

SOLUTIONS (SECTION-2)

A) (i) CLASSIFICATION ACCURACY OF THE MODELS DEPLOYED(Out of 1)

-> LINEAR SVM - 0.8

->RADIAL BASED SVM -0.8

->POLYNOMIAL BASED SVM - 0.9

->SIGMOID BASED SVM-0.6

(ii) NEURAL NETWORK(WITH CROSS ENTROPY LOSS FUNCTION) (Out of 1)

-> BACK PROPAGATION NETWORK - 0.44

1.0	0.88998	0.0	1.0	0.66667	0.66667	0.6
1.0	0.8889	0	1	0.6667	1	1
1	0.8	0	1	1	1	1
1	0.5714	0	0.75	0	0	0

The above values demonstrate the number of occurrences in the testing sample as per the comparison of recall and precision data.

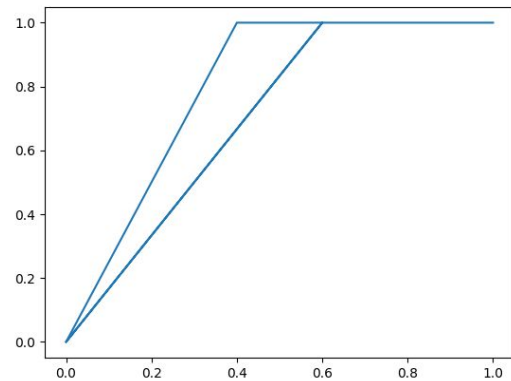
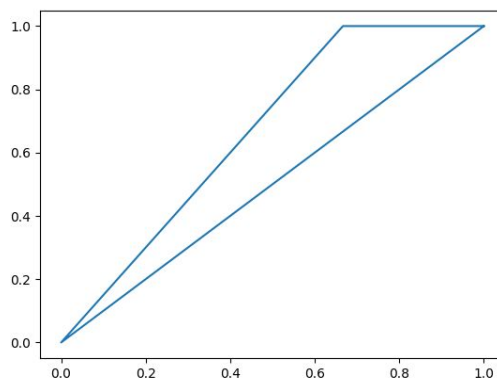
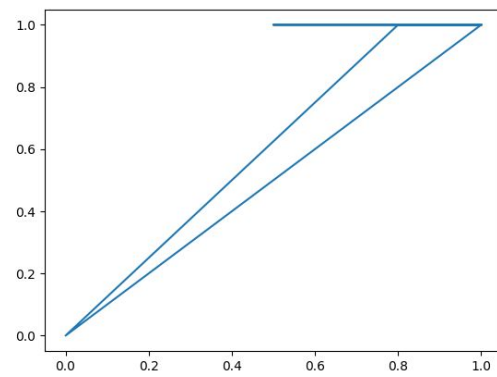
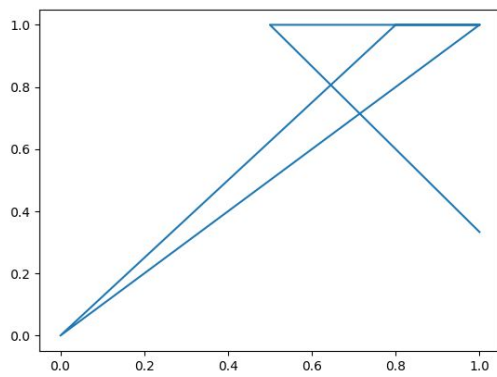
B) As per the results Obtained in SVM, following relations can be inferred

- As the accuracy of the Linear SVM and Radial based vector machines is good the basic understanding is as to how the data behaves in relationship with the output class. As the linear kernels are quite successful in predicting the result we can easily say that most of the parameters behave more or less like in a linear manner.
- As far as the Sigmoid based Kernel is giving a poor accuracy it can be due to various reason ->Type of the data. (Linear or Polynomial)
->More of Classes to differentiate. (7 in our given case)
- The best result that came was from the POLYNOMIAL KERNEL used. Thus in easy word we can say that there are more input parameters that are linked to the output via some higher degree polynomial.
- Since the Dataset that has been given is quite restricted, the case of Overfitting can easily be ruled out.

As Per the results obtained in NN, following points can be deduced

- We have applied the concept of Back Propagation in the deployment of Neural Network having in all 3 layers of perceptron.
- Still the reason behind the poor accuracy is the the limited size of the data.

C) X-AXIS -> Precision
Y-AXIS -> Recall



LABELS IN CLOCKWISE ORDER:

1. LINEAR SVM.
2. RADIAL BASED SVM.
3. POLYNOMIAL BASED KERNEL.
4. SIGMOID SVM

D) Link of Code (SVM):

Link of Code(Neural Network):

Explanation of the Code:

-> There were actually two documents provided with the data that was to be trained. Initially the output was the types of animals. The problem statement was related to the prediction of the type of the zoo in which the animal belonged to. We in the initial stages of the code have already converted the output into the classes rather than looking for the animals into their specific zoo.

-> Next the data was divided into training and the testing part using the K fold methodology.

-> All the Algorithms thus were implemented and various libraries were used to get the desired output as mentioned in the solution (A)

-> As far as the neural network is concerned the it has been deployed using keras library