Machine Learning (60050) : Assignment 1

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Part a :

<u>Implementing Linear Regression</u>

- **Features** : Linear Combination
- **Error Function** : Mean Square Error
- **Optimization Function** : Gradient Descent
- **Learning Rate** : 0.05

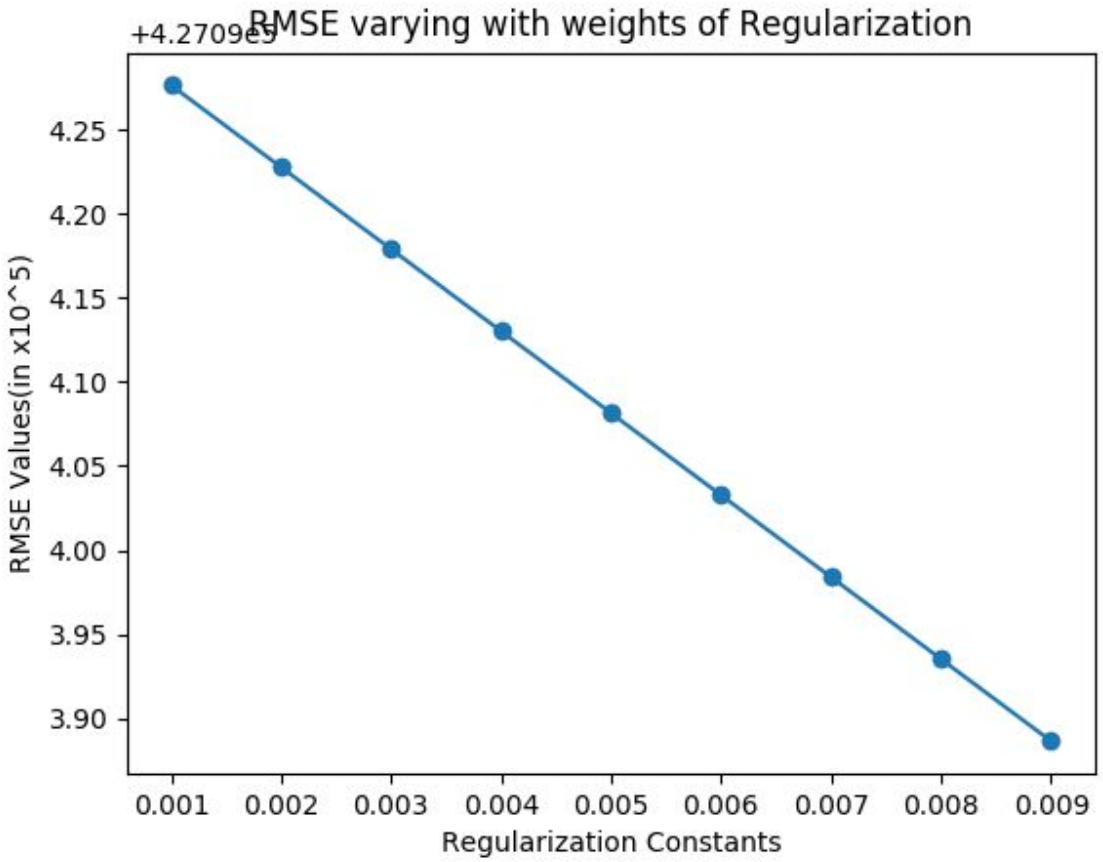
Procedure :

1.Split the Dataset into Train Set and Test Set [80:20]
2.Theta Values (Learning Parameters) are initialized randomly.
3.Took Regularization Constants = [0.001 to 0.01]

Final Learned Values (Theta Values) :

Regularization Constant	Without Regularization	With Regularization
0.001	[-0.00974371 0.28375361 0.08000541 0.8962003 0.28090481]	[-0.0097436 0.28375281 0.08000536 0.89619773 0.28090449]
0.002	[-0.00974371 0.28375361 0.08000541 0.8962003 0.28090481]	[-0.00974349 0.28375201 0.08000531 0.89619516 0.28090416]
0.003	[-0.00974371 0.28375361 0.08000541 0.8962003 0.28090481]	[-0.00974337 0.28375121 0.08000526 0.89619259 0.28090384]
0.004	[-0.00974371 0.28375361 0.08000541 0.8962003 0.28090481]	[-0.00974326 0.28375041 0.08000521 0.89619002 0.28090352]
0.005	[-0.00974371 0.28375361 0.08000541 0.8962003 0.28090481]	[-0.00974315 0.28374961 0.08000516 0.89618745 0.2809032]
0.006	[-0.00974371 0.28375361 0.08000541 0.8962003 0.28090481]	[-0.00974303 0.2837488 0.08000512 0.89618488 0.28090288]
0.007	[-0.00974371 0.28375361 0.08000541 0.8962003 0.28090481]	[-0.00974292 0.283748 0.08000507 0.89618231 0.28090256]
0.008	[-0.00974371 0.28375361 0.08000541 0.8962003 0.28090481]	[-0.0097428 0.2837472 0.08000502 0.89617974 0.28090224]
0.009	[-0.00974371 0.28375361 0.08000541 0.8962003 0.28090481]	[-0.00974269 0.2837464 0.08000497 0.89617716 0.28090192]

Plots :



PS : Because of Random initialization,every execution of the trained model gives different Learned Values.

The above graph is corresponding with the values submitted in part_a result file.