Programming for AI Lab

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Task #11

1. LangChain

A framework to help build apps using LLMs (like ChatGPT), especially when you want to connect them to real data.

- On its own, an LLM doesn't know about your files or databases.
- LangChain helps combine LLMs + external data.

Example:

You want to create a chatbot that can answer questions about your company's documents (PDFs, websites, etc.). LangChain helps you load those documents, understand them, and let ChatGPT answer questions about them.

2. RAG (Retrieval-Augmented Generation)

A method where the AI first looks up relevant information, then uses that info to generate an answer.

- LLMs can forget details or make things up. RAG keeps the answers factual and grounded.

Example:

You ask: "Tell me about the latest features of FastAPI."
Instead of guessing, the AI retrieves recent documentation, then explains it accurately.

3. LLM (Large Language Model)

A very large AI model trained to understand and generate human-like text.

- Famous examples: ChatGPT, Claude, Gemini, LLaMA.
- Write stories, answer questions, summarize articles, translate languages, write code, and more.

Example:

You type: "Explain quantum physics like I'm 5."
An LLM will break it down simply and conversationally — like a smart friend.

4. FAISS (Facebook AI Similarity Search)

A search engine for finding similar things, especially helpful when using vectors (numerical representations of text).

- It can quickly find the most similar documents to a user's input, even if the words used are different.

Example:

You have 10,000 customer reviews stored as numbers. Someone asks, "What do people think about delivery?"
FAISS helps find the most related reviews super fast.

5. Vector

A list of numbers that represents a word, sentence, or document in a way that AI understands its meaning.

- Computers don't understand language directly. Vectors let them compare meanings and find similarities.

Example:

The sentence "Dogs are great pets." is turned into numbers like [0.45, -0.33, …] so it can be compared to "I love my puppy."

6. VectorDB (Vector Database)

A special database that stores vectors (instead of just text or numbers) and helps search them efficiently.

- To find related or similar information quickly, even if it's phrased differently.

Example:

In a customer support bot, when a user asks a question, a VectorDB helps find the most similar help article — even if the exact words don't match.

7. Generative AI

Any AI that can create new content — text, images, music, videos, code, etc.

- It's not just analyzing — it's producing creative and useful content.

Example:

- ChatGPT writes blog posts or emails.
- DALL·E draws artwork from text.
- AI music tools compose background tunes.

8. GANs (Generative Adversarial Networks)

A type of generative AI where two AI models play a game — one tries to create fake data, and the other tries to catch the fake.

- This "game" helps create very realistic images, videos, or data.

Example:

A GAN can create photos of people who don't exist, or turn a rough sketch into a photorealistic image.