

Specialised Programme on Machine Learning- 3 Weeks

Aim

This programme will give a platform to participants to comprehend the ways to analyze data, systematically extract information from a large dataset and build highly accurate machine learning models. The participants would be able to make data driven decisions, transform data into actionable insights, and develop statistically sound and robust analytical solutions.

Objective

- To Develop and implement techniques for data cleaning for further processing and visualization.
- To Develop the understanding of Python programming and its use in machine learning applications.
- To introduce the major Machine learning algorithms and their applications to solve the real world problems
- To introduce various analytics solutions for processing datasets and for the mathematical modeling of data.

Course Contents

Introduction to Python Programming

Installing Python, Introduction to Python Basic Syntax, Data Types, Variables, Operators, Input/output, Python data structure, Introduction to Strings, Lists, Tuples, Dictionaries, Sets. Flow of Control (Modules, Branching) 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. Mathematical Computing with Python (NumPy), Data Manipulation with Pandas, Machine Learning with Scikit-Learn. Data visualization in Python with Pandas, Matplotlib, Seaborn.

Machine learning

- **Introduction to Machine Learning**
What is machine learning? Types of learning, Applications of Machine learning, Evaluating ML techniques.
- **Data Preprocessing techniques**
Data cleaning, scaling of continuous features, encoding of categorical features, train and test split of the dataset

- **Supervised Algorithms**

Simple Linear Regression, Multiple 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, Support Vector Machines, 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

- **Unsupervised Algorithms**

Different type of Unsupervised Machine Learning Algorithms, clustering, K-mean, agglomerative clustering, Association rule mining, Apriori algorithm

Flagship Scheme of Government of India

- Overview of National e-Governance Plan in Agriculture (NeGPA), towards the Mission of Digital Agriculture
- Overview of Gem (Government e-Marketplace) is using Machine Learning algorithm to bring in cognitive computing capabilities to automate human decisions making process