

Module 1:

Introduction to Python

Comments, print statement, Variable assignment and how it is different from other languages, Numbers and arithmetic in Python, Order of operations in arithmetic expressions, Built-in functions for working with numbers, Functions, Boolean values, Boolean (Comparison/ Relational) operators, Combining Boolean Values (usage of “and”, “or” and “not”), Order of precedence of operations, Conditional Statements, Introduction to Lists, Indexing, Slicing, modifying Lists, List functions (sorted(), sum(), len() etc)), List methods (append, index etc), Tuples, The for loop, Range() method, The while loop, List comprehensions, Strings, String methods, Split() and join(), Dictionaries

Module 2:

Introduction to Artificial Intelligence and Machine Learning in industry perspective, ML model types, Different ML models, Market Trends and Analysis, ML methodologies, Future Scope and advancement, Industrial Use case Discussion Prerequisites to get it into AI ML. Python recap, overview, installation, Data Types, Functions, Conditions, Loops, Modules and Packages. Reading and writing the files, Jupiter Note book, VS Code and industrial software’s and real time implementation procedure.

Python libraries and its usage

Use Case: - AI ML in industry production line automation.

Hands on programming – OpenCV based face recognition system design.

Module 3:

General Model architecture for ML Models and its working with parameter, Linear Regression model and industrial use case discussion, Random Forest and industrial Use Case Discussion, Decision Tree working and industrial use case discussion.

Hands on programming – Implementing the Linear regression and Decision tree model of price prediction and estimation model.

Module 4:

Neural Networks CNN, RNN architecture, parameter, application and working, MobNet, ResNet, VGG models and its working with application of Usage for different industrial use cases.

YOLO – use case and working architecture, parameters, SVM, KNN, Naive Bayes, LLM models, Reinforcement Learning models, Generative AI model, Prompt Engineering

Hands On – Testing of YOLO model in CPU, YOLO training methods and procedures.

Module 5:

AI ML in Data Science with Industrial Use Case

About Pandas data frame, how to read tabular data, Data cleaning, data mining

Writing CSV files with Numpy and pandas, Importing Data from various sources (Csv, txt, excel, access etc),

Extracting the specific column or row, Data cleaning Method implementing with python eliminating null, removing the unsupported characters etc. Data Mining Methods – Implementation with one example

Module 6:

Data Analysis – Visualization, Using Python, Data visualization – chart preparation, graphs, Industrial Use case.

Python coding for the CSV/Excel File data for data visualization, Graphing, chart preparation, Tableau Flipkart user data analysis for predicting the next buying item interest with the price range

Understanding the computer vision in ML, Industrial Application of computer vision/Machine vision, working architecture of computer vision and computer vision model, OpenCV Library introduction, Installation of OpenCV, Working with OpenCV, OpenCV in computer vision

Practical: - Some image pre-processing techniques hands on, Industrial use case implementation with OpenCV for the ML model.

OpenCV library exploration, use case and real time example, Industrial applications. Real time data exploration with the OpenCV and Camera.

1. Image resizing
2. Binary image, Gray scale image and RGB image conversion
3. Image addition, Image multiplication, Image capturing from camera, Video recording

Module 7:

Architecture of YOLO, Annotation Methods, software's for annotation, YOLO Installation in GPU and CPU procedure, how to work with YOLO V4, Model working flow, implementation methods, parameters and Output detection

Programming Hands-on – Using the YOLO trained model to test the image detection in CPU system for Cotton Boll Detection.

OpenCV Hands on for object detection using the pretrained models

Activity: Difference between CPU, GPU and TPU system.

Module 8:

Introduction NLP, NLP libraries exploration and programming with NLP libraries, Data pre-processing, Tokenization, Stemming, Lemmatization, and Stop words concepts in NLP, learn how to extract text from PDF files

Use Regular Expressions for search in text, Use Scikit-Learn and Deep Learning for Text Classification, NLTK model exploration for basic NLP programming. Use case – Using Spacy and NLTK for Sentiment Analysis, LSTM models, LLM models Generative AI model introduction, architecture and Working with Use case consideration – Chat GPT, DALL – E and BERT.

Sentimental analysis using NLTK. Project Demo, discussion and Hands on. Creating Own Chatbot.