Report for the programming assignment1

I have included 3 classes

1. LinearRegression.py
2. Main.py
3. Plot.py

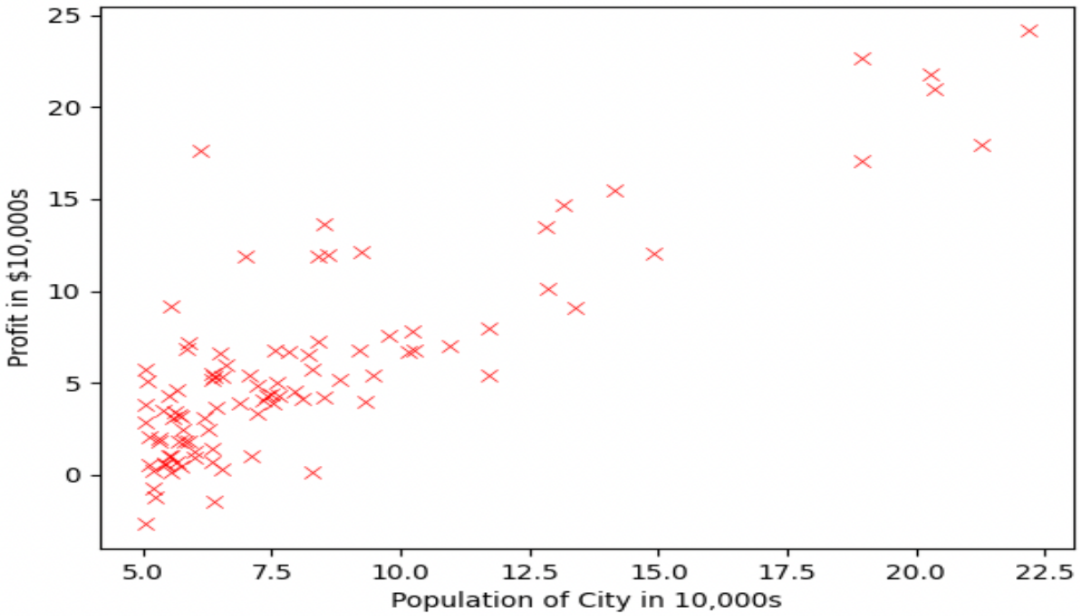
LinearRegression.py includes the linear regression library which contains all the required methods like getting cost_function, initialize_parameters, update_parameters, get_gradients, fit, fit_batch, predict, mse(mean square error). All the parameters like learning rate, number of iterations(epochs), batch size, and the initial value of θ_0 & θ_1 can be passed as an argument for the functions. Fit function accepts both “cost_based” and “l2_norm_based” as the stopping conditions as a parameter. By default the stopping condition used is “cost_based”

Plot.py includes all the essential methods that we can use to plot the dataset and the error(training error)

