Generative AI Masterclass: LLMs, Agents, and LangChain in Practice

Duration: 16 hours

Course Overview

This immersive course offers a comprehensive journey through the evolution and practical application of Artificial Intelligence, Machine Learning, and Generative AI, culminating in hands-on agentic development using LangChain. Participants will explore foundational ML paradigms, the architecture behind modern LLMs, and the art of prompt engineering for real-world tasks like summarization and Q&A. The curriculum deepens into building autonomous AI agents, understanding multi-agent frameworks, and implementing Retrieval-Augmented Generation (RAG) pipelines with vector databases. Designed for aspiring AI practitioners, the course blends theory, architecture, and applied tooling to equip learners with the skills to design intelligent, context-aware systems.

Course Prerequisite

Functional knowledge of Python, Familiarity with ML, DL

Course Contents

Module 1: Evolution of AI and Machine Learning

- Historical overview: symbolic AI to deep learning
- Key concepts: intelligence, learning, autonomy
- Generative and agentic AI in modern systems

Module 2: Machine Learning Paradigms

- Supervised, Unsupervised, and Reinforcement Learning
- Model lifecycle: training, evaluation, deployment
- Real-world ML applications across domains- discussion

Module 3: Introduction to Generative AI and LLMs

- What is Generative AI?
- Transformer architecture, embeddings, attention
- Overview of open-source LLMs: Mistral, LLaMA, Falcon

Module 4: Prompt Engineering Essentials

- Crafting effective prompts
- Prompt techniques- persona, Chain of thoughts , context
- Use cases: content generation, summarization, Q&A

Module 5: Building Agents with LangChain

- What is LangChain
- LangChain componets: Chains, Agents, prompt templates
- Memory management
- Gen AI Application with LangChain

Module 6: What is an AI Agent?

- What's an Agent?
- Definition and characteristics of agents
- Agents vs. LLMs: autonomy, tool use, planning
- Agent Application with LangChain
- Multi Agents and framework which supports. (Discussion)

Module 7: Retrieval-Augmented Generation (RAG)

- What is RAG and why it matters
- Vector databases: FAISS, chromadb
- Implementing RAG pipelines with LangChain