Generative AI Specialty

Duration: 05 days (40 hours)

Labs: Open Source platform and Koenig DC will be provided
Pre-requisite: Fundamentals of Python. Knowledge of machine learning will be an added advantage

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: 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 05: 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 06: Fine-tuning Techniques using Open Source Models

- Introduction to Quantization
- Optimization of model weights (data types)
- Modes of Quantization
- Fine tuning LLMs (Meta's Llama / Alibaba's Qwen / Google's Gemma)
- Labs

Module 07: 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