CoE202 - Basics of Artificial Intelligence “Big data analysis and machine learning”

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Homework#1
Report

During this homework, I learned various methods of implementing regularized and non-regularized training training models. For the sake of comparison, the results from a one run of a program is displayed bellow.

Task#	Model	Result
3	Polynomial Regression	train RMSE: 0.99, test RMSE 1.01
4	Closed form Ridge Polynomial Regression	train RMSE: 0.99, test RMSE 1.01
5	Mini-batch GD Polynomial Regression	train RMSE: 2.25, test RMSE 2.20
6	Mini-batch GD Ridge polynomial regression	train RMSE: 1.59, test RMSE 1.64
7	Mini-batch GD Lasso polynomial regression	train RMSE: 1.43, test RMSE 1.44

From what we can see from the data above, it is clear that the results obtained using mini-batch GD are somewhat worse that the ones that we got when directly using normal equation for polynomial regression. As it can be seen, the result obtained from task 3 and 4 are identical, while the ones we obtained using mini-batch GD ridge&lasso polynomial regression show more pronounced discrepancy, which can be attributed our choice of alpha/lambda. Generally, mini-batch GD with Lasso polynomial regression showed best performance, while the mini-batch GD polynomial regression the worst.
Overall, most of the results came off according to the theoretical expectations.