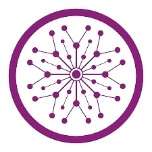
PAI LAB

Task 11



The Superior University

Faculty of Computer Science & Information

Technology

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**Question: Describe the Difference between:**

**1. Lang-Chain**

**2. RAG**

**3. LLMs**

**4. FAISS**

**5. Vector**

**6. VectorDB**

**7. Generative AI**

**8. GANs**

**Answer:**

**1. Lang Chain**

**Lang Chain** is a **framework** designed to help developers **build powerful applications** using **large language models (LLMs**).

* Think of it as a **toolkit** that allows you to connect LLMs (like GPT) with external tools such as:
  + **Databases**
  + **APIs**
  + **User input**
  + **Memory**
* Lang Chain is especially useful when you're building **Chabot’s**, **agents**, or **RAG pipelines**.

*Example: Creating a Chabot that remembers past messages and utilizes documents to provide answers.*

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

**RAG** is a technique used to **enhance LLMs** by providing them with **relevant context** from a document or database **before generating a response**.

* Instead of relying on the LLM's memory, RAG:
  1. **Retrieves** relevant information using search/indexing.
  2. **Feeds** it into the LLM.
  3. **Generates** a better-informed response.

*Example: Chatbot answers based on your uploaded PDF using RAG.*

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

**LLMs** are deep learning models trained on massive text data to understand and generate human-like language.

* Examples: **GPT-4**, **BERT**, **LLaMA**, **Claude**, **Gemini**
* They can:
  + Summarize
  + Translate
  + Generate code
  + Answer questions
  + Write essays

*Example: ChatGPT is an LLM.*

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

**FAISS** is a **library** for **fast similarity search** and **clustering** of dense vectors (like embedding’s).

* It is used to **index and retrieve similar items** based on **vector distance** (e.g., cosine similarity).
* Essential in **RAG systems** to retrieve relevant document chunks.

*Example: Find top 5 similar document embedding’s for a query.*

**5. Vector**

In AI, a **vector** is a list of numbers that **represents data** (text, images, etc.) in a form that models can understand.

* Text is often converted to **embedding vectors** using models like Sentence-BERT or Open AI Embeddings.
* These vectors capture **semantic meaning**.

*Example: The sentence "I love pizza" becomes a 768-dimensional vector.*

**6. Vector DB (Vector Database)**

**Vector DB** stores and manages vectors and allows **efficient search** by similarity.

* Used to **store embedding’s** from documents, images, etc.
* Supports fast **k-NN search** (e.g., FAISS, Pinecone, We aviate, Q drant).

*Example: Store embedding’s of a knowledge base for Chabot search.*

**7. Generative AI**

**Generative AI** refers to systems that can **create new content**, like:

* Text (LLMs)
* Images (DALL·E, Midjourney)
* Music
* Code
* Videos

These models "generate" outputs based on input data or prompts.

*Example: GPT writing poetry or Midjourney generating art.*

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

**GANs** are a specific kind of **Generative AI architecture** with two neural networks:

* **Generator**: Creates fake data.
* **Discriminator**: Judges whether the data is real or fake.
* They **compete** in a loop to improve over time.

Used heavily in:

* **Image generation**
* **Deepfakes**
* **Style transfer**

*Example: Creating realistic human faces that don’t exist*