Lab Task # 11

# Difference Between LangChain, RAG, LLMs, FAISS, Vector, VectorDB, Generative AI, and GANs

**1. LangChain:**

LangChain is a framework to build apps with AI models. It helps connect language models to outside data, like PDFs or websites. For example, I can make a chatbot that reads a company’s manual and answers questions. LangChain has parts like chains, agents, and memory. Chains run tasks step by step, agents decide what to do, and memory saves old chats. It uses Python code to set up these parts. LangChain is not AI itself, it just makes AI useful. It is different because it builds apps, not thinks or searches like others.

**2. RAG:** RAG is Retrieval-Augmented Generation. It is a method to make AI answers more correct. RAG has two steps: retrieve and generate. First, it searches a database for documents using a query, like “What is Python?”. Then, it gives those documents to a language model to write an answer. For example, RAG can find Wikipedia pages and make a summary. It uses embeddings to match queries and documents. RAG is different from LangChain because it is only a method, not a tool for apps.

**3. LLMs:**

LLMs are Large Language Models. They are AI that understand and write text like humans. Examples are GPT-4 or LLaMA. They train on big datasets, like billions of web pages, to predict words. For example, if I ask “What is AI?”, LLM writes a full answer. LLMs use transformer models with layers and attention to process text. They are the main AI for LangChain and RAG. LLMs are different because they think and create text, not build or search like others.

**4. FAISS:**

FAISS is Facebook AI Similarity Search. It is a library to find similar items in big datasets. For example, I have 10,000 images and want ones like a dog picture. FAISS uses vectors to compare and find matches fast. It has algorithms like k-nearest neighbors to search. FAISS is used in RAG to find documents. FAISS only searches the similar vectors.

**5. Vector:**

Vector is a list of numbers. It represents data, like words or images, for AI to use. For example, word “apple” can be a vector like [0.2, -0.1, 0.5]. Vectors come from models like BERT, which turn text into numbers. AI compares vectors to find similar things, like “apple” and “orange”. Vectors are small, maybe 768 numbers long. They are used in FAISS and RAG for searching. Vectors are just a data in form of numbers.

**6. VectorDB:**

VectorDB is a database for vectors. It stores and searches number lists. For example, I save vectors for all sentences in a book. VectorDB can find vectors close to my query vector. It uses indexes, like HNSW, to make search fast. Examples are Pinecone or Weaviate. VectorDB works with FAISS for searching in RAG. It is different because it saves vectors, not searches like FAISS or thinks like LLMs.

**7. Generative AI:**

Generative AI is AI that creates new things. It makes text, images, or sounds. For example, it can write a poem or draw a car. LLMs are Generative AI for text, like making essays. Other Generative AI makes music or videos. It uses models like transformers or diffusion. Generative AI is a big group, not one tool. It is different from FAISS, which searches, or VectorDB, which saves. It is not for building apps like LangChain.

**8. GANs:**

GANs are Generative Adversarial Networks. They are AI for making images or videos. GANs have two models: generator and discriminator. Generator makes fake images, like a cat. Discriminator checks if image is real or fake. They train together to make better images. Example is making fake faces for movies. GANs are different from LLMs, which make text, and from RAG, which helps answers. They are part of Generative AI but focus on pictures.