In The Name of Allah

Machine Learning (Fall 2022)

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Homework#1-part 2: ***Logistic Regression***

Due Date: 1401.08.14

PART II

C. Logistic Regression

In this part, we aim to localize the cellphones due to their calling points. Suppose you are in a building with seven routers. When a cellphone calls, each router receive a signal from the cellphone with different strength. Moreover, this building is divided into four regions. In this question, you are provided with samples containing the strength of a receiving signal from each seven routers and the region each person is called from. You should learn a classifier to predict theregion corresponding to each strength of the receiving signal from the routers.

1. Merely consider the data attributed to region 1 and 3. Then shuffle them randomly and specify 80 percent of them training data and the remaining test data. Now, learn a Logistic Regression classifier on the training data. Finally, report the precision and confusion matrix for test data. In addition, plot the cost function value with respect to each learning step.
2. Add $||\omega||_2$ to the cost function with regularizer factor as 5, 0, 1, 2 in the previous part. Repeat the calculations and compare the results with the ones in previous part.
3. Now, consider the data corresponding to all four regions. Learn a Logistic Regression classifier on them. Report the classification precision and the attributed confusion matrix.

Report:

- Prepare a PDF format report including the figures and answers to the questions.
- Make a folder, including your report and your codes (Note that your code is needed to be self-comment)
- Submit all your files in a zipped **folder** named as “HW1-2_studentnumber.zip”

Good Luck