REPORT ON ASSIGNMENT 3 (MACHINE LEARNING LAB)

❖ PROCEDURE

★CLASSIFICATION USING RADIAL BASIS FUNCTION
- The MNIST dataset was downloaded and using Tensorflow, a function was written which would train an RBF classifier.
- The training data was taken and on it, the RBF classifier was trained.
- The resulting classifier was evaluated on a test set and an accuracy of 93.4% was obtained.

★CLASSIFICATION USING LINEAR CLASSIFIER
- The dataset was split into test and training sets and a linear classification model was built using Tensorflow.
- The resulting model had a test accuracy of 91.67%
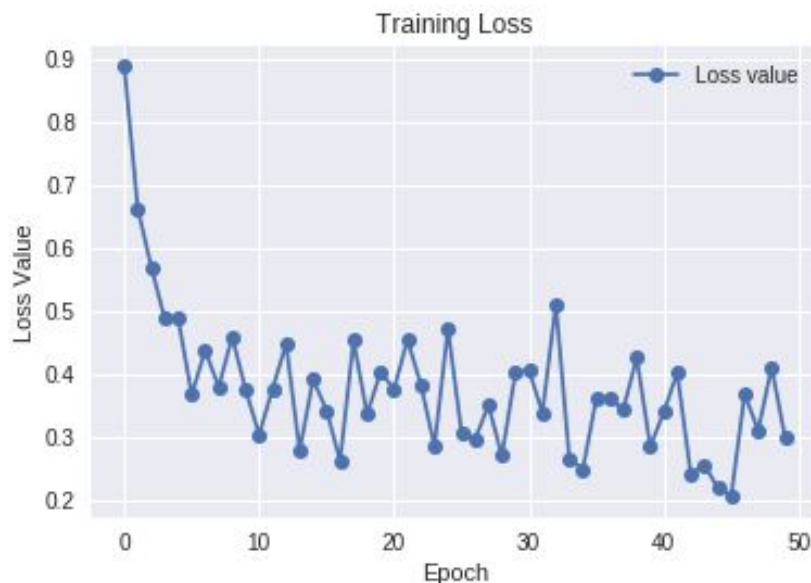
# ★PERFORMANCE COMPARISON OF RBF ON VARIOUS HYPER-PARAMETERS

1. ACCURACY VS STANDARD DEVIATION:
OBSERVATIONS

- Till a standard deviation (stddev) of 5.0 , accuracy increases w.r.t stddev.
- After stddev = 5.0, the accuracy saturates around 92%.
- If stddev incerases too much, accuracy slowly starts falling.
- Hence accuracy is very sensitive to very low or very high values of stddev.

accuracy vs standard deviation
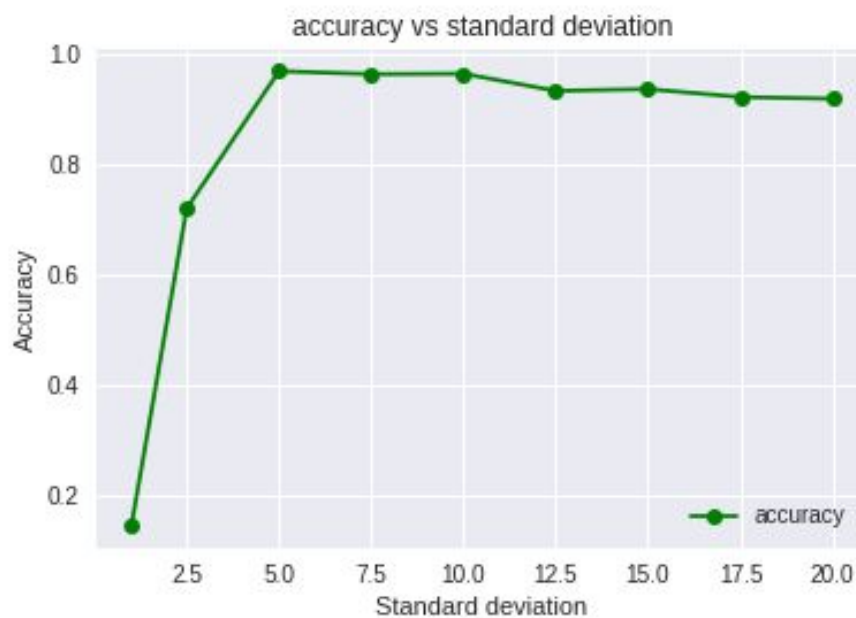
2. ACCURACY VS OUTPUT DIMENSIONS: OBSERVATIONS

- The output dimensions equals the number of weights in the linear model; so larger the dimension, better the accuracy.

