

LangChain is a framework for developing applications powered by large language models (LLMs). It helps you connect LLMs with external data sources like APIs, databases, or documents to build chatbots, agents, or question-answering tools.

Example: A chatbot that can read your company's documentation and answer questions about it using OpenAI's GPT.

2. RAG (Retrieval-Augmented Generation)

RAG is a technique that combines information retrieval and text generation. It retrieves relevant documents from a knowledge base and passes them to an LLM to generate a more accurate and contextual response.

Example: A medical assistant that first finds articles on a topic and then summarizes them in simple language.

3. LLMs (Large Language Models)

LLMs are AI models trained on huge amounts of text data to understand and generate human-like language.

Example: ChatGPT, Google's Bard, or Meta's LLaMA — all are LLMs that can write essays, answer questions, or have conversations.

4. FAISS (Facebook AI Similarity Search)

FAISS is a library developed by Facebook to quickly search and retrieve similar vectors (like document embeddings). It's used in semantic search and vector-based retrieval tasks.

Example: Finding similar documents or images in a huge database based on meaning, not just keywords.

5. Vector

A vector is a numeric representation of data (like text, image, or audio) in a multi-dimensional space. It captures the meaning or features of that data.

Example: The word 'king' might be represented as a vector like [0.21, 0.55, 0.63...].

6. VectorDB (Vector Database)

A VectorDB is a database designed to store and search vectors. It allows fast similarity search and is used in AI apps involving semantic search and recommendations.

Example: ChromaDB, Pinecone, Weaviate are popular vector databases used with LLMs.

7. Generative AI

Generative AI refers to AI systems that can create new content like text, images, music, or code based on training data.

Example: ChatGPT (for text), DALL·E (for images), and AIVA (for music) are generative AI systems.

8. GANs (Generative Adversarial Networks)

GANs are a type of generative AI model that consists of two networks — a generator and a discriminator — competing to improve output quality.

Example: GANs can generate realistic human faces that don't actually exist (used in deepfakes or art generation).