Systems and Biomedical Engineering Department **Fourth Year / AI in Medicine**
Faculty of Engineering **Fall 2021**
Cairo University

Homework#2: Linear Regression

In this homework, you will implement multivariate linear regression using gradient descent. This exercise looks very long, but in practice you implement only around 10 lines of code total; it is designed to walk you through working with scikit-learn and implementing machine learning algorithms from scratch in python. You need to employ the train dataset to learn the weights of the linear function, while testing to evaluate the performance.

Starting from the tutorial Python code, you need to:

1. Use univariateData.dat dataset to test your univariate linear regression.
2. Use multivariateData.dat dataset to test your multivariate linear regression.

Make sure to generate your code in a modular format with the following function names:

- fit: method to train the multivariate linear regression model
- predict: method to use the trained linear regression model for prediction
- Compute Cost: compute the value of the objective function
- Gradient Descent: optimizes the parameter values via gradient descent
- Evaluate Performance: calculate the accuracy of the prediction for the test data.

Bonus:

- Please report what will happen if you used Lasso regression.

General instructions:

- This is an individual based assignment.
- Your code should be submitted through BB.
- The due date for the submission of this phase is Saturday, November, 6, 2021 at 12:00 am.
- You are permitted to discuss the following problems with others in the class. However, you must write up your own solutions to these problems. Any indication to the contrary will be considered an act of academic dishonesty. Please Review the definition of cheating in the first presentation.

Best Regards,

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