Assignment 1 Report

Computer Vision

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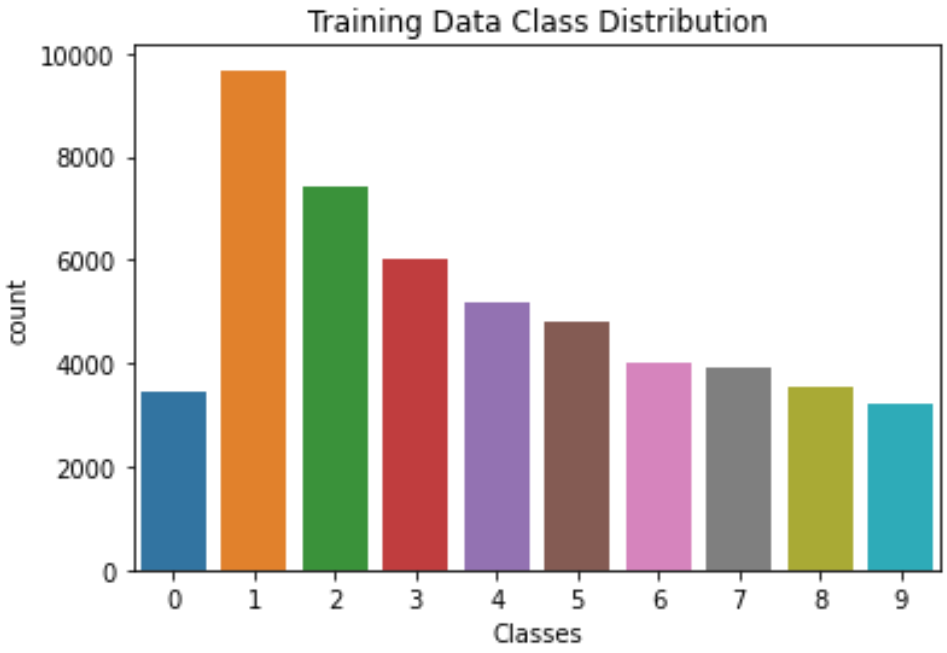
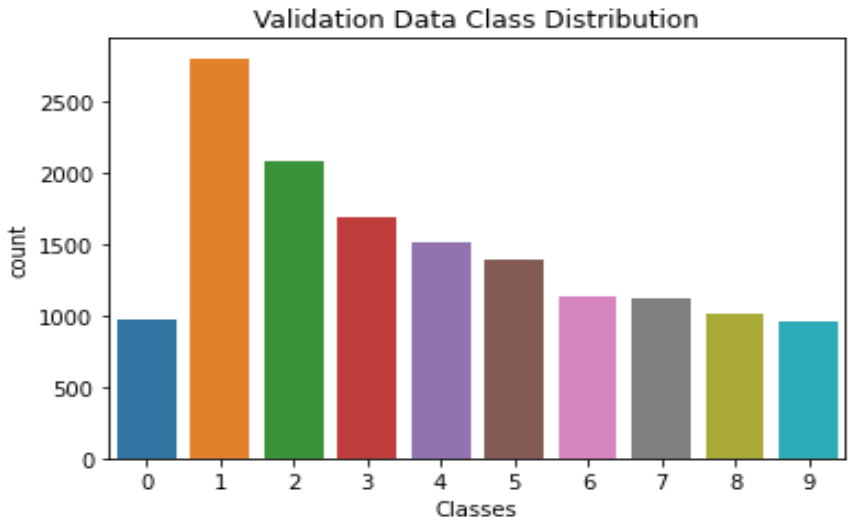
Question 1.1 | 1.2

