# Advanced Computing: Machine Learning:

Game 3

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Do not use your book or the Internet or another student. If you have questions, you can ask Richard.

1. Suppose you are training an MLP with 10 outputs y. Suppose every data point has 3 features: [x1, x2, x3], and there are 100 data points.  
   What are the dimensions of y?

The dimension for y will be (100, 10).

1. The equation for the SVM margin is t(w dot x + b) >= 1. What is the effect of decreasing |w| = w dot w?

The effect of decreasing the |w| will increase the margin of the SVM. However decreasing the value of |w| will sometimes result in overfitting of the margin.

1. Why do you need to scale the features for SVM and other algorithms?

It can help to improve the accuracy of our SVM and other algorithms. If one feature has a much larger scale than the others it can cause bias within the data and can skew where we would want to put our hyperplane between two classes

1. What is np.dot(np.transpose(w), w)

It calculates the dot product of the weight vector giving us a scalar.

1. Give 2 methods for selecting the RBF layer.

We can use the k-means clustering method or kernels.

1. Describe what a support vector machine does.

It finds the hyperplane that best separates data into different classes. It tries to find one that has the largest margin between the data points.