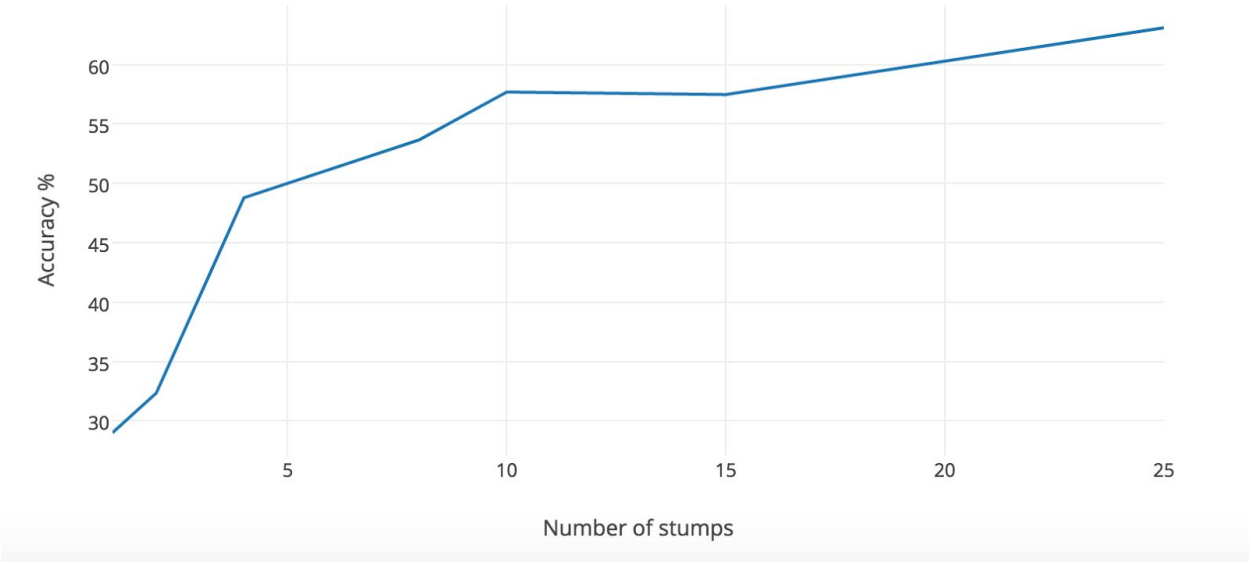
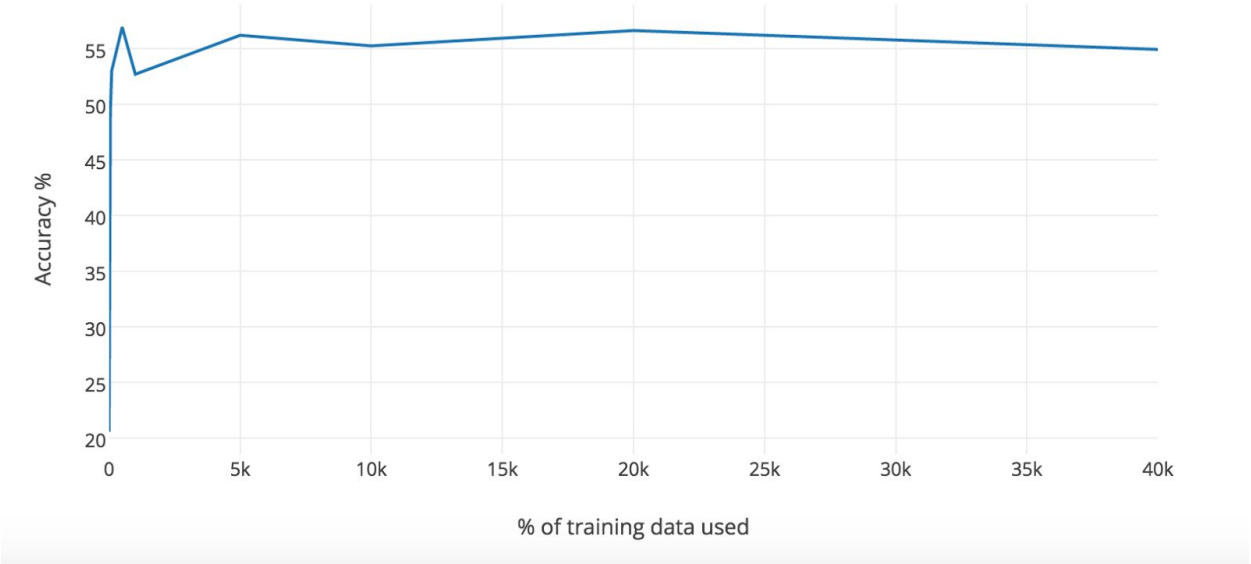
Adaboost:

Results:

1. The accuracy is directly proportional to the stump count. As the number of stumps increase the accuracy also increases and after a certain limit the accuracy saturates.
   We ran our code for multiple stump counts and the results are plotted
   In the following graph.