- **Training set label distribution**

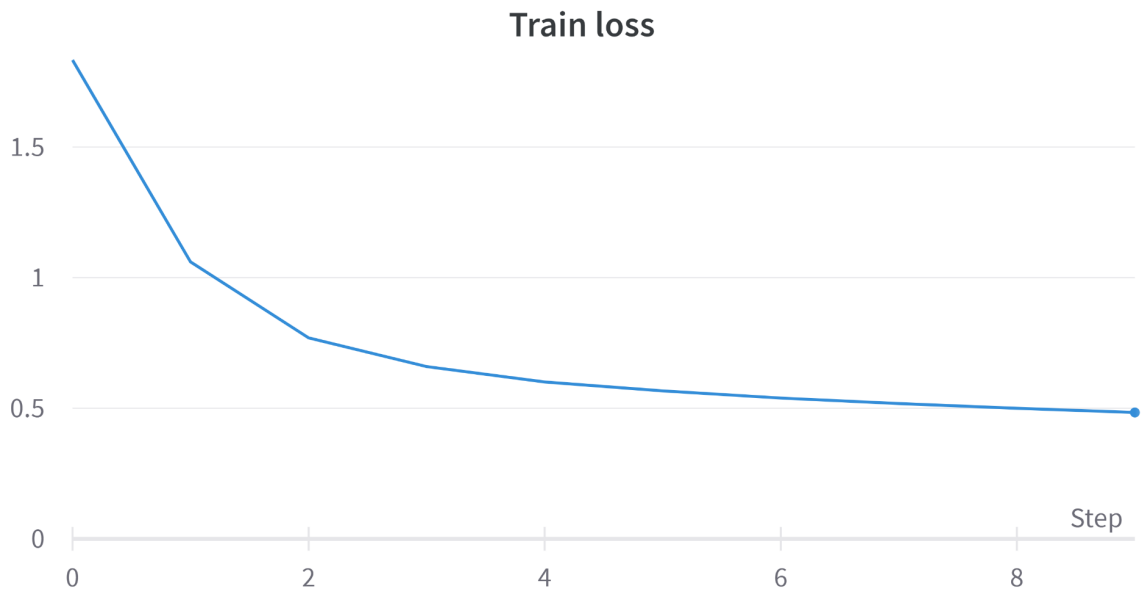


- **Validation set label distributions**



As we can see distributions of data are the same for both train and validation sets.

- **Train Loss plot**

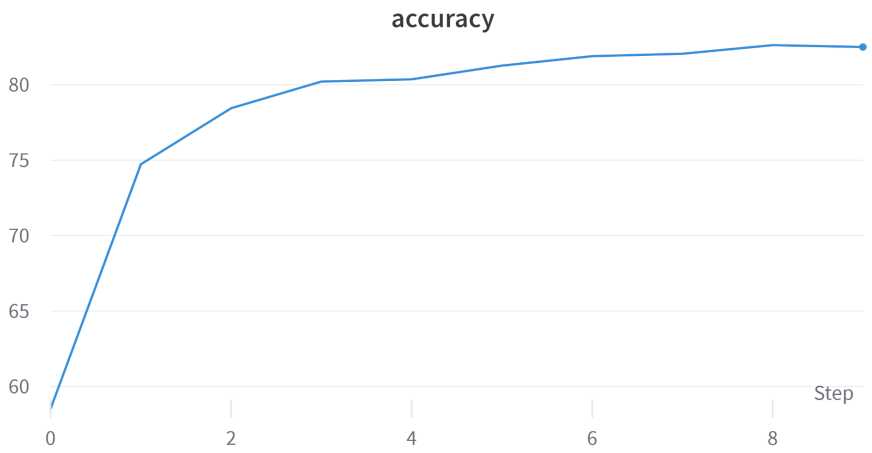


Training loss is reduced as no. of epochs increases.

- **Validation Loss plot**

- Validation loss is decreasing as no. of epochs are increasing.

Validation Accuracy

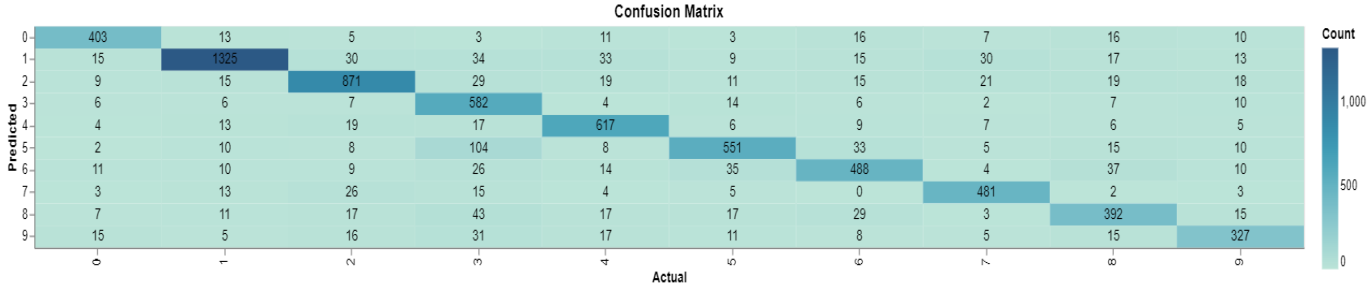


The model is generalizing better on unseen data.

