

CS 5011: Assignment 2 report

Due on Thursday, October 16, 2014

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CS12B028

Question 1.

The parameters are chosen based on the accuracy scores.

Linear : 61.43% accuracy

polynomial:

maximum accuracy - 68.58% for degree=2 and gamma=2.

guassian(rbf):

maximum accuracy - 69.68% for gamma = 2 and C = 4 .

sigmoid:

maximum accuracy - 54.37% for gamma=1 and coef0=0 .

Question 2.

For the original back-propagation algorithm, the performance measures are:

parameters used $\gamma_r = 0.01$ and iterations=200.

Accuracy = 0.6125

Precision for coast = 1.0

Precision for forest = 0.90

Precision for insidicity = 0.54

Precision for mountain = 0.58

Recall for coast = 0.05

Recall for forest = 0.5

Recall for insidicity= 1.0

Recall for mountain = 0.9

F_measure for coast = 0.095

F_measure for forest = 0.64

F_measure for insidicity = 0.7017

F_measure for mountain = 0.7058

Updated rules for the new error function :

$$\beta_{km}^{(r+1)} = \beta_{km}^{(r)} - \gamma_r \sum_{i=1}^N \left(\frac{\partial R}{\partial \beta_{km}^{(r)}} + 2\gamma \beta_{km}^{(r)} \right)$$

$$\alpha_{ml}^{(r+1)} = \alpha_{ml}^{(r)} - \gamma_r \sum_{i=1}^N \left(\frac{\partial R}{\partial \alpha_{ml}^{(r)}} + 2\gamma \alpha_{ml}^{(r)} \right)$$

The new error function is similar to adding ridge in ridge regression. The advantage of this error function is numerical values of weights will be low as compared to previous weights which were derived from original back propagation algorithm.

Question 3.

For L2 logistic regression, the performance measures are

Accuracy - 0.95

Precision for forest class - 1.0

Precision for mountain class - 0.909090909091

Recall for forest class - 0.9

Recall for mountain class - 1.0

F-measure for forest class - 0.947368421053

F-measure for mountain class - 0.952380952381

For L1 logistic regression using Boyd's code ,the performance measures are *for* $\lambda = 0.01$

Accuracy - 0.975

Precision for forest class - 1.0

Precision for mountain class - 0.952380952381

Recall for forest class - 0.95

Recall for mountain class - 1.0

F-measure for forest class - 0.974358974359

F-measure for mountain class - 0.975609756098

Question 4.

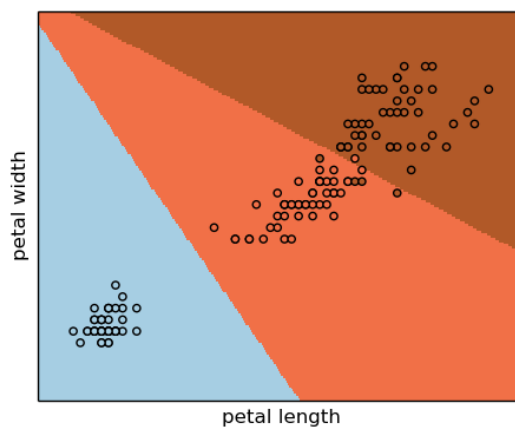


Figure 1: LDA

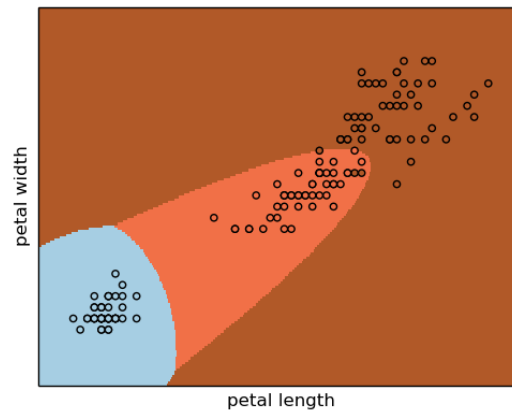


Figure 2: QDA

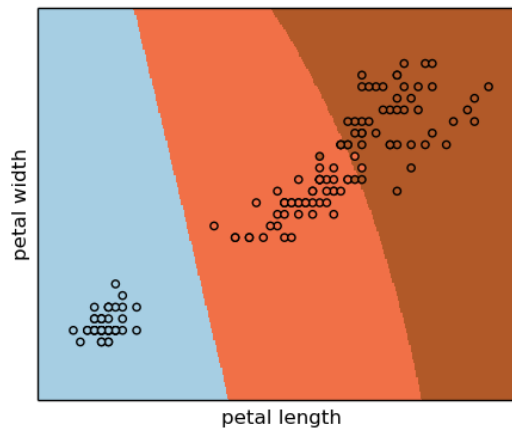


Figure 3: RDA with regparam as 0.3