Open-source Generative AI for Developers

Duration: 40 hours

Course Overview

This comprehensive course is curated for developers looking to build a strong foundation in AI, especially in Generative AI and Large Language Models (LLMs). It covers both theoretical concepts and practical implementation, allowing developers to explore AI architectures, experiment with models, and build AI-driven applications. With hands-on labs using open-source tools like LangChain, LLaMA, Gradio, and Streamlit, developers will gain real-world skills to create chatbots, retrieval-augmented systems, and agentic AI applications. Plus, the emphasis on prompt engineering, multi-modal AI, and model evaluation ensures they can optimize and deploy AI solutions effectively. Whether you're an AI enthusiast or a developer looking to integrate cutting-edge AI into your projects, this course offers valuable expertise to level up your skills

Course Pre-requisites:

- Basics of Python language.
- Basics of Machine Learning

Course Contents

Module 01: Introduction of GenAI

- Introduction to Generative AI
- Architecture of Generative AI
- Applications of Generative AI using Transformer Library
- Introduction to Generative Adversarial Networks (GANs)
- Labs

Module 02: Introduction of Large language Model

- Architecture of Large Language Models
- Types of Large Language Models (LLMs)
- Task based Text AI LLMs – Translation, Summarization, Sentence Similarity, Automatic
- Speech Recognition, Text to Speech, etc.
- Major Text AI LLMs - LLaMA, Qwen, Cohere, Falcon LLM
- Image AI Models & Services – Object Detection, Image Segmentation, Image

- Retrieval, Image, Image Captioning, Visual QnA, Zero-shot Image Classification, etc.
- Labs

Module 03: Learning Prompt Engineering using Open Source Models

- Introduction to Prompt Engineering
- Prompt Engineering Techniques
- Text Prompting using Llama (Meta)
- Image Prompting using Llama (Meta)
- Code Prompting using Llama (Meta)
- Labs

Module 04: Multi-Modal Models

- OpenAI Whisper: Speech-to-text model (open-source)
- DALL-E Mini: Image generation and understanding (open-source alternative)
- DeepMind Perceiver: Multi-modal task processing

Module 05: Basic LLM Systems (RAG) using Open Source Models

- Introduction to Retrieval Augmented Generation (RAG)
- Introduction to LangChain
- Concept of Embedding, Retrieval, Chain and Agents using LangChain
- Las: Build a Simple LLM Application using LangChain
- Lab: Build a Chatbot LangChain
- Lab: Build vector stores and retriever using LangChain
- Lab: Build an Agent LangChain
- Lab: Build a Retrieval Augmented Generation (RAG) Application using LangChain
- Lab: Build a Conversational RAG Application using LangChain

Module 06: Advanced LLM Systems (QnA) using Open Source Models

- Difference between RAG & Question Answering system
- Build a Question Answering system over Tabular Data using LangChain
- Build a Question/Answering system over SQL data using LangChain
- Labs

Module 07: Open-Source Tools for Creating Agentic AI Systems

- LangChain: Building complex agent workflows
- Gradio: Creating interactive user interfaces
- Streamlit: Lightweight UIs for Agentic AI applications
- Docker: Scaling and deploying open-source AI agents

Module 08: Building Chatbots with Agentic AI

- Using Llama 2 and Open-Assistant for Conversational Agents
- LangChain for Multi-Turn Conversations and Workflow Automation
- Integrating Gradio or Streamlit for Chatbot UIs
- Hands-On: Building a Task-Specific Chatbot

Module 09: Evaluation of Open Source Models using MLflow

- Introduction to MLflow
- Build a machine learning model using MLflow
- MLflow Deployment Servers
- LLM Evaluation using MLflow
- Lab: Evaluate a Hugging Face LLM