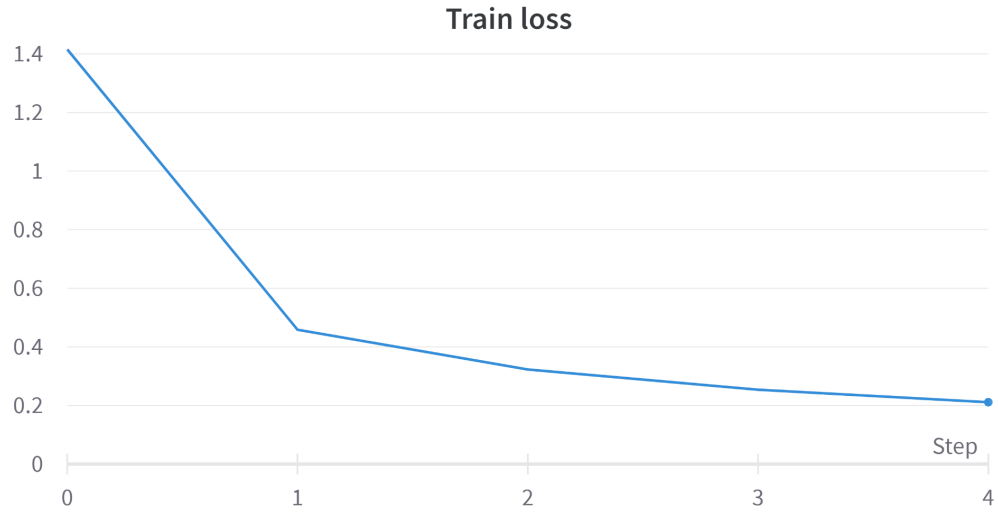
Accuracy and F1 score on the test set

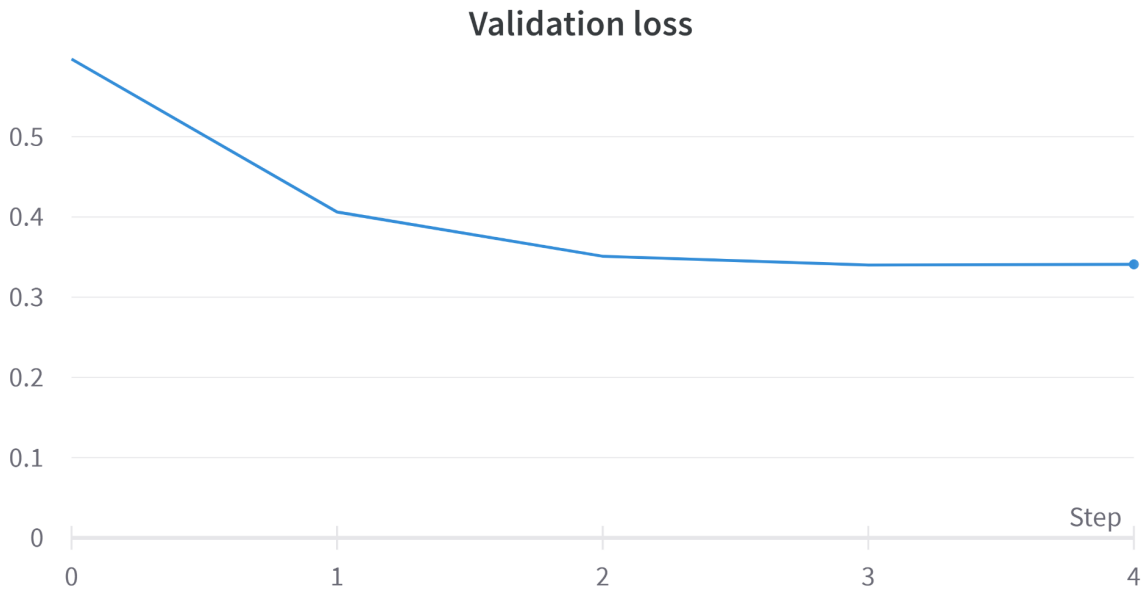
```
accuracy is : 86.22525597269625
f1 score is : 86.20689655172413
```

