Artificial Intelligence & Machine Learning using Python

"AI Enabled Vision & Speech based Personal Assistant"

AI & ML are technique, code or algorithm that enables machines to develop, demonstrate and mimic human cognitive behavior or intelligence and hence the name "Artificial Intelligence". Some of the most successful applications of AI around us can be seen in Robotics, Computer Vision, Virtual Reality, Speech Recognition, Automation, Gaming and so on…

Artificial Intelligence is constantly pushing the boundaries of what machines are capable of. The Main purpose of training real time smart machine is to use their speed and capability. Most importantly machine can think and perform task like humans. By this course student will be able to design and develop an advance AI System.

In this program, one would get to learn about Building Artificially Intelligent systems including computer vision and natural language processing techniques. Machine Learning & Deep Learning are the key part of this course, and, are implemented using Python Scripting. Various Libraries like numpy, pandas, matplotlib, scikit-learn, keras, tensorflow, pytorch etc. were used and discussed in detail.

Why should you learn from us?

- A Team built with Professional Trainers having an experience of delivering for more than 20K students
- An outreach of 300+ colleges pan India
- Free Python/Linux recorded sessions.
- Daily 15 minutes Query Solving Session at the end of the class.
- Minor/major project development

The Fee structure is mentioned below:

DURATION	**60 Hours**	**For Arya Institute of Engineering & technology**
FEES	**INR 9999/+ GST**	**INR 4000/- per student**

Who can attend this program?

- Engineering Undergraduates/Computer Programming Pursuing
- Python/AI Hobbyists and Students willing to kick-start their career in AI/Machine Learning
- Knowledge of any computer programming is advantageous

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Project Titles

Final Project (1)

"AI Enabled Vision & Speech based Personal Assistant Bot"

Capstone Projects (3)

1. ***Real Time Face Recognition based Music Player***
2. ***A Web-chatbot application***
3. ***Loan Customer Prediction Model***

Mini Projects (7+)

1. ***Moving Object Detector***
2. ***My Selfie Machine***
3. ***Detecting People and Vehicles violating Covid Protocol***
4. ***Email SPAM Detection Application***
5. ***Real-estate House Price Predictor Model***
6. ***Image Classification Model***
7. ***Object Recognition Model***

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ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Duration – 30 Days/4 Weeks (60 Hours)

15 Hours	**Introduction** (2.5 Hours)	• Introduction with **AI & Machine Learning** • Data Science vs Data Engineering vs Data Analysis vs AI • Use of Data in the world of AI • Connecting with Upflairs Community • Basic Linux/Windows Commands • Setting Up GITHUB & Google Colab/Kaggle
	Python Overview (5+2.5 Hours)	• Command Line & Script based Python Programming • Python Quicker: Keywords, Data Types, Operators • Conditional/Looping/Error Handling in Python • Comprehensions • Python User Defined Functions • Python Generators • Lambda Expressions • Python Modules: Usage and Installation • Understanding the OOP of Python • **GUI Development** with Python
	Data in Python (1 Hour)	• *Types of DATA?* • **Numpy Arrays**: Creating, Accessing, Manipulating • Array Attributes; Data Operations • The file handling in python • Dealing with Excel/Json/CSV/txt files
	Image Processing (4 Hours)	• About Digital Images & Processing • Concept of Computer Vision in AI • Working on Digital Images (skimage, opencv, pillow, imutils) • Use of Matplotlib library for Images & Graphs • Changing Color-spaces, Geometric Transformations • Image Thresholding, Filtering, Morphology
15 Hours	**Computer Vision & Image Processing** (2.5 Hours)	• Live Image Capturing • Color Feature Detection in Images • Image Feature Detection, Extraction and Matching
	Mini Project (2.5 Hours)	• ***Project 1: "Moving Object Detector"*** • ***Project 2: "My Selfie Machine"*** • ***Project 3: "Detecting People and Vehicles violating Covid Protocol"***
	Capstone Project (2.5 Hour)	• ***Capstone 1: "Real Time Face Recognition based Music Player"***
	Natural Language Processing (2.5 Hours)	• What is NLP? Linguistic to Natural Language! • NLTK in Python for Text Processing • **Text to Speech** and **Speech to Text** Modules in Python • Morphological Analysis; Syntactic Analysis • Generating Word Clouds • SMTP with Python; Reading and Sending Mail from Python

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	Chatbot (2.5 Hours)	• What is Chatbot • How to create query-response pairs • Use of Regular Expressions • Interacting with Web-based Services • **API Integration** • Introduction with Flask • **Deploying AI Applications over Web/Cloud**
	Capstone Project (2.5 Hour)	• ***Capstone 2: "A Web-chatbot application"***
15 Hours	**Pandas** (6 Hours)	• **Pandas:** The Series and DataFrame • Creating, Accessing, Manipulating Pandas Data • Series and DataFrame Attributes & Basic Functions • Arithmetic and Statistical Methods; Sort, Search, Count • Data Grouping, Missing Data Handling • Merging & Joining of Data • **File Handling** with Pandas • **Data Visualization with Pandas & Seaborn**
	Introduction with Machine Learning (1 Hour)	• *Understanding the concept of Machine Learning* • *How Machine Learning is Related to AI* • The Flow of Machine Learning • The Mathematics Required for ML • Types of Learning and their sub-categories
	ML – Naïve Bayes (0.5 Hours)	• The Bayes Theorem • **Naïve Bayes** Algorithm for Machine Learning
	Mini Project (2.5 Hours)	• ***Project 4: "Email SPAM Detection Application"***
	Supervised Machine Learning – Regression (1 Hours)	• ***Linear Regression****: l*ine equation; Fitting Data in Model • Model Evaluation • **Polynomial Regression:** The Non-linearity in Data • Performance Evaluation of Regression Model
	Mini Project (1.5 Hours)	• ***Project 5: "Real-estate House Price Predictor Model"***
	Supervised ML – Classification (2.5 Hours)	• **Logistic Regression:** Concept & Need • Performance Evaluation of Classifications Models • **Support Vector Machines (SVM)** • **Kernel Nearest Neighbors (KNN)** • The Information Theory • **Decision Trees Classifier** • **Random Forest Classifier** • Biases versus variances • Data Overfitting & Underfitting • The Concept of Cross-validation
15 Hours	**Capstone Project** (2.5 Hour)	• ***Capstone 3: "Loan Customer Prediction Model"***
	Speech Processing (1 Hour)	• Recording Live Sound/Speech Data • Working with sound data • MFCC for speech processing

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	Deep Learning with ANN – TensorFlow (1.5 Hour)	• What is Deep Learning? • Understanding Neural Network • The basic terminology – Layers, weights, biases, activation functions, losses, optimizers, learning rate • What is **ANN**? • Using **TensorFlow** Library for **ANN** • TensorFlow 1.x vs TensorFlow 2.x • Creating Sequential Model with Hidden Layers
	Mini Project (1 Hour)	• ***Project 6: "Image Classification Model"***
	Convolutional Neural Network – Keras (1.5 Hour)	• The Convolution Theory – Filters, Pools, Averaging etc. • Generating Convolution Neural Network Models • Image Augmentation • About the Architectures: AlexNet, VGGNet, ResNet, UNet, EfficientNet
	Mini Project (1 Hour)	• ***Project 7: "Object Recognition System"***
	Major Project (6.5 Hour)	• ***FINAL PROJECT: "AI Enabled Vision & Speech based Personal Assistant Bot"***

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