

Specialised Programme on Machine Learning (6 Weeks)

Machine Learning is a technique behind innovations such as facial recognition, self-driving cars, predictive results in search, Predictive text etc. The objective of this training program is to understand how machines can learn from its past experience which is considered as the core of AI. The focus is on creating strong fundamental knowledge sets on building algorithms by mastering the principles of statistical analysis, machine learning and deep learning.

During the course students will be able to:

1. Gain an in-depth understanding of data structure and data manipulation in python programming
2. Gain expertise in mathematical computing using the NumPy and Scikit-Learn and handling data using Pandas
3. Comprehend the principles, algorithms, and applications of Machine Learning
4. Learn the applications of Machine Learning across various use cases like customer service, financial services, healthcare and more
5. Understand supervised and unsupervised learning models including linear regression, logistic regression, clustering, classification, K-NN
6. Master the concepts of recommendation engine and time series modeling, search algorithms, neural networks, and NLP

Python Programming

- Installing Python
- Introduction to Python Basic Syntax
- Data Types
- Variables
- Operators, Input/output, Strings
- Python data structure
- Lists, Tuples, Dictionaries, Sets.
- If, If- else, Nested if-else
- Looping, For, While, Nested loops
- Control Structure, Uses of Break & Continue
- Functions and methods and Exception Handling
- OOPs Concepts
- Python classes and objects

- Introduction and Installation of Machine learning packages like PANDAS, NUMPY
- SKLearn, Matplotlib, Seaborn.
- Mathematical Computing with Python (NumPy)
- Data Manipulation with Pandas
- Machine Learning with Scikit-Learn.
- Introduction to Data Visualization in Python (matplotlib)

Machine Learning

- Introduction to Machine Learning and data preprocessing
- What is machine learning?
- Types of learning
- Applications of Machine learning
- Evaluating ML techniques.
- Data cleaning
- Scaling of continuous features
- Encoding of categorical features,
- Train and Test Split
- Machine Learning Algorithms
- Linear Regression
- Decision Trees, Decision Trees case study
- Naive Bayes classifier, assigning probabilities and calculating results, Naïve Bayes case study
- K-Nearest Neighbors ,Algorithm and case study
- Ensemble Learning: Concept of model ensembling
- Random forest
- Gradient boosting Machines
- Model Stacking
- Support Vector Machines
- Different type of Unsupervised Machine Learning Algorithms
- Clustering, K-mean
- Agglomerative clustering
- Association rule mining
- Apriori algorithm

Introduction to Deep Learning

- Neural Network and its applications
- Single Layer Neural Network
- Constructing Neural Networks model
- Overview of Feed Forward Neural Network
- Back Propagation

- Activation Functions: Sigmoid, Hyperbolic Tangent
- Introduction to deep Learning
- Why Deep Learning is taking off?
- Deep Learning Architecture
- Introduction to Tensor flow
- Introduction to Keras
- Building blocks of deep neural networks
- Activation Functions
- Why non-linear activation functions?
- Introduction to Convolutional Neural Network.
- Sequence Modeling:
 - Recurrent Neural Network
- Real world case studies for CNN and RNN Model

Introduction to NLP

- Overview of NLP
- Pre-processing
- Need of Pre-processing Data
- Introduction to NLTK
- Using Python Scripts
- Shallow Parsing
- Deep Parsing
- Text Featurization technique
- NLP with Machine Learning and Deep Learning
- Word2Vec models
- Building NLP Application.

Project Work