Weekly Homework 6

Ava Chong
CS 1675: Intro to Machine Learning

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Problem 1. Support vector machines

(*a*) See code.
(*b*) See code.
(*c*)

Training Confusion Matrix

	1	0
1	115	40
0	85	299

Miss-classification error: 125/539 = .232
Sensitivity: 115/(115+85) = .575
Specificity: 299/(299+40) = .882

Testing Confusion Matrix

	1	0
1	35	11
0	33	150

Miss-classification error: 44/229 = .192
Sensitivity: 35/(35+33) = .514
Specificity: 150/(150+11) = .931

(*d*) Comparing to last weeks data, it seems as though this weeks is better. The miss-classification error is significantly less and the specificity is higher for this week's model.

Problem 2. Deep learning toolbox in Matlab
(1) N/A
(2)

Training Miss-classification Error

Hidden Units	Error
2	89/377 = .236
3	91/377 = .241
5	83/377 = .220
10	101/377 = .268

Testing Miss-classification Error

Hidden Units	Error
2	20/81 = .247
3	20/81 = .247
5	18/81 = .222
10	21/81 = .259

When we compare the miss-classification error from parts a and b, we find that they are similar but that the miss-classification error is smaller in part a. This leads me to believe that model a is a better choice.

Extra Credit: I found that the increase of hidden units per layer did not really change the miss-classification error. However the number of layers seemed to have a positive effect when it come to minimizing the miss-classification error.