

Practical Applications of Large Language Models (LLMs)

Module 1: Introduction to Large Language Models (LLMs) and Setup

- **Overview of LLMs:** Brief introduction to what LLMs are and how they are used in practice.
- **Installing and Setting Up Tools:** Set up Python, install libraries like Hugging Face, OpenAI, and LangChain.
 - Install LangChain, OpenAI API, or Hugging Face models.
 - Overview of basic Python skills needed (very brief).

Module 2: Basic Q&A with Pre-trained Models (CV)

- **Introduction to Pre-trained LLMs:** How to use pre-trained models like GPT-4 and Hugging Face's models.
- **Building a Basic Q&A System:** Walk students through how to set up a Q&A system using an LLM.
 - Practical exercise: Use LangChain to ask questions and receive answers from an LLM.
 - Customize prompts to improve performance.

Module 3: Prompt Engineering and Output Control

- **Controlling LLM Outputs:** Teach how to structure prompts for specific outputs (Q&A, summaries, creative writing, etc.).
 - Introduction to prompt templates.
 - Setting parameters like temperature, max tokens, etc.
 - Practical exercise: Create different outputs from the same LLM by modifying the prompts.

Module 4: Summarization and Text Processing Applications

- **Summarizing Documents and Text:** Teach students how to summarize long documents or text inputs.
 - Practical exercise: Build a tool that summarizes research papers or news articles using LLMs.
- **Text Classification:** Briefly touch on how LLMs can categorize or classify text.
 - Practical exercise: Build a text classifier for a specific task (e.g., identifying sentiment or topic).

Module 5: Building a Custom Chatbot

- **Creating a Chatbot Using LLMs:** Teach students how to build a simple chatbot using LLMs.
 - Integration with LangChain to maintain conversation context.
 - Practical exercise: Build a basic customer service or personal assistant chatbot.

Module 6: Connecting LLMs to External Data Sources

- **Retrieving Data from External Sources:** Introduce how to integrate LLMs with external APIs or databases.
 - Use LangChain to query databases or make **API calls** for real-time data.
 - Practical exercise: Build an LLM that retrieves live data (e.g., weather, stock prices, or search results) and responds accordingly.

Module 7: Working with Documents and **Databases**

- **LLMs and Databases:** Show how to use LLMs to interact with structured data.
 - Connecting LLMs to SQL databases for querying information.
 - Practical exercise: Build an AI assistant that queries a database and provides answers based on the data (e.g., a library database or inventory).

Module 8: Multi-Step Workflows with LangChain

- **Building Complex Pipelines:** Teach how to chain multiple tasks together using LangChain.
 - Introduction to multi-step workflows (e.g., extracting data, processing it, and generating reports).
 - Practical exercise: Build a multi-step task, such as reading a document, analyzing it, and providing insights in a report.

Module 9: AI-Powered Assistants and Tools

- **Creating AI-Powered Assistants:** Build more advanced AI assistants for different use cases (coding assistants, writing assistants, etc.).
 - Practical exercise: Build a tool like a code assistant that helps with writing Python code or a writing assistant for generating content.

Module 10: **Advanced Chatbots with Custom Knowledge Bases**

- **LLMs with Custom Knowledge Bases:** Teach how to fine-tune LLMs or integrate them with custom knowledge bases.
 - Use LangChain to connect LLMs to specific datasets (e.g., company documents or academic papers).
 - Practical exercise: Build a chatbot that answers questions based on a custom dataset (like company policies or a collection of documents).

Module 11: Large-Scale Applications and Deployment

- **Deploying LLM Applications:** Teach how to deploy applications on cloud platforms (AWS, GCP, etc.).
 - Practical exercise: Deploy a chatbot or LLM-powered app to a cloud service and make it publicly accessible.

Module 12: Future Trends and Opportunities in LLMs

- **Discussion of Advanced Applications:** Brief overview of cutting-edge developments (fine-tuning, RLHF - Reinforcement Learning with Human Feedback).

- Practical discussion on how students can stay updated and keep improving their skills.