**Programming Assignment-1 Univariate Linear Regression**

**First Name1:\_\_\_Andrew\_\_\_ Last Name 1: \_\_\_\_King\_\_\_\_\_\_\_\_**

**First Name2: \_\_\_Richu\_\_\_\_ Last Name2: \_\_Mathew\_\_\_\_\_\_\_\_\_**

**Introduction**

In this programming assignment, you will implement the gradient descent algorithm and test how learning rate α will impact the learning process.

**Part-I:**

1. The Jupyter notebook file, “Univariate Linear Regression-PartI-Incomplete.ipynb”, is provided.

Please fill in the blanks, where you can find the indications -- “Your code starts from here”.

1. Two files, “train.csv” and “test.csv” are provided. Please put down the following information after training:

*w*0 = 6.968712318098739

*w*1 = 2.0903326295089353

**Part-II:**

1. The Jupyter notebook file, “Univariate Linear Regression-PartII-Incomplete.ipynb”, is provided.

Please fill in the blanks, where you can find the indications -- “Your code starts from here”.

1. The provided program will output a figure showing the curves of hypothesis functions at every 200 iterations (epochs). Please experiment with the learning rate . Please attach figures for each learning rate in this document.

A screenshot of text

Description automatically generated

A close up of a map

Description automatically generated

A screenshot of a social media post

Description automatically generated

A screenshot of a cell phone

Description automatically generated

1. Will the program work well with each of the learning rates? If not, which one(s) doesn’t return a valid answer?

**Answer**

The model will not work well with each of the learning rates. The model was able to predict the values with highest accuracy when learning rate was 0.05. The was able to predict with 98% accuracy using the testing data. However, if the learning rate = 0.1 it diverges quickly.

**Submission:**

* **Rule1:**
  + If you work with a partner, please name your zipped file as follows:

PA1\_LNAME1\_LNAME2.Zip for folder and PA1\_LNAME1\_LNAME2.docx for a word document, i.e., the file names should include both LAST NAMEs.

* + If you work on your own, the format should be

PA1\_LNAME.Zip for folder and PA1\_LNAME.docx for a word document.

* **Rule2:**
  + Put your FULL names whether working in a group or individually in the word document.
* **Rule3:**
  + **EVERYONE** in the class should submit this Assignment, which should provide all files (such as **ipynb** files etc.. ) that are necessary for the execution of code in the submission folder.
* **Rule4:**
  + Please submit two Jupyter files, each of which is corresponding to Part I and Part II, respectively.