SUPERIOR UNIVERSITY

Programming for AI

Task 11

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1. LangChain

- LangChain is a tool that helps developers connect LLMs (like ChatGPT) with other things like documents, tools, or databases.
  It makes it easier to build **AI apps** that can talk, search, remember, and take action.
- You don't need to build everything from scratch LangChain gives you the parts to make an AI assistant that can think and act.

Example:
If we want to make an AI chatbot that reads PDFs and answers questions from them, LangChain can help us to do that.

RAG (Retrieval-Augmented Generation)

- RAG is a smart technique where an AI doesn't just rely on what it was trained on.
  Instead, it first searches for useful info (retrieval), then uses it to generate an answer (generation).

Example:
If we ask the AI about a topic in our notes, RAG will search notes first and then answer based on that not just from memory.

LLMs (Large Language Models)

- LLMs are AI models that understand and generate human language.
  They are trained on a lot of text and can answer questions, write essays, translate, and more.

Example:
ChatGPT is an LLM. It can talk with you like a human.

4. FAISS

- FAISS is a tool that helps you find similar things very fast like finding similar texts or images.
  It works with vectors (numbers that represent text).

Example:
If you want to find hadiths similar to a given one, FAISS can do that quickly by comparing their vector values.

5. Vector

- A vector is a list of numbers that represents something like a word, sentence, or image in a way the computer understands.

Example:
The sentence "he is kind" becomes a vector like [0.5, 0.9, -0.3, …] inside the computer.

6. VectorDB (Vector Database)

- A special type of database that stores **vectors** and helps to **find similar ones** quickly.

Example:
If you save 1000 hadiths as vectors in a VectorDB, you can easily ask: "Which hadith is closest to this topic?"

7. Generative AI

- It's AI that can **create new things** like text, images, music, code, etc.

Example:
ChatGPT writing an essay or DALL·E creating an image from text is generative AI

8. GANs (Generative Adversarial Networks)

- GANs are a **type of AI** where two models **compete** with each other — one tries to create fake data (like images), and the other tries to catch it. This back-and-forth helps generate **very realistic images or videos**.

Example:
AI-generated fake faces or fake art often come from GANs.