accuracy vs output dimensions
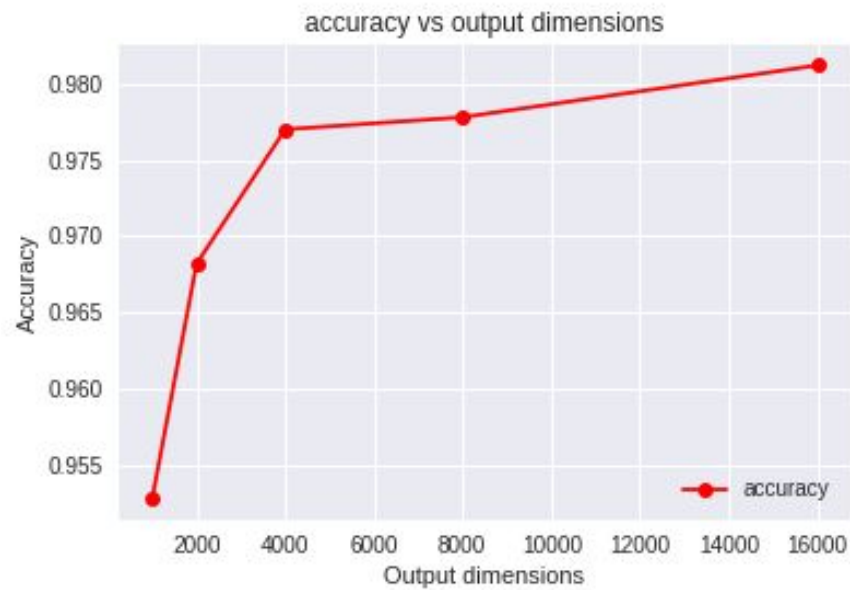
3. ACCURACY VS NO. OF EPOCHS: OBSERVATIONS
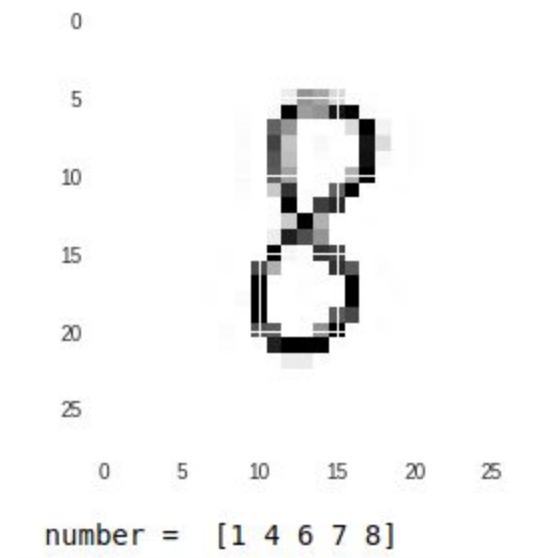
- As the no. of epochs are increased, accuracy increases, and after a certain threshold, the accuracy is almost constant.

accuracy vs epochs

★CLASSIFICATION OF SELF-CREATED MNIST IMAGES

Five random digits were created as per MNIST format (28x28) and they were classified using the trained classifier. All the digits were predicted successfully.

number = [1 4 6 7 8]
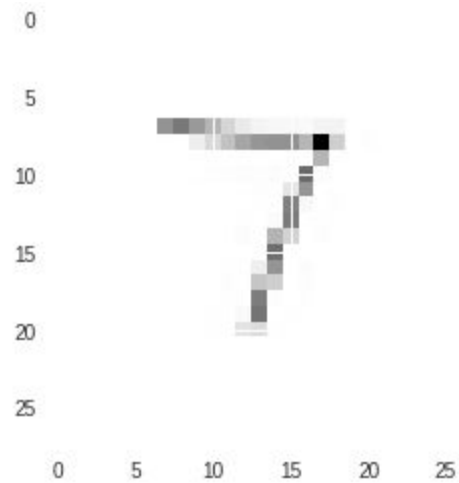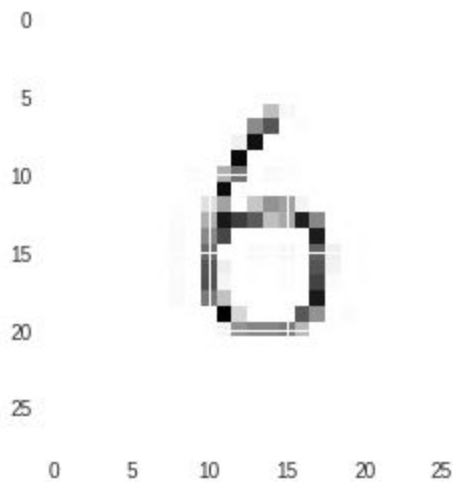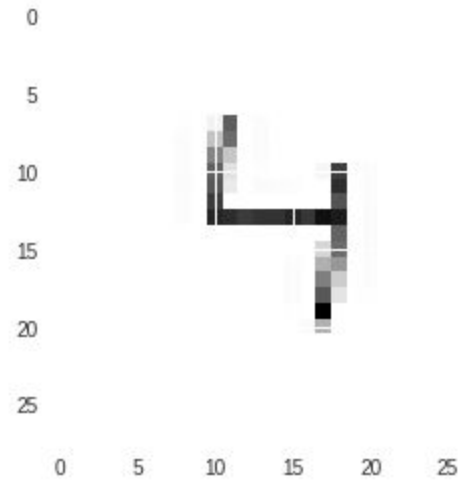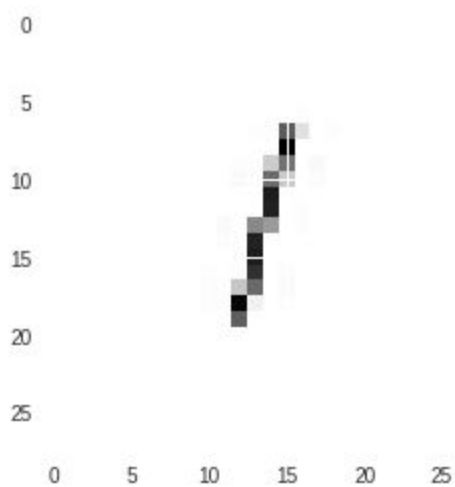
The 'number' array shows the predicted numbers (in order).