Artificial Intelligence and Machine learning

Duration :40 hrs

Course Overview:

This elaborate course provides a hands-on journey through AI and ML, covering Data Science, Deep Neural Networks, NLP, and Generative AI. Participants will explore regression, classification, clustering, CNNs, RNNs, and key NLP techniques like TF-IDF and Word2Vec. The course delves into generative AI, transformers, and LLMs with practical labs on text, image, and speech-based applications. Finally, it focuses on building AI applications using LangChain, LlamaIndex, and LangGraph, including prompt engineering, fine-tuning, chatbot creation, and Retrieval-Augmented Generation (RAG). Hands-on labs ensure practical exposure to real-world AI development.

Audience Profile

This comprehensive 5-day course is designed for professionals and enthusiasts aiming to master Generative AI, with a focus on open-source platforms and hands-on labs. It is ideal for individuals with a background in Python and machine learning, including:

- Data Scientists
- Machine Learning Engineers
- AI Researchers
- Software Developers
- IT Professionals
- Data Analysts
- AI Enthusiasts
- Python Programmers
- Deep Learning Specialists
- Technical Leads and Managers
- UX/UI Designers with an interest in AI
- Automation Engineers
- Research Scholars
- AI Product Developers

Course Syllabus

Module 1: Data Science

- Introduction to Data science
- Supervised and Unsupervised learning
- Supervised - Regression and Classification algorithms
- Unsupervised Learning algorithms

- Lab: Data analysis insights
- Lab: Regression
- Lab: Classification
- Lab: Unsupervised – K means clustering

Module 2: Deep Neural network

- Understanding Perceptron
- Lab: Perceptron
- Understanding Artificial Neural network / multi-layer perceptron
- Lab: ANN
- Understanding Convolutional Neural network – CNN
- Padding, strides, pooling, Transfer learning etc
- Flattening layer and prediction
- LAB: CNN prediction
- Understanding Recurrent neural network
- RNN, LSTM, GRU
- Lab: RNN

Module 3: Natural Language processing

- Converting language to numbers capturing semantic relationship
- Techniques Bag of words, TF-IDF, Word2Vec
- Name entity recognition
- Lab: Sentiment Analysis lab on e-commerce Reviews dataset
- Lab: Name entity recognition
- Lab: Word cloud

Module 4: Generative AI

- Understanding background and backdrop of generative AI
- Understanding Transformer architecture
- Introduction to Hugging Face Large language models (LLM)
- Labs : Language text – Text completion , classification , translation, sentence similarity
- Labs: Text to image , image to text , question answering Image based , Object detection , image captioning
- Labs: Automatic speech recognition

Module 5: Application Development – Langchain , LlamaIndex

- Prompt engineering and techniques – zero shot, on shot and few shot
- Lab: Prompt engineering
- Fine tuning model on custom dataset

- Lab: Finetuning a base model on custom dataset
- Simple Langchain application
- Lab: Simple langchain application
- Creating a Conversational customised chatbot on LLM
- Labs: Chatbot creation
- Vector stores and retrievers
- Labs – vector store and retrievers
- Understanding Retrieval augmented generating system
- Labs: PDF RAG
- Labs: QnA RAG
- Introduction to AI Agents - Lang graphs
- Labs: customise agent on Langgraphs