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CS 1675

Assignment 6 Report

Due: 2/27/19

1a) $w = (0.0445; 0.0116; -0.0050; 3.3242E-4; -2.0359E-4; 0.0264; 0.3524; 0.0063)$

$b = -2.7182$

1c)

Training Set:

C =

| | |
|-----|-----|
| 115 | 40 |
| 85 | 299 |

SENS = 0.5750; SPEC = 0.8820; Misclass err = 0.2319

Testing Set:

C =

| | |
|----|-----|
| 42 | 19 |
| 26 | 142 |

SENS = 0.6176; SPEC = 0.8820; Misclass err = 0.1965

1d) The results from the support vector machine produced lower misclassification errors than both the Naïve Bayesian and logistic regression models. It is safe to conclude that the support vector model performed the best out of the three.

2b)

| Hidden Units | Training misclassification error | Testing misclassification error |
|--------------|----------------------------------|---------------------------------|
| 2 | 0.2375 | 0.2402 |
| 3 | 0.2263 | 0.2271 |
| 5 | 0.2078 | 0.1965 |
| 10 | 0.2301 | 0.2140 |

The neural network with one hidden layer and 5 hidden units seems to perform the best. The misclassification errors trend downwards as more hidden units are added until a certain point

where the misclassification error starts increasing. This is most likely due to overfitting when too many hidden units are applied to the data