Course:	**INFO-3142**
Professor:	**Osam Ali**
Project:	**Project #1 – Machine Learning - Version 1.0 [Apply Three Different Forecasting Algorithms]**
Due Date:	**Tuesday, October 31, 2023 / ALL Sections**
Submitting:	**Please see the last page for instructions**

How will my project be graded?

- **Find a classmate(s) and ENROLL yourself into a Group – Due October 15th, 2023.**
- This project counts for **25%** of your final grade and will be evaluated using the following grid:

Marks Available	What Deliverables are the Marks Awarded For?	Mark Assigned
4	Description of the selected forecasting problem	
4	Description of available data (attributes, context, quantity…). Clearly indicate what attributes and/or parts you have used	
3	Short overview of the selected algorithms	
4	Specifics about how algorithms were trained/applied and the evaluation procedure	
4	Accuracy comparison	
4	Code (using Python or R). Marks will be deducted if the code does not match the used algorithms of the report.	
2	Proper Submission (1 Report document file + scripts/code files)	
25	**Total**	

Project #1 Requirements

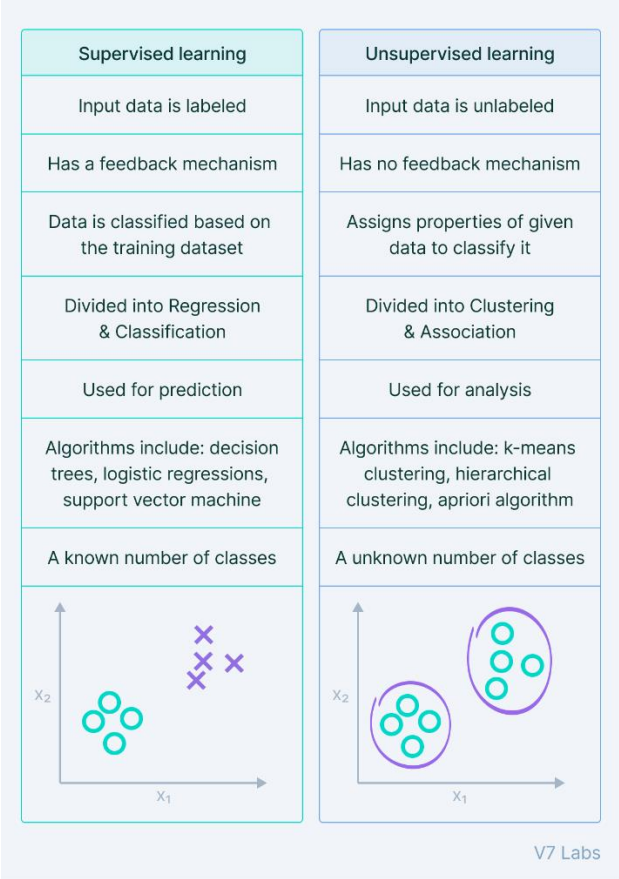
Introduction:

Machine learning is a branch of artificial intelligence (AI) and computer science which focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy. Machine learning involves showing a large volume of data to a machine so that it can learn and make predictions, find patterns, or classify data. The three machine learning types are:

1. Supervised learning: It is the most common type of machine learning algorithms, also known as inductive learning, includes regression and classification.
2. Unsupervised learning: It is to find the underlying structure of dataset, group that data according to similarities, and represent that dataset in a compressed format. Using k-means for clustering problems. Apriori algorithm for association rule learning problems.
3. Reinforcement learning:

Dealing with Five Major Steps in the Machine Learning Process:

- Define the problem.
- Build the dataset.
- Train the model.
- Evaluate the model and measure the accuracy.
- Inference (Implementing the model)



Details:

In this Project #1 you will experiment with different forecasting approaches and algorithms. As this is your first ML project in this course, you can keep it simple.

1. Select a forecasting problem for which there is an open-source dataset or for which you have data from other sources. Many links for open data sets are available. Some possible forecasting tasks include Energy Forecasting (https://www.kaggle.com/c/global-energy-forecasting-competition-2012-load-forecasting/data) and house prices prediction (https://www.kaggle.com/c/house-prices-advanced-regression-techniques/data), etc.
2. Carry out forecasting with at least 3 different approaches/algorithms. The approaches need to be significantly different. For example, support vector regression with two different kernels will be considered one approach. Some possibilities include neural networks, support vector machine/regression, multivariate regression, k-nearest neighbour, regression trees, ARMA, ARIMA, Markov chain, and any other algorithms.
3. Evaluate the three models/algorithms using hold-out or cross-validation and compare their accuracy.

Note: The objective of this project is to experiment with different models. The focus is on applying forecasting approaches and not on optimizing models.

***** End of Requirements *****

How should I submit my project?

Electronic Submission:

One of the Group members should submit the project to the INFO3142 “Project #1” electronic submission folder in FOL. Your work should be submitted as a single document file containing your report deliverables in addition to your source code files (Python or R).

Submit your project on time!

Project or essay submissions must be made on time! Late submissions will be subject to divisional policy on missed test and late projects. In accordance with this policy, no late submissions will be accepted without prior notification being received by the instructor from the student.

Submit your own work!

It is considered cheating to submit work done by another student or from another source. Helping another student cheat by sharing your work with them is also not tolerated. Students are encouraged to share ideas and to work together on practice exercises, but any code or documentation prepared for a project must be done by the group’s team members. Penalties for cheating or helping another student in another group cheat may include being assigned zero on the project with even more severe penalties if you are caught cheating more than once. Just submit your own work and benefit from having made the effort on your own.