### Universities The Superior University

### Name: mehreen sadiq

Roll no: SU92-BSAIM-F23-063

AI 4B

### 1. **LangChain**

**LangChain** is a Python framework that helps developers build applications that use **Large Language Models (LLMs)** combined with **external data sources** (like databases, files, APIs).  
It makes it easy to connect LLMs with **tools**, **memory**, **reasoning steps**, and **custom workflows**.

🔵 **Main Use:** Building AI apps like chatbots, document analyzers, search engines with LLMs.

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

**RAG** is a technique where a **language model** first **retrieves** real information (from a database, knowledge base, etc.) and then **generates** a final answer using that information.  
It improves accuracy by giving the model access to **updated** or **external data**, not just what it "remembers" internally.

🔵 **Main Use:** Building smart chatbots that don't hallucinate but fetch real answers.

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

**LLMs** are **very large AI models** trained on massive amounts of text data.  
They can understand and generate human-like text, answer questions, summarize articles, write code, and more.  
Examples include **GPT-4**, **BERT**, **LLaMA**, and **Claude**.

🔵 **Main Use:** Chatbots, assistants, text generation, translation, summarization.

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

**FAISS** is a **library** created by Facebook AI to **quickly search** for **similar vectors** in a huge database.  
It is used to **find the nearest neighbors** very fast, even among **millions of items**.

🔵 **Main Use:** Searching documents, images, or data points based on similarity (e.g., "find me articles similar to this one").

### 5. **Vector**

In AI, a **vector** is just a **list of numbers** that represents information like a **word**, **sentence**, **image**, or even **a document**.  
It captures **meanings**, **relationships**, and **features** in a way that computers can work with.

🔵 **Main Use:** Mathematical representation of data for machine learning, similarity search, clustering.

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

A **VectorDB** is a **specialized database** that stores and manages **vectors** instead of normal text or numbers.  
It lets you **search by similarity** (e.g., "find documents similar to this one") instead of exact matching.

🔵 **Examples:** FAISS, Pinecone, Chroma, Milvus.

🔵 **Main Use:** In RAG systems to retrieve the most relevant documents for LLMs.

### 7. **Generative AI**

**Generative AI** refers to **AI systems** that can **create new content** — like text, images, music, or videos — instead of just analyzing or classifying existing data.  
They "generate" something new from what they learned.

🔵 **Examples:** ChatGPT (text), DALL·E (images), Jukebox (music).

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

**GANs** are a **type of AI model** made of **two parts**: a **Generator** and a **Discriminator**.  
The **Generator** tries to create fake data (like fake images), and the **Discriminator** tries to spot if it's fake or real.  
They compete with each other, and over time, the Generator becomes very good at creating **realistic-looking data**.

🔵 **Main Use:** Creating realistic faces, deepfakes, AI art, fake videos