CSE 847 (Spring 2022): Machine Learning
Homework 4

Instructor: Jiayu Zhou
Submitted: Riya Thakore

1 Logistic Regression: Experiment

In this experiment, we are implementing Logistic Regression that takes input parameters as input dataset, training labels, and optional argument of convergence criterion to output a set of logistic weights.

Procedure

I have used Python (version 3.7.13) with NumPy instead of MATLAB after the confirmation posted by Dr. Jiayu Zhou.
(link: https://piazza.com/class/kxo2488l3zb72b?cid=25)
As per the instructions, I have created a train dataset with first 2000 rows and test data set with 2001 to 4601 rows inclusive with files and corresponding labels.

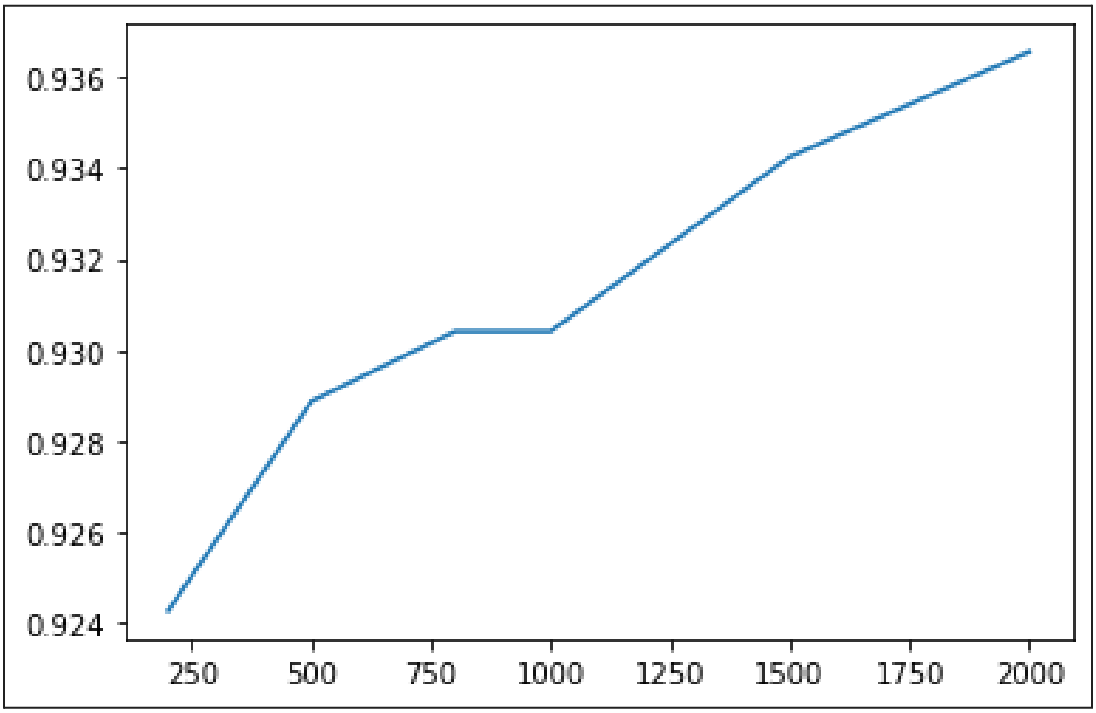
Results

Please find github link to the code: CSE-847-Machine-Learning/Problem 1 at main · RiyaThakore/CSE-847-Machine-Learning (github.com)
Following table show results of accuracy reported against *n* values of rows:

n	**Accuracy**
200	0.9242599000384467
500	0.928873510188389
800	0.9304113802383699
1000	0.9304113802383699
1500	0.9342560553633218
2000	0.936562860438293

Table 1.1

Also, I tried plotting a graph with the given values that overall concludes an upward increasing behavior.



Graph 1.1

2 Sparse Logistic Regression: Experiment

In this experiment, we are implementing Sparse Logistic Regression that trains a linear model on a given training set and prediction on a given test set.

Procedure

I have used MATLAB in this and used an implementation in SLEP (ref: https://github.com/jiayuzhou/SLEP/). The graph is output using AUC with the given range of parameters.

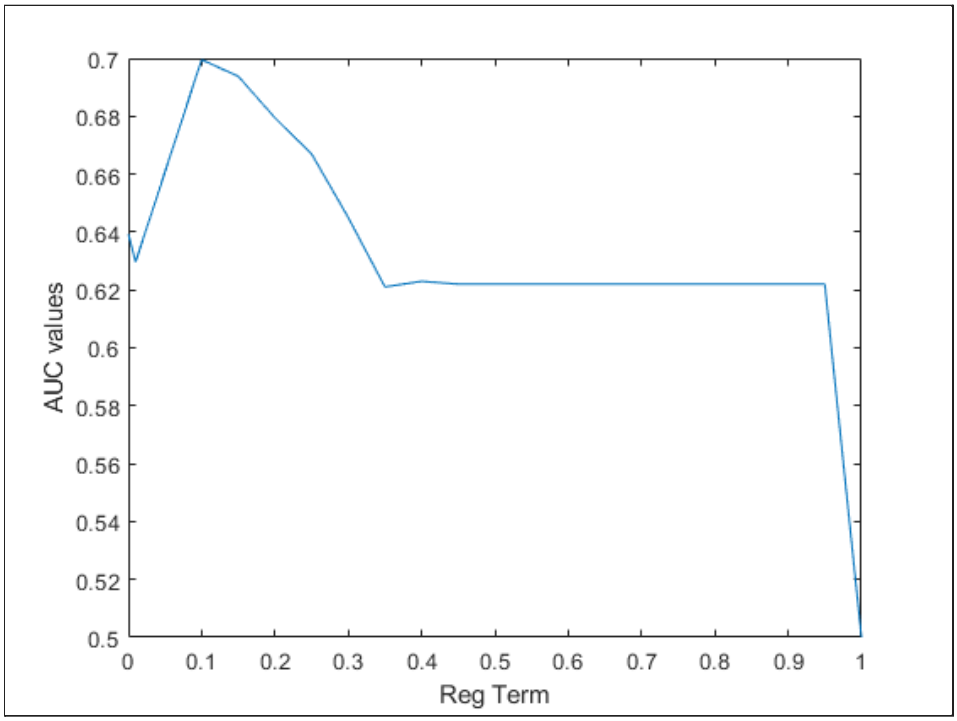
The input par is the regularization parameter and the range I have selected is as follows:

par = [0.00000001, 0.01, 0.1, 0.15, 0.2, 0.25, 0.3, 0.35, 0.4, 0.45, 0.5, 0.55, 0.6, 0.65, 0.7, 0.75, 0.8, 0.85 0.9, 0.95, 1]

Results

Please find github link to the code: CSE-847-Machine-Learning/Problem 2 at main · RiyaThakore/CSE-847-Machine-Learning (github.com)

Please find the AUC for different L1 regularized terms.



Graph 1.2