Applied AI for Vision, Language & Generative Innovation

Duration: 40 hours

Course Overview

This 40-hour course offers a practical, hands-on journey through AI and ML with a strong emphasis on Computer Vision. Participants will build a foundation in Data Science, explore key ML concepts like regression, classification, and clustering, and dive into Deep Neural Networks including CNNs and RNNs. Core Computer Vision techniques such as image preprocessing, object detection, and image classification are covered in depth. The course also introduces essential NLP concepts (e.g., TF-IDF, Word2Vec) and touches on generative AI using transformers and LLMs. Through guided labs, learners will gain experience with real-world applications in text, image, and speech processing, enabling them to develop practical and deployable AI solutions.

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 and 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 -1 : Data analysis insights
- Lab 2 : Regression
- Lab 3 -: Classification
- Lab 4 – Unsupervised – K means clustering
- Auto Report Generator for CSV Data

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
- Auto Sentiment Reporter for Product Reviews

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
- AI Text Assistant with Prompt Templates

Module 5 –Computer Vision

- Introduction to OpenCV- Dealing with Numpy arrays
- Images to array and arrays to images
- Image transformation – Scaling ,Rotation , translation , affline translation
- Image enhancement
- Edge and corer detection
- Drawing functions – Line , circle , rectangle , words
- Arithmetic operation – addition , subtraction

- Morphological transformations, Image segmenttion,color segmentation , thresholding
- Image blurring, face detection , eye detection , object detection
- Automated data entry system with OCR