CS 4375

ASSIGNMENT Assignment 1: Linear Regression using Gradient Descent

Names of students in your group:

Adrian Cortes - AXC210010

Abiola Alalade - AXA200196

Number of free late days used: 0

Note: You are allowed a **total** of 4 free late days for the **entire semester**. You can use at most 2 for each assignment. After that, there will be a penalty of 10% for each late day.

Please list clearly all the sources/references that you have used in this assignment.

Assignment One Report

GitHub where the dataset is hosted:

https://github.com/AdrianC165/ObesityPrediction/tree/main

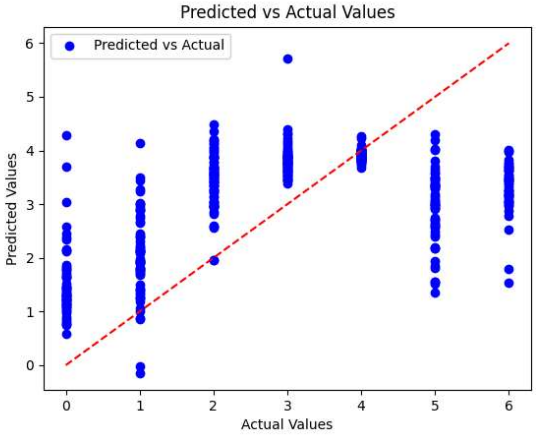
Are you satisfied that you have found the best solution?

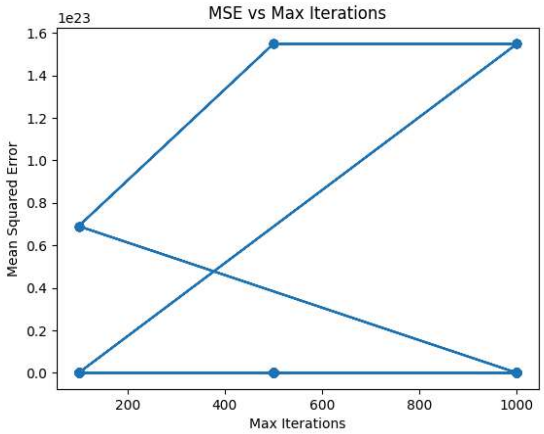
- No, I am not entirely satisfied with our solution. Despite our efforts to modify and optimize the code, we only observed minimal improvements in our results. I believe there are definitely more ways to optimize our code, and this project has highlighted areas where we can enhance our approach.
- There is a lot of room for improvement, and I am confident that as we continue with the class, we will develop our machine learning skills further. This will enable us to explore more advanced optimization techniques and ultimately achieve better results.

Snippet of Log of trials with different parameters:

Learning_Rate	Max_Iterations	Tolerance	Alpha	MSE	R2
constant	100	0.00001	0.0001	2.802005051	0.261362776
constant	100	0.0001	0.0001	2.801765418	0.261403731
constant	100	0.001	0.0001	2.803710708	0.260885085
constant	500	0.00001	0.0001	2.802005051	0.261362776
constant	500	0.0001	0.0001	2.801765418	0.261403731
constant	500	0.001	0.0001	2.803710708	0.260885085
constant	1000	0.00001	0.0001	2.802005051	0.261362776
constant	1000	0.0001	0.0001	2.801765418	0.261403731
constant	1000	0.001	0.0001	2.803710708	0.260885085
optimal	100	0.00001	0.0001	6.9069E+22	-1.84421E+22
optimal	100	0.0001	0.0001	6.9069E+22	-1.84421E+22
optimal	100	0.001	0.0001	6.9069E+22	-1.84421E+22
optimal	500	0.00001	0.0001	1.54876E+23	-4.07093E+22
optimal	500	0.0001	0.0001	1.54876E+23	-4.07093E+22
optimal	500	0.001	0.0001	1.54876E+23	-4.07093E+22
optimal	1000	0.00001	0.0001	1.54876E+23	-4.07093E+22
optimal	1000	0.0001	0.0001	1.54876E+23	-4.07093E+22
optimal	1000	0.001	0.0001	1.54876E+23	-4.07093E+22

Plots:


Predicted vs Actual Values
Predicted vs Actual
Predicted Values
Actual Values
0
1
2
3
4
5
6


MSE vs Max Iterations
1e23
Mean Squared Error
Max Iterations
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
200
400
600
800
1000