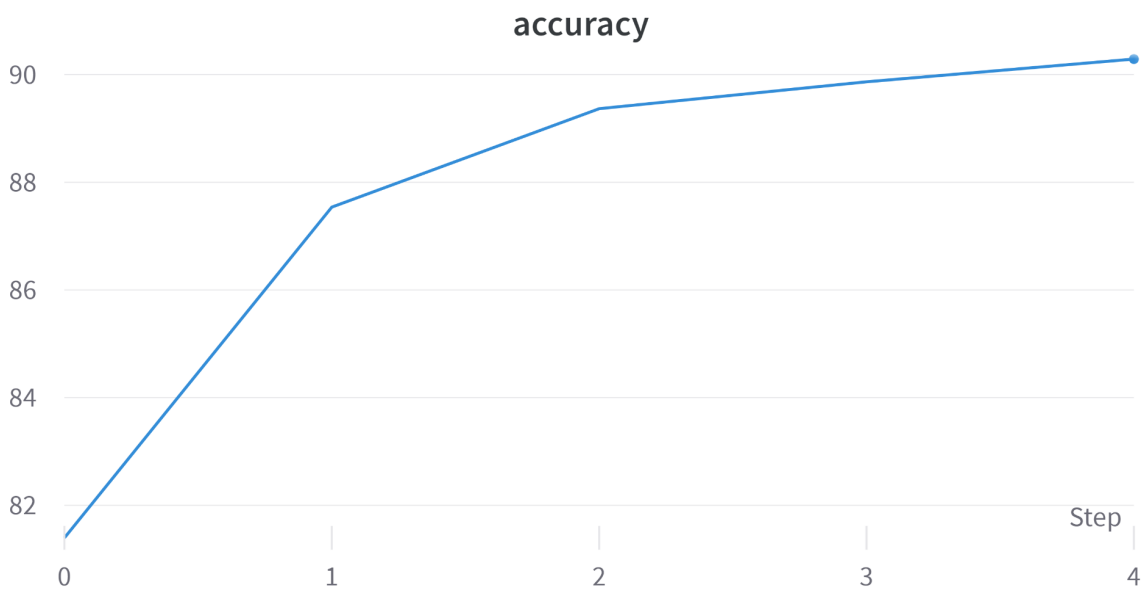
Confusion matrix



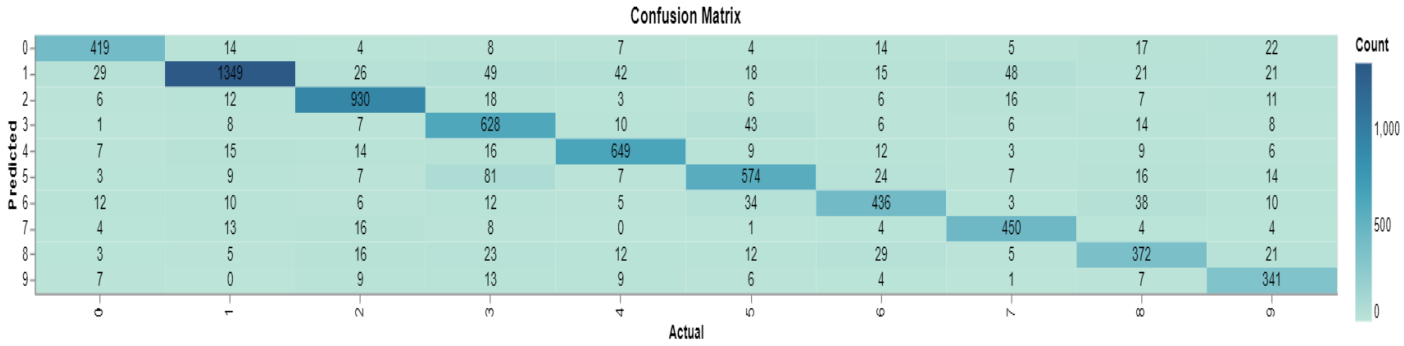
Question 1.3




Validation loss
0.5
0.4
0.3
0.2
0.1
0
Step
0
1
2
3
4


accuracy
90
88
86
84
82
Step
0
1
2
3
4

