Machine Learning Foundations

Instructor: Sumudu Tennakoon, Ph.D.

Course Objective: This course aims to provide a comprehensive understanding of the core principles of Machine Learning (ML) with hands-on training on applying machine learning to solve real-world problems. A learner who completes this course should be able to define a machine learning problem, understand the solution path, and display the ability to carry out the end-to-end process of building a machine learning application.

Career Prospects: The foundational knowledge in ML covered in this course is essential to those who want to start or expand their careers in the Data Science/ML domain: Data Scientist, ML/AI Engineer, Data Engineer, Data Analyst, AI/ML Developer, Data Science/ML Consultant, or Freelancer.

Target Audience: Students, Corporates without a Data Strategy, Corporates and Individuals who are beginners to Machine Learning.

Level: Beginner-Intermediate

Duration: 60 hours

Schedule and Format:

- Schedule: 3-month program/12 weeks, two sessions per week (weekends).
- Format: Live/Recorded Lectures, Demonstrations, Hands-on Exercises/Labs.
- Evaluation: Quizzes (2), Project (1)
- Additional Practice: Students must spend extra time on exercises and the capstone project.

Training Conducting Medium: English

Prerequisites:

- Basics of computer programming, mathematics, and statistics.
- Basic knowledge in computer applications: spreadsheet, word processor and presentation authoring.

Platform and Data for Hands-on Exercises and Project:

- Programing Language: Python 3 will be used as the primary programming language in teaching, practice examples and assignments.
- Python Libraries: Scikit-learn, TensorFlow, Pandas, NumPy, Matplotlib, Seaborn, Flask.
- Applications/Tools: Jupyter Notebook/Lab, IDE (Spyder/VS Code/Atom/PyCharm), Spreadsheet (MS Excel/LibreOffice Calc).

- Data: Data for exercises, case studies, and projects will be obtained from open data repositories.
- Computing Environment: Cloud platform (will be decided on class consensus and service availability) or locally installed Python distribution in student's PC.

Topics Covered in the Training Program

Topic #	Topic Name	Training Week #
1	Introduction to Machine Learning (ML), History, and Applications	1
2	Setting up a Computing Environment, Python and Required Libraries.	2
3	Knowledge Foundations to ML (Computing, Statistics, and Mathematics) *	2-3
4	Exploratory Data Analysis (EDA) and Feature Engineering *	4-5
5	Supervised and Unsupervised Learning (concepts)	6
6	Machine Learning Algorithms *	6-7
7	Explaining ML Models and Predictions (introduction) *	7
8	Deep Learning and Neural Networks (introduction) *	8
9	Design, Develop and Deploy ML Solutions *	9-10
10	Capstone Project *	11-12

* Topic includes hands-on programming exercise/assignment or project.

Evaluations and Grading:

	Topic #	%
Quiz1 (Basic Concepts)	1-6	20
Quiz 2 (Advanced Concepts, Deep Learning and Application Building)	7-9	20
Deliverable and Project Report	10	50
Presentation (video narration)	10	10
		100

Completion Requirement:
- 80 % Attendance (at least 19 out of 24 sessions)
- Final Grade > 70 %
- Completion with Distinction: Final Grade > 90 %

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