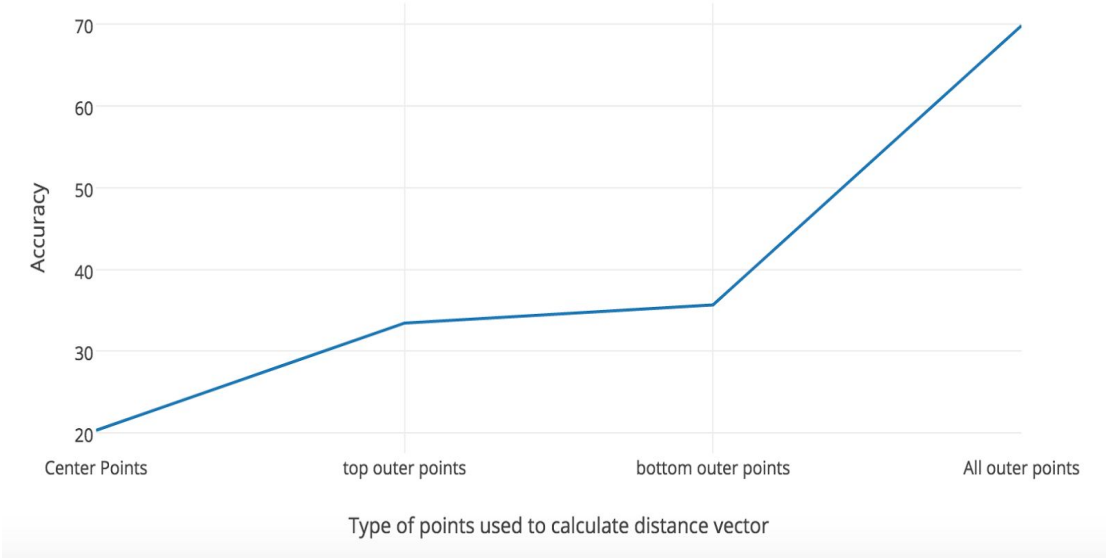
2. The accuracy is also directly proportional to the amount of training data we have used. As the amount of training data increases the accuracy increases and after a certain point of time it saturates.
We ran our code for multiple amounts of training data and plotted a graph which is given below:



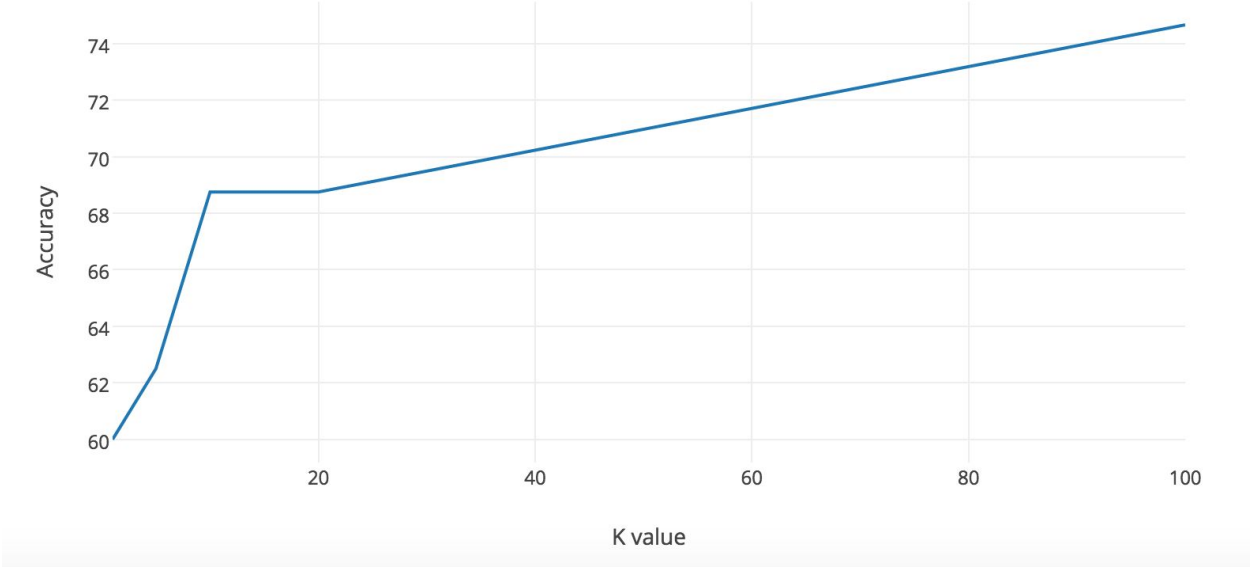
2) KNN:-

There are many parameters that affect the performance of KNN are :-

1. The k value
2. The pixel points that we consider to calculate the distance/similarity between two images - for example, the points on the edges give a better distance measure than the inner points, this is because - in an image some things are generally on top and some things are generally on the bottom , like mountains and sky are on top and grass and some objects are likely to be on bottom points.
   So, the outer/corner points would prove to be better while calculating distance.
   Also consider this case - the points which are at the center of image won't change their position even if the image is rotated , so it is not of much use to use them to calculate the distance.
   We have plotted a graph below showing the average accuracies for the kind of points that we used to calculate the distance vector.



Another parameter that could affect is k. Accuracy is directly proportional to k value. Usually when k =1 or when k value is very less the model doesnt learn anything i.e., it underfits and if k is large the model overfits. For this particular dataset though the accuracy increases with K value the difference in accuracy is not much(around 10% difference between k=1 and k=1000). We think this behaviour is particular to this dataset and KNN might go bad for some other data sets. The graph below shows how the accuracy varied with different k values.



Neural Nets:-

For neural networks the performance depends on many parameters such as the number of layers in the NN , number of nodes in each hidden layer, number of iterations of backpropagation etc. Below are our findings:

1. Performance gets better with increase in the number of hidden layers.
2. Accuracy improves if we do more iterations during the time of backpropagation.

Examples of images getting classified correctly by our classifier are :