



STATISTICAL PATTERN RECOGNITION (FALL 2021) HOMEWORK#1: LINEAR REGRESSION

Due date: 26th November 2021

In order to do this homework, you have to go through linear regression theories and concepts.

○ Linear Regression

Dataset : Data-Train, Data-Test

Linear regression tries to model the relationship between two variables by applying a linear equation to a series of data.

Your task is to train linear model on the given datasets.

Implement **linear regression** using **closed form** solution and the **Gradient Descent** algorithm (Batch or Stochastic, only one) and test your implementation on the given Test Dataset.

- Use the Data-Train to train your model, and test on the Data-Test.
- Plot of the datasets and regression lines.
- Plot cost function for enough iteration for linear regression in Gradient Descent (Batch or stochastic, only one).
- Report the learned parameters (θ_0 , θ_1 , ..., θ_n), and also the value of MSE error on the train and test data.
- Do not forget that you could normalize the data.

Notes:

- ✓ Pay extra attention to the due date. It will not extend.
- ✓ Be advised that submissions after the deadline would not grade.
- ✓ Prepare your full report in PDF format and include the figures and results.
- ✓ Do not use sklearn or any similar library for regression and logistic regression and write your own code.
- ✓ Submit your assignment using a zipped file with the name of "StdNum_FirstName_LastName.zip"
- ✓ Feel free to use your preferred programming languages.
- ✓ Using other students' codes or the codes available on the internet will lead to zero