**Lab 11 Task**

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**Roll no SU92-BSAIM-F23-030**

**Section BSAI-4A**

**Subject PAI (LAB)**

**1. LangChain**

* **What it is:** A framework for building applications using large language models (LLMs).
* **What it does:** Makes it easier to build things like chatbots, document Q&A systems, and agents by chaining together components like LLMs, vector databases, tools, and memory.
* **Use Case:** Building a custom AI assistant that can access your own documents.

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

* **What it is:** A technique where an LLM retrieves relevant external data before generating a response.
* **How it works:**
  1. **Retrieve**: Pull info from a knowledge base (like a VectorDB).
  2. **Generate**: Feed that info into an LLM to create a more accurate response.
* **Use Case:** Q&A systems that answer based on your documents, not just the model’s training.

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

* **What it is:** Deep learning models trained on large amounts of text data to understand and generate human-like language.
* **Examples:** GPT-4, BERT, LLaMA, Claude.
* **Use Case:** Text generation, summarization, translation, code completion, etc.

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

* **What it is:** A **library** for efficient similarity search in high-dimensional data (like vectors).
* **What it does:** Helps you find which stored vectors are closest to a query vector.
* **Use Case:** Powering search and retrieval in RAG systems or recommendation engines.

**5. Vector**

* **What it is:** A numeric representation of data (like text) in a multi-dimensional space.
* **Why it matters:** Vectors let you compare similarity between pieces of data using math (e.g., cosine similarity).
* **Use Case:** Representing words, sentences, or documents for retrieval or classification.

**6. VectorDB (Vector Database)**

* **What it is:** A database designed to store and search vectors efficiently.
* **Examples:** Pinecone, Weaviate, Chroma, Qdrant.
* **Use Case:** Used in RAG setups to store document embeddings and quickly find relevant info.

**7. Generative AI**

* **What it is:** A branch of AI focused on creating content (text, images, music, code, etc.).
* **Tools:** LLMs for text, DALL·E for images, MusicLM for music, etc.
* **Use Case:** ChatGPT, AI art, content generation, synthetic data creation.

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

* **What it is:** A type of generative model with two neural networks: Generator and Discriminator.
* **How it works:**
  + Generator tries to create realistic data.
  + Discriminator tries to detect if the data is real or fake.
  + They train against each other.
* **Use Case:** Deepfakes, AI-generated art, realistic photo synthesis.