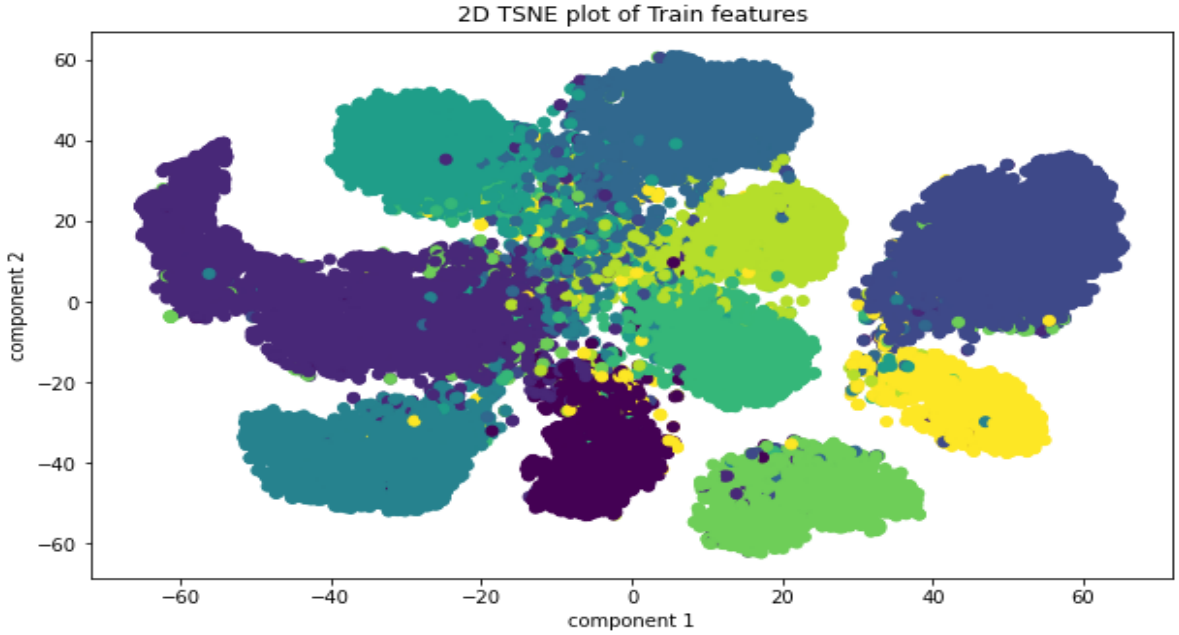
Confusion matrix



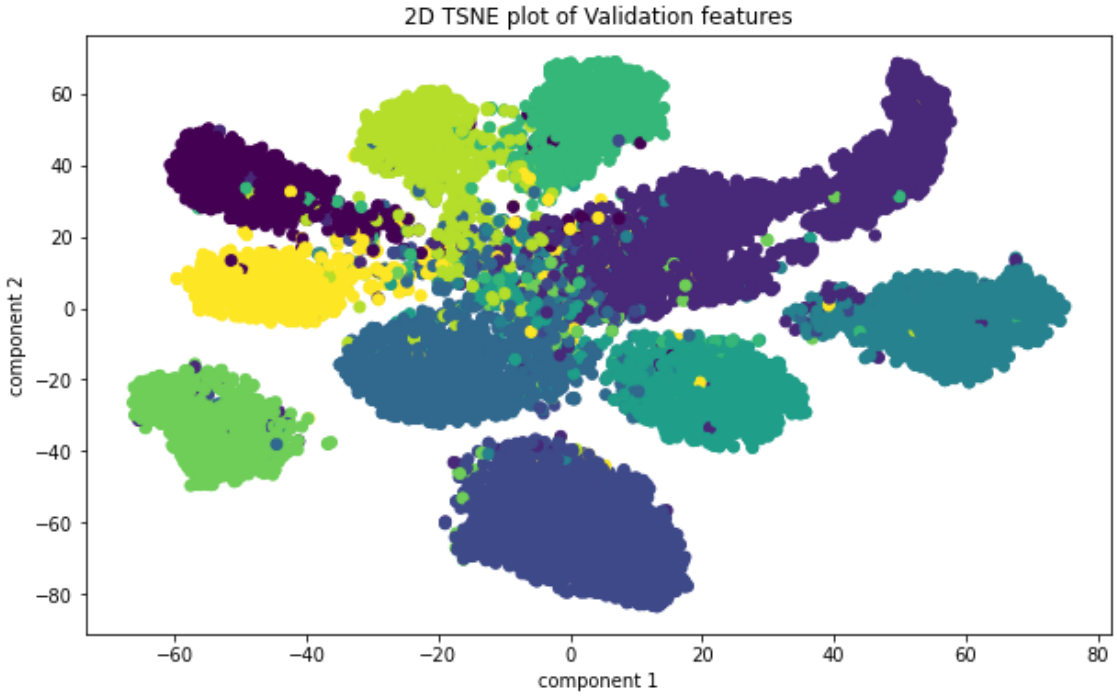
Accuracy and F1 score

View run at https://wandb.ai/jk12/A1/runs/kx1i72d9
accuracy is : 93.48805460750853
f1 score is : 93.10344827586206

