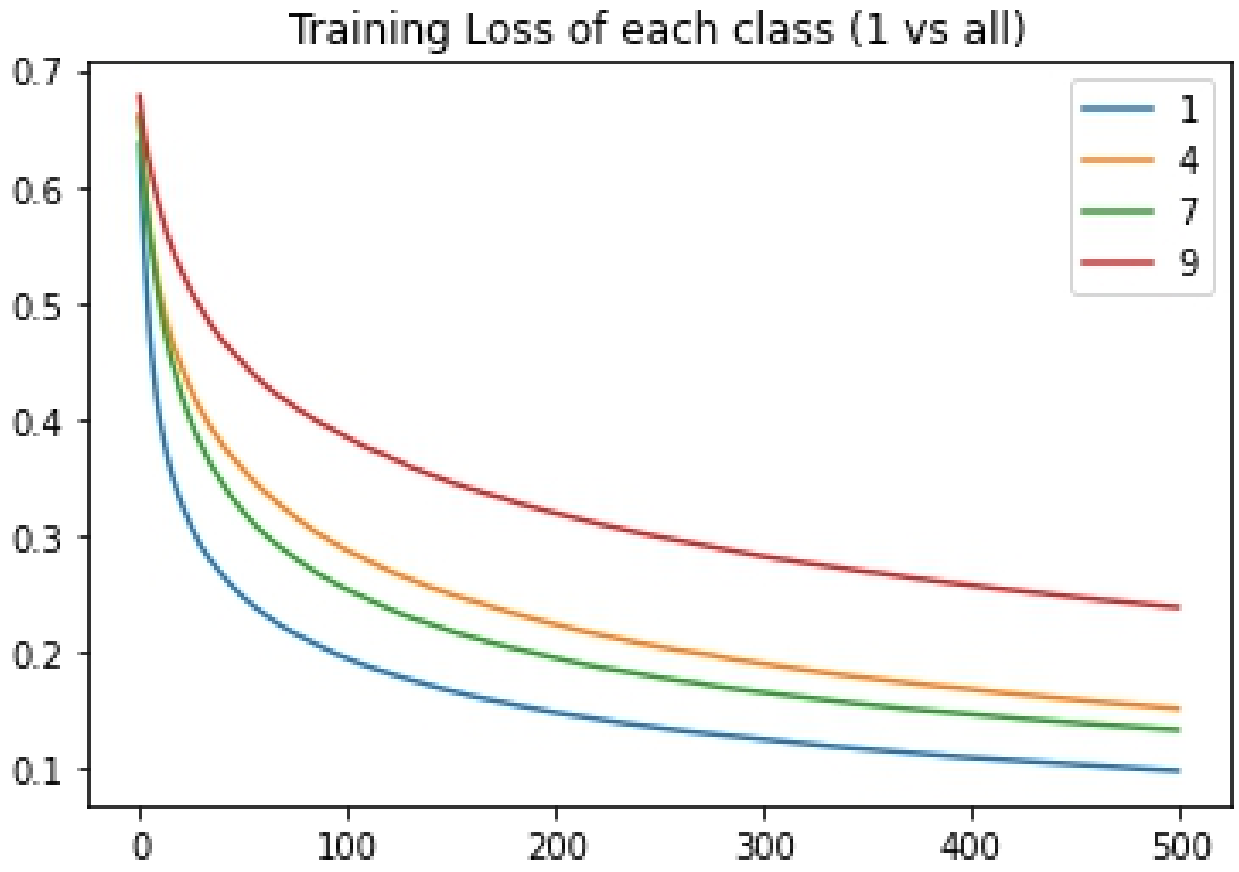
CS335- AIML - Lab03- Report

Sudhir Kumar (170050053)

Q-1.4 (a)



Q-1.4 (b)

Calculate accuracy, precision , recall and F1-score

```
[322] accuracy(Y_pred, Y_val)

      Total Accuray :  0.92
      Accuray class 1 :  1.0
      Accuray class 4 :  0.9320388349514563
      Accuray class 7 :  0.8598130841121495
      Accuray class 9 :  0.8901098901098901
      [0.92, 1.0, 0.9320388349514563, 0.8598130841121495, 0.8901098901098901]
```

overall accuracy is about 0.92 (i.e.$\approx 92\%$)

accuracy of class 1 is $\approx 100\%$

accuracy of class 4 is $\approx 93\%$

accuracy of class 7 is $\approx 85\%$

accuracy of class 9 is $\approx 89\%$.

for model M:

since there are four classes$(1,4,7,9)$, lets assume all are equally likely.

probability of occurrence of each digit is 25%.

according to model M we will always predict given data as 1 so we will be correct 25%. but with accuracy calculated using python given in assignment work we are predicting 1 with almost 100% accuracy.

so accuracy is a good evaluation metric for given model decide how reliable it is.

Q-1.4 (c)

```
[320] precision, recall, f1_score = calculate_metrics(Y_pred, Y_val)
```

```
print("precision", precision)
print("recall", recall)
print("f1_score", f1_score)
```

```
precision [0.2725, 0.30303030303030304, 0.28431372549019607, 0.2916666666666667, 0.21359223300970873]
recall [1.0, 1.0, 1.0, 1.0, 1.0]
f1_score [0.4282907662082515, 0.4651162790697675, 0.44274809160305345, 0.45161290322580644, 0.35200000
```

for model M //as assumed above, all four class are equally likely

TP_one = 25% // lets say true positive for class 1

FP_one = 75% //false positive for class 1

FN_one = 0 % //false negative for class 1

now applying the formula given in problem statement

recall = 1

precision = 0.25

F1_score = 0.4

Recall , precision and F1 score are more close to actual data so and provides more information and insights for prediction. so its better evaluation metric as compared to accuracy.