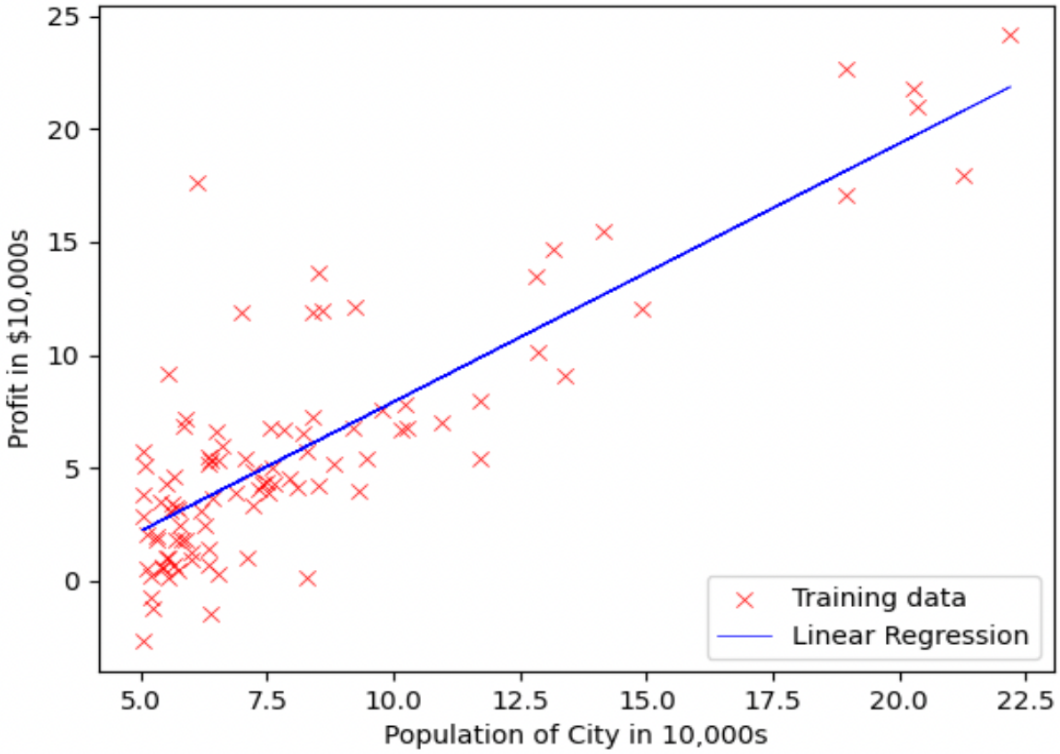
Main.py includes the main function to call the implemented linear regression library. On running the Main.py, we get the following output:
initial_plot.png, final_plot.png, and training_error.png are generated
The following is the output on the terminal for the values of theta_1, theta_0, and predictions (in 10,000s)
theta_1: [[1.14305609]]
theta_0: -3.5077046611764495
predictions for 3.5000: [[0.49299166]]
predictions for 7.0000: [[4.49368798]]

requirements.txt includes all the required libraries

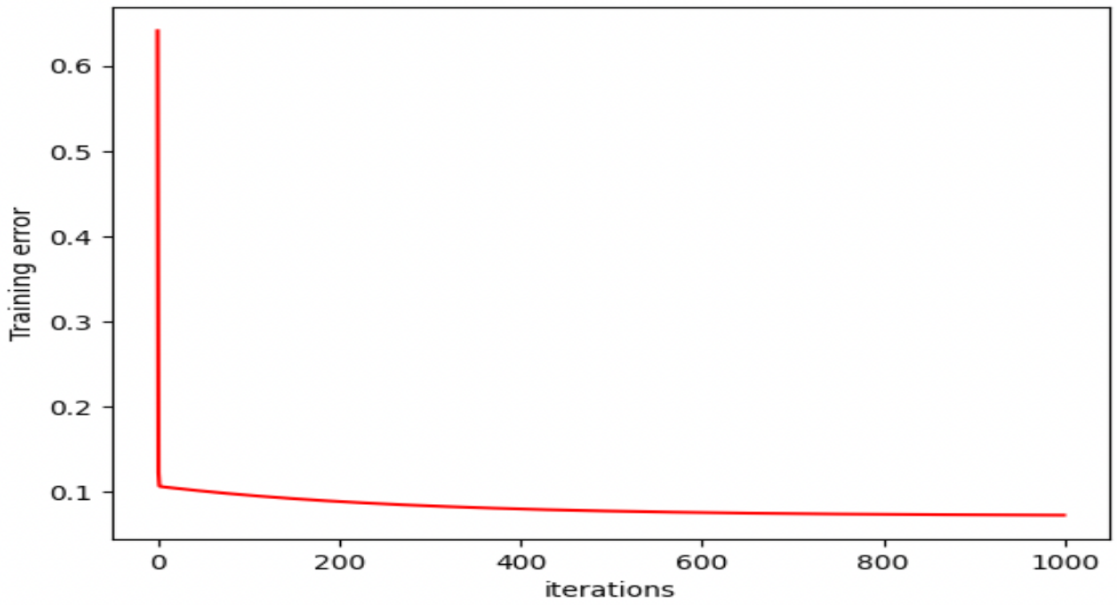
I have added some of the generated plots when we run the Main.py for reference:



