

**Programming for AI Lab**

**Task 11**

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Describe the Difference between:

1. Lang-Chain

2. RAG

3. LLMs

4. FAISS

5. Vector

6. VectorDB

7. Generative AI

8. GANs

**1. LangChain:**

LangChain is a framework for building applications using large language models (LLMs) and other AI tools. It allows developers to create complex, multi-step, or multi-modal systems that use LLMs to interact with data sources and APIs.

Example Use: Chatbots, dynamic document processing, or systems that combine LLMs with databases.

**2. RAG (Retrieval-Augmented Generation):**

RAG refers to a method where a generative model (like an LLM) is enhanced by retrieving relevant information from an external database or knowledge base (e.g., a search engine or vector database).

Example Use: An AI assistant that pulls in real-time data (e.g., from a document or knowledge base) to answer queries more accurately.

**3. LLMs (Large Language Models):**

LLMs are deep learning models trained on vast amounts of text data to understand and generate human language. These models (e.g., GPT-4, GPT-3) are capable of answering questions, writing text, translating languages, and much more.

Example Use: Chatbots, text summarization, and content generation.

**4. FAISS (Facebook AI Similarity Search):**

FAISS is a library developed by Facebook for efficient similarity search and clustering of dense vectors. It is designed to handle large-scale similarity search tasks, often used with embeddings (such as vector representations of text or images).

Example Use: Searching for the most relevant documents based on a query vector.

**5. Vector:**

In the context of machine learning and AI, a vector is a mathematical representation of data, often used to represent words, sentences, or documents in high-dimensional space. Vectors encode semantic information in a form that models can process.

Example Use: Representing words using word embeddings like Word2Vec or sentence embeddings for use in models like BERT.

**6. VectorDB (Vector Database):**

A VectorDB is a specialized database designed to store and search large collections of vector embeddings. It is optimized for similarity search, enabling quick retrieval of vectors that are similar to a query vector.

Example Use: A VectorDB could be used to store embeddings of documents and then perform a search to retrieve the most relevant documents based on a user query.

**7. Generative AI:**

Generative AI refers to algorithms and models that create new data based on patterns learned from existing data. These models can generate new text, images, audio, video, and more.

Example Use: Text generation (GPT), image creation (DALL·E), and music generation.

**8. GANs (Generative Adversarial Networks):**

GANs are a type of generative AI model consisting of two neural networks—a generator and a discriminator—that work in opposition to create new data. The generator produces fake data, while the discriminator attempts to differentiate between real and fake data.

Example Use: Image generation (e.g., generating photorealistic images), deepfake videos, and art generation.