SUPERIOR UNIVERSITY

Programming For Artificial Intelligence (Lab)

Assignment -11

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Question # 1:

Describe the Difference Between the Following Concepts:

LangChain:

It is like a framework that helps us build smarter AI applications using LLMs. It's not an AI itself, but it makes LLMs more useful by connecting them to other tools, APIs, or databases. LangChain like the connecter between the LLM and these actions.

LLMs (Large Language Models):

LLMs are big AI models trained on huge amounts of text and data. They learn patterns in language, grammar, and facts to generate human-like responses. They can also predict the next word that will be written by the context of the previous text because of the amount of data they have been trained over. **GPT-4** is a good example of LLM.

RAG (Retrieval-Augmented Generation):

RAG is a way to combine search and generation. Instead of asking an LLM to answer purely from memory, it first retrieves relevant information from a database, then generates an answer based on that information. LLMs can hallucinate facts. RAG makes answers more accurate by giving the model real data to use.

FAISS (Facebook AI for Semantic Search):

FAISS is a tool for searching vectors efficiently. When we convert text or images into vectors i.e., numbers representing meaning, we need a fast way to find the closest matches. FAISS does this very quickly, even for millions of vectors.

Vector:

A vector is simply a list of numbers that represents something i.e., text, image, audio in a form that machines can understand. Vectors capture meaning or features.

VectorDB:

A VectorDB is a specialized database designed to store vectors and make similarity searches fast. Traditional databases can’t efficiently compare millions of high-dimensional vectors.

Generative AI (GenAI):

Generative AI is a type of AI that creates new content instead of just analyzing existing data. This can include text, images, music, code, or even 3D models.

GANs (Generative Adversarial Networks):

GANs are a specific type of Generative AI. They consist of two AI models: a Generator (creates fake data) and a Discriminator (checks if data is real or fake). They train together in a competition, which makes the generated data more realistic over time.