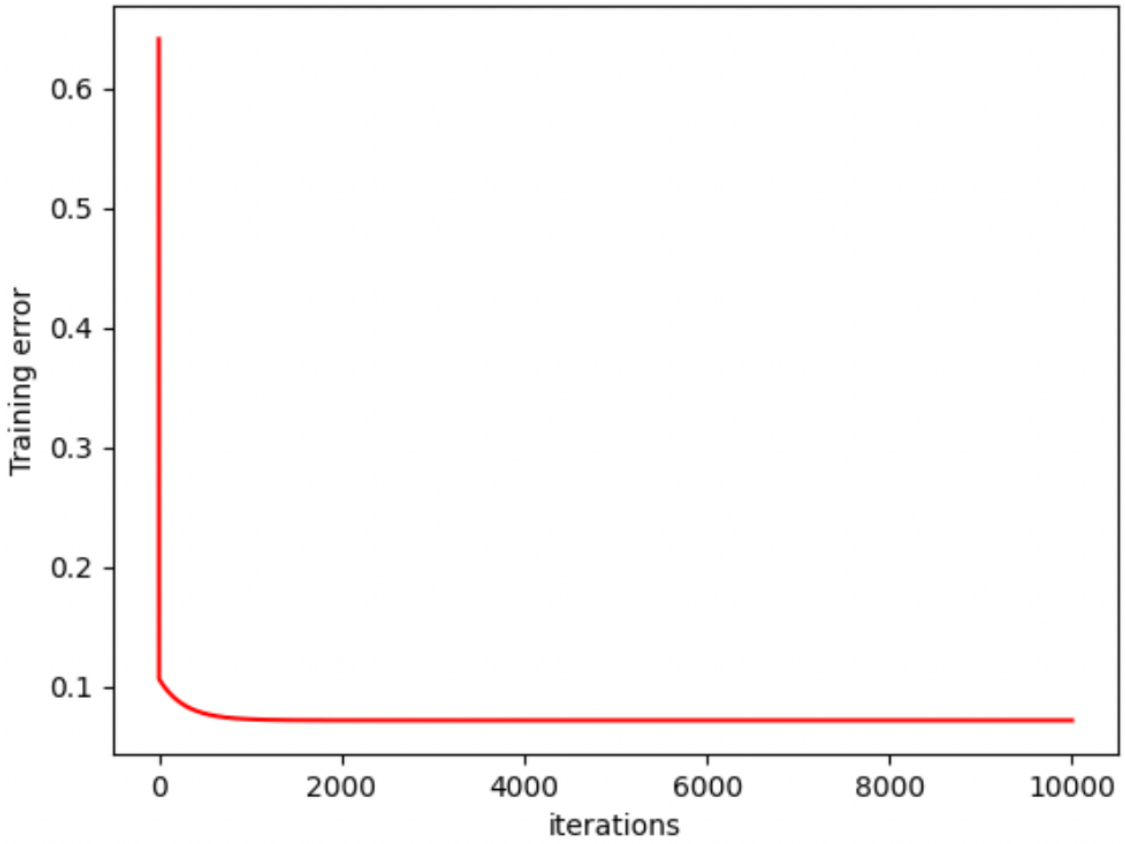
The above plot is the visualization of the dataset using a scatter plot



The above is the plot obtained after we fir the regression model on our dataset



The above is the plot of the training error for 1000 iterations or epochs
All the above plots are generated as soon as we run the Main.py



The above is the plot of the training error for 10000 iterations or epochs

Please refer **README.txt** to run the program

I have tested the program on my local machine and the Computer Science department servers.