BIGM

Bangladesh Institute of Governance and Management

Introduction to Machine Learning with Python

(Batch-2)

www.bigm.edu.bd

About the Course

Machine Learning (ML) is a branch of Artificial Intelligence (AI) focused on building computer systems that learn from data and Python is a high-level, interpreted, general-purpose programming language. After completion of this course, participants will learn fundamental concepts of machine learning and algorithms of both supervised and unsupervised learning, data propossessing, hyper-parameter tuning and evaluation of model performance with different packages and libraries of Python.

Course Objectives

This course aims to provide knowledge of basic machine learning models such as regression, decision tree, support vector machine, random forest, decision tree, K-nearest neighbor, etc. using different packages and libraries of Python. The core objective of this course is to prepare participants for real-world applications of machine learning modeling through hands-on exercises and projects.

This Course is Designed for

- Researchers from both academic and non-academic institutions.
- Personnel working in consultancy, research firms, software companies, and market research firms.
- Individuals engaged in financial institutions and R&D of private sectors.
- Employees of public and private sectors or NGOs.
- Students who intend to learn statistical computing for higher studies/research.

Expected Outcomes/Benefits

After successful completion of the course, participants will be able to:

- Implement basic machine learning algorithms and techniques using Python libraries.
- Pre-process and analyze data effectively.
- Build and evaluate predictive models for various real-world applications.
- Interpret results of models and make informed decisions based on machine learning insights.
- Apply best practices in model selection, evaluation, and deployment.
- Gain confidence in their ability to pursue further learning and specialization in machine learning.

Minimum Course Requirements

Individuals equipped with basic concepts of python programming language.

Course Details

Duration: (Five weeks long course) April 19, 2025 to May 19, 2024

Class Time: Saturday: 3:00 PM - 5:30 PM; Monday: 6:00 PM - 8:30 PM

Class Duration: 2.5 Hrs

Number of Sessions: 10

Course Delivery Mode: Offline and Lab based.

Course Fee: TK 7,000

Course Outline

Date	Session	Area	Topics Covered
19-04-25	Seesion-1	Introduction to Machine Learning and Python Setup	1. What is Machine Learning (ML)? 2. Types of ML: supervised, unsupervised, and reinforcement learning. 3. Real world application of ML. 4. Setting up and familiarize with google colab. 5. Installing libraries.
21-04-25	Session-2	Data Handling	1. Introduction to numpy and pandas. 2. Exploratory Data Analysis (EDA): descriptive statistics, data visualization, identifying patterns and outliers. 3. Data preprocessing: handling missing data, data scaling.
26-04-25	Session-3	Data Visualization	1. Introduction to matplotlib and seaborn. 2. Generating basic graphs: bar, histogram, line, pie, box plot.
28-04-25	Session-4	Introduction to Linear Model (Regression Problem)	1. Introduction to linear regression. 2. Theoretical overview of model evaluation.
03-05-25	Session-5	Introduction to Linear Model (Classification Problem)	1. Introduction to linear regression. 2. Regularization. 3. Theoretical overview of model evaluation.
05-05-25	Session-6	Introduction to Tree Based Model	1. Theoretical underpinning of tree based model. 2. Introduction to decision tree (DT). 3. Hands on exercise.
10-05-25	Session-7	Introduction to Distance Based Model	1. How does distance based model works? 2. Introduction to k-nearest neighbor and support vector machine. 3. Hands on exercise.
12-05-25	Sesson-8	Ensemble Methods	1. Introduction to ensemble methods (bagging, boosting). 2. Some familiar ML models. 3. Hands on exercise.
17-05-25	Session-9	Unsupervised learning: (Clustering Model)	1. What is unsupervised learning? 2. Introduction: k-means clustering, hierarchical clustering, density-based clustering. 3. Hand on example.
19-05-25	Session-10	Real Life Application and Case Studies	Application of ML in various domains (healthcare, finance, marketing, etc.)

Assignment

One practical and real life project will be provided to the participants as assignment to be submitted by one week as a necessary criteria for certification.

Course Coordination Team

Dr. Mohammad Tareque
Director, BIGM
Course Advisor

Mohammad Tareque, PhD a career civil servant, currently serves as the Managing Director Board of Trustee and Director at Bangladesh Institute of Governance and Management (BIGM). Dr. Tareque worked as Senior Secretary, Finance Division, Government of Bangladesh and Alternate Executive Director at the World Bank prior to joining BIGM. Under his dynamic leadership and visionary thinking, BIGM is contributing to the nation with its academic excellence, research, and training potential.

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