ARYA VIDYA MANDIR
UPDATED DATA ANALYSIS
LEVEL 1 & LEVEL 2

LEVEL 1- COURSE - AI/ML WITH DATA ANALYSIS - 10 SESSIONS
LEVEL 2- COURSE - AI/ML WITH DATA ANALYSIS - 12 SESSIONS

LEVEL 1 - AI/ML WITH DATA ANALYSIS

	SESSION NO	Topic name	Concepts learnt
1	**SESSION 1:**	Undertsanding Python analysis packages - NUMPY	1. Introduction to Arrays 2. Arrays vs Lists 3. Creating Arrays using NumPy 4. NumPy Array Methods 5. Dimensions in Arrays 6. Indexing 7. Slicing
2	**SESSION 2:**	Undertsanding Python analysis packages - ADVANCED NUMPY	1. NumPy Data Types 2. Converting datatype of an array 3. Array Reshaping 4. Joining Arrays 5. Array Stacking 6. Filtering NumPy Array
3	**SESSION 3:**	Exploring the World of Images and Data with NumPy and OpenCV	1. NumPy Topics - Copy & View 2. Reshaping & Flattening the NumPy arrays 3. Sorting the NumPy Arrays 4. Introduction to openCV-Python 5. OpenCV Topics - vstack, hstack, indexing, cropping, slicing,filtering
4	**SESSION 4:**	Mastering the Basics of Pandas Series: Handling Data Types, Appending, and Concatenation	1. What is Pandas? 2. Pandas Series 3. Datatype handling in Panda Series 4. Appending in Panda Series 5. Concatenation in Panda Series
5	**SESSION 5:**	Mastering Data Manipulation with Pandas: From Creating DataFrames to Loading and Analyzing CSV and Excel Files	1. Dataset, Series & Dataframe 2. Creating a DataFrame 3. Loading files into a DataFrame 4. Read CSV in Pandas 5. Read Excel in Pandas
6	**SESSION 6:**	Exploring Advanced DataFrame Operations in Pandas: Combining, Merging, Grouping, and Aggregating Data for Better Analysis	1. Filtering data in DataFrame 2. Combining in DataFrame (Joins) 3. Merging in DataFrame 4. Counting in DataFrame 5. Functions in DataFrame (groubpy & filter)
7	**SESSION 7:**	Matplotlib: A Comprehensive Guide to Visualizing Data and Analyzing Relationships A Comprehensive Guide to Plotting Multiple Charts and Adding Grid Lines, Subplots, Titles, and Legends	1. What is matplotlib? 2. Display Multiple Plots 3. Matplotlib Pie Charts 4. Matplotlib Adding Grid Lines 5. Matplotlib Subplot 6. Title 7. Legend function in Matplotlib
8	**SESSION 8:**	Mastering Data Visualization with Matplotlib: Mastering Scatter Plots, Heatmaps, and Confusion Matrices	1. Scatter Plots in matplotlib 2. Scatter Plots using CSV in matplotlib 3. Change marker and marker size using CSV 4. Scatter plot colored by category 5. Markers' Size in Scatter Plot 6. DataFrame in Heatmap using matplotlib 7. Confusion Matrix using matplotlib
9	**SESSION 9:**	Linear Regression and Supervised Machine Learning: Understanding Types, Assumptions, and Real-World Applications with Python Examples	1. Machine Learning - Introduction 2. Types of Machine Learning 3. Types of Supervised Learning: 4. Linear Regression - Introduction 5. Simple Linear Regression 6. Multiple Linear Regression 7. Assumptions in Linear Regression Model
10	**SESSION 10:**	Beyond the Straight Line: Unleashing the Power of Polynomial Regression in Python	1. Polynomial Regression - Introduction 2. Need for Polynomial Regression 3. Python implementation of polynomial regression 4. Construction of polynomial regression model 5. Displaying the polynomial regression result 6. Polynomial Smooth Regression Using CSV with Python 7. Polynomial Regression with Various Polynomial degree ranges

LEVEL 2 - AI/ML WITH DATA ANALYSIS

	SESSION NO	Topic name	Concepts learnt
1	**SESSION 1:**	Understanding Image processing refers to the manipulation and analysis of digital images using various algorithms and techniques. Understanding OpenCV (Open Source Computer Vision Library) is a popular open-source library designed for computer vision and machine learning tasks.	1) Image processing 2) OpenCV
2	**SESSION 2:**	Understanding MediaPipe is a cutting-edge, cross-platform framework for building multimodal perceptual AI pipelines.	1) MediaPipe 3) MediaPipe Face Detection and Tracking 4) MediaPipe Pose Detection and Tracking 5) MediaPipe Object Detection and Tracking 6) MediaPipe Customization and Development 7) Facial landmark detection
3	**SESSION 3:**	Implentation using MediaPipe is a cutting-edge, cross-platform framework for building multimodal perceptual AI pipelines	Project 1 Using the Session 1 & 2 Topics: Project using Mediapipe for instagram filters examples - Develop a Python-based project with Mediapipe for implementation.
4	**SESSION 4:**	Understanding topics in the field of data science for data manipulation, analysis, and visualization.	1) Face recognition library 2) Revisting of NumPy 3) Revisting of Pandas 4) Revisting of Matplotlib
5	**SESSION 5:**	Understanding three of the most widely used and popular libraries for machine learning and deep learning	1) TensorFlow 2) Keras 3) Scikit learn
6	**SESSION 6:**	Implentation using Computer Vision & Face Recognition Library	Intermediate Project 2 : Project using Computer Vision & Face Recognition Library for Student Attendance System - Using Computer Vision & Face Recognition Library for capturing Student Image & Updating Attendance System using the option of "auto click" when video image of student is captured.
7	**SESSION 7:**	Understanding topics in the field of automation and scripting	1) Pyautogui 2) Cursor movement 3) Error handling 4) Input device interface
8	**SESSION 8:**	Implentation using Pyautogui	Intermediate Project 3 : Project using Pyautogui library to move the cursor based on the finger movement detected by an input device. - Using Pyautogui for Color on the Finger and the Cursor moves when the finger moves.
9	**SESSION 9:**	Understanding tools and techniques necessary to build powerful and effective machine learning models.	1) Convolutional Neural Networks (CNNs) 2) Transfer Learning 3) Data Augmentation 4) Image Preprocessing 5) Loss Functions 6) Optimization Algorithms 7) Performance Metrics 8) API Integration with TensorFlow Serving
10	**SESSION 10:**	Implementation using CLASSIFICATION	Intermediate Project 4 : Project using Google Collab use CLASSIFICATION APIs for Rose or Sunflower or Tulip Classification - Create Python project that uses the Google Collab platform to access the pre-trained models and online Classification Model APIs. - Using online CLASSIFICATION Model APIs for Flowers Classification and predicting with test images to identify whether Rose or Sunflower or Tulips.
11	**SESSION 11:**	Implementation using OBJECT DETECTION using YOLO Model & SORT	Final Project 5 : Project on Developing a machine learning model for OBJECT DETECTION - Using basic concepts in MODEL TRAINING including i) Data Collection ii) Model Selection iii)Training Model iv) Testing v) Prediction of Image with sample.
12	**SESSION 12:**		