

Connor Johnson

CS 1675

Assignment 6

1.

a) $w = [0.0445 \ 0.0116 \ -0.0050 \ 0.0003 \ -0.0002 \ 0.0264 \ 0.3524 \ 0.0063]$, $b = -2.7182$

c) Test Data

	Predicted Negative	Predicted Positive
True Negative	142	19
True Positive	26	42

Error = 0.1965

Sensitivity = 0.6176

Specificity = 0.8820

Training Data

	Predicted Negative	Predicted Positive
True Negative	299	40
True Positive	85	115

Error = 0.2319

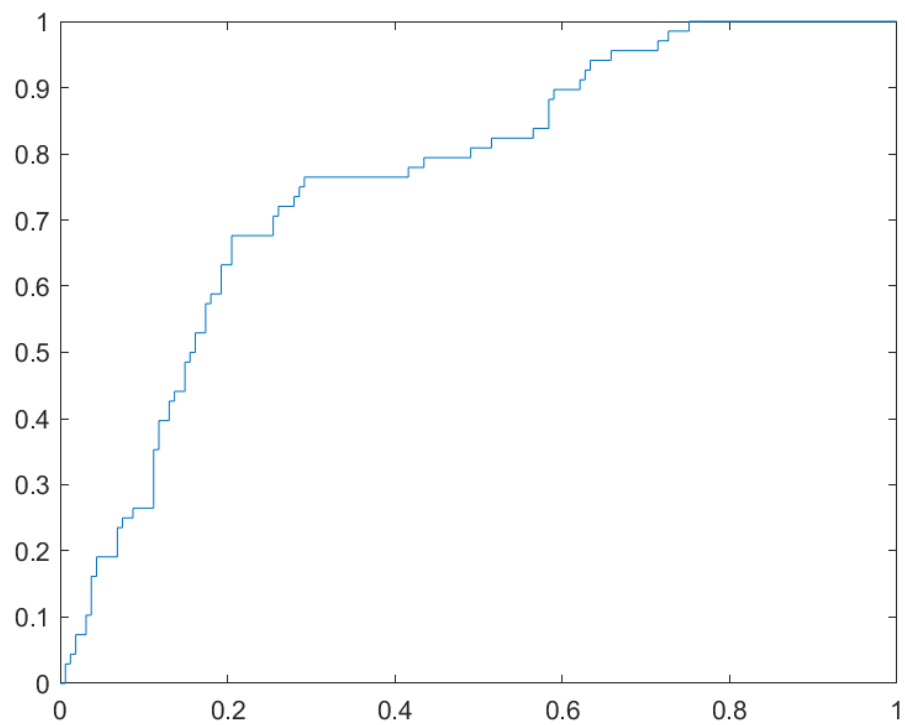
Sensitivity = 0.5750

Specificity = 0.8820

d) Overall, this model performed much better than the logistic regression. The errors for both the training and test set are about 0.1 lower. This model performed much better at predicting negatives which is seen in the specificity values. Because of this, it had much lower error.

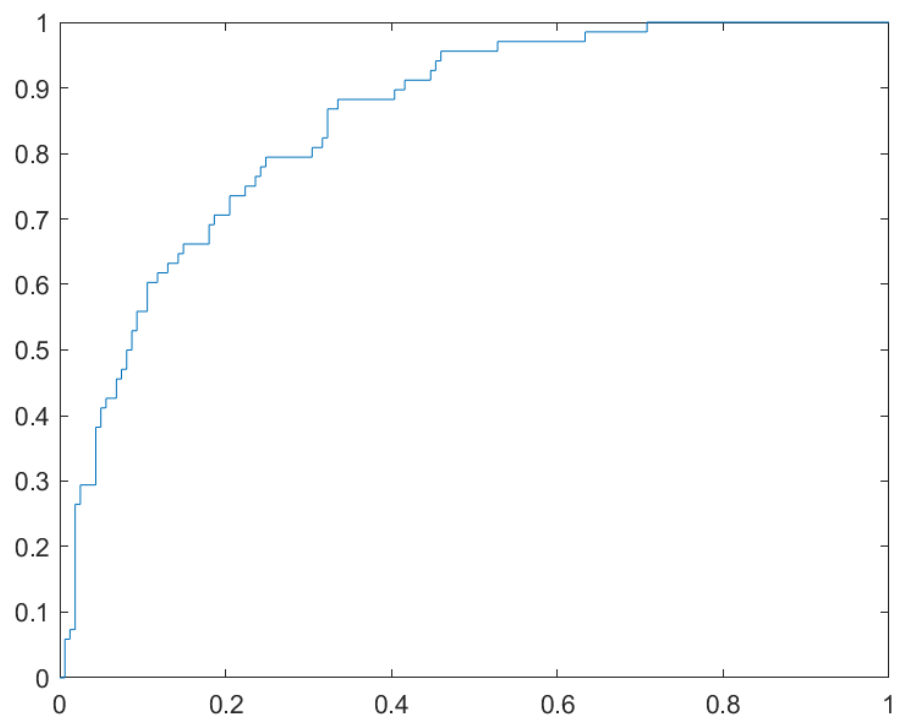
2.

Logistic Regression



AUC = 0.7633

SVM Model



AUC = 0.8497

THE ROC curves and their AUC values show that the SVM model performs better than the logistic regression. A perfect model would have an AUC of 1.0 and the SVM Model's AUC is about 0.1 greater than the logistic AUC.

3.

Hidden Units	Train Error	Test Error
0	0.2468	0.2358
2	0.22375	0.2489
3	0.2301	0.2445
5	0.2226	0.1921
10	0.2319	0.2096

The neural network performed slightly better with the hidden layers. It continued to improve as more units were added to the hidden layer as seen in the error values above