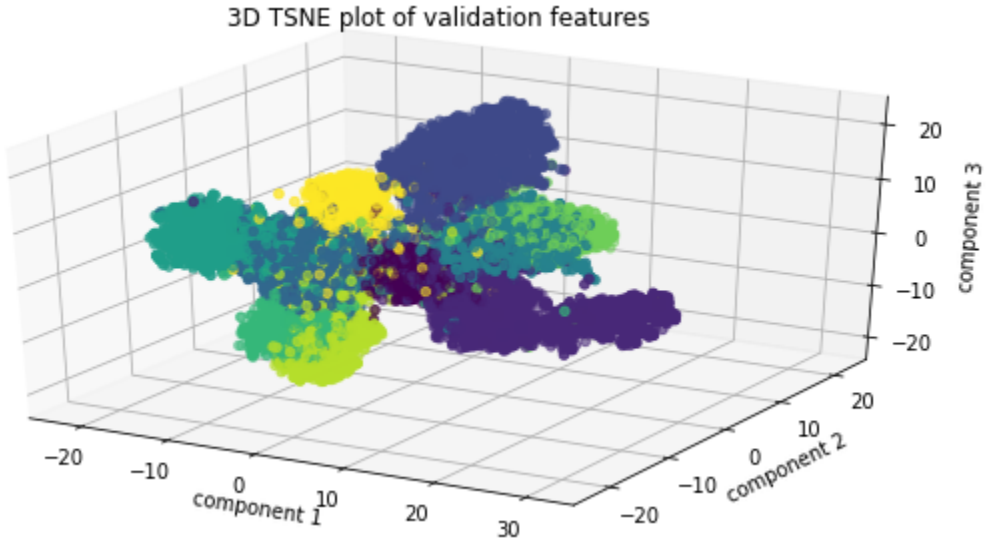
2D TSNE plot of training features



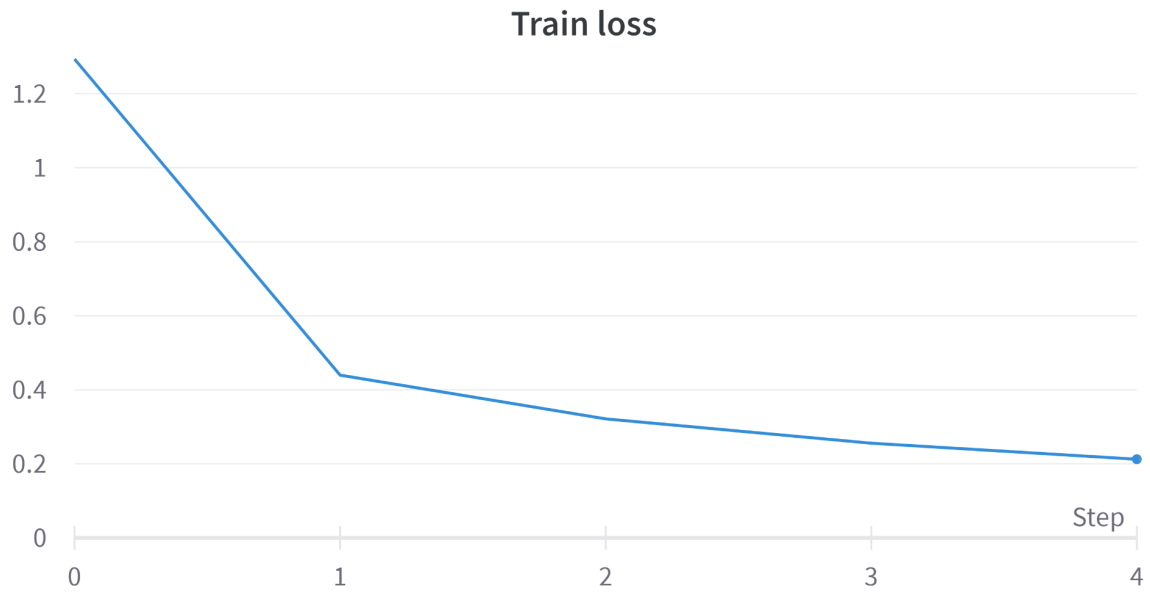
2D TSNE plot of Validation features

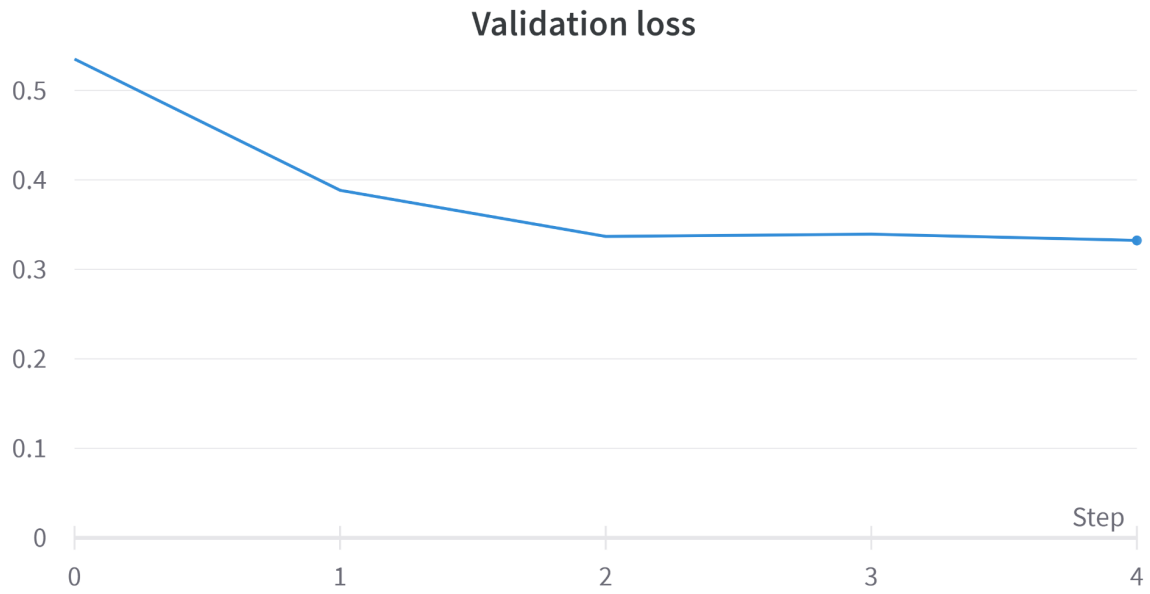


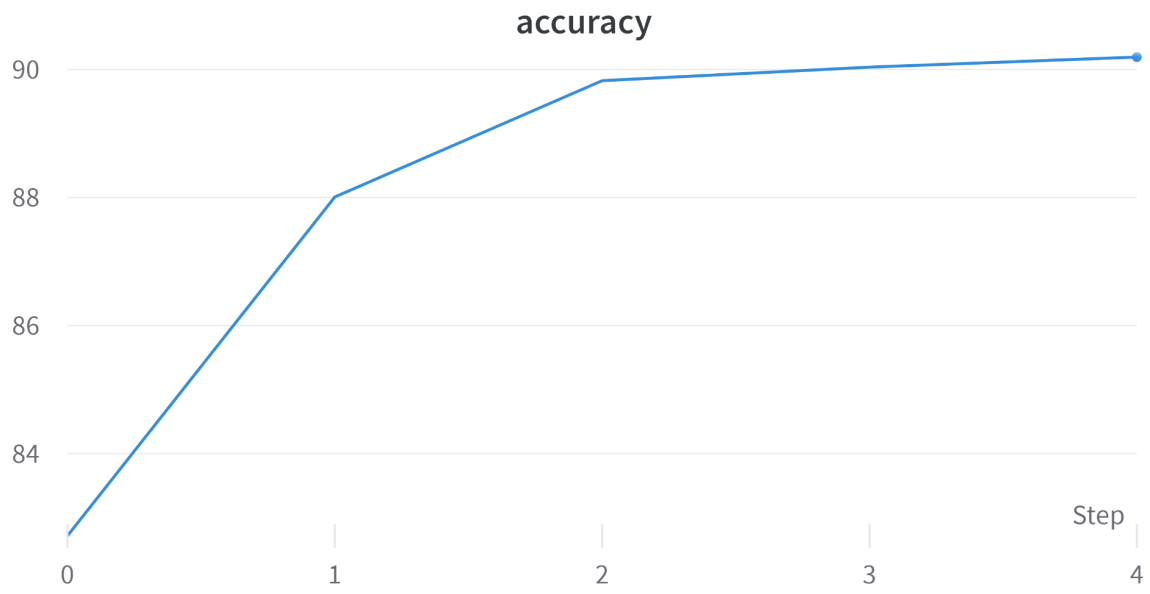
3D TSNE plot of Validation Features

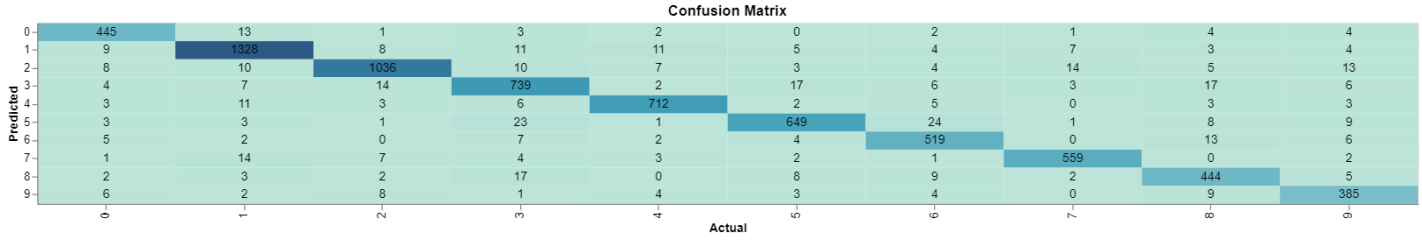


Question 1.4


Train loss
1.2
1
0.8
0.6
0.4
0.2
0
Step
0
1
2
3
4


Validation loss
0.5
0.4
0.3
0.2
0.1
0
Step
0
1
2
3
4





Accuracy and F1 score

```
accuracy is : 93.05119453924915
f1 score is : 93.10344827586206
```

Question 1. 6

The basic CNN model's test accuracy is 83 %.
Pretrain Resnet18 model test accuracy is around 90 %.
Resnet18 with augmented data model's test accuracy is 93 %.

As we can see basic CNN model is not capturing all types of features and makes 17 % of images misclassified.

Resnet18 pre-train model trained on ImageNet dataset and after that, we are doing fine-tuning on top so that fine-tuned model
gives better performance than the Basic CNN model.

When we train the resnet18 pre-train model again After data augmentation the performance of the model increase compared to the Resnet18 model.
Because we have given various different types of images of the same dataset to learn more patterns from images.

So as we can see more diverse sets of features and more data on Resnet18 gave us better performance compares to the two earlier models.