

CS518 - Assignment 2

Bag of Words based Classification

- **How did you choose the optimum value of the number of clusters?**

I tried different values for the number of clusters (k). I explored the space on a logarithmic scale with the number of clusters ranging from 1024 to 32. I got the best results with value for k = 128.

- **How did I extract features?**

Since the image resolution is very low, it is impractical to use SIFT for feature extraction. As a resort, I used a grid for feature extraction. I tried different features vis-a-vis 4x4, 28x1, 1x28, 28x2 and many more. 28x1 proved to be the best choice. Note, that this corresponds to using each column in an image as a feature.

- **What are the dependencies for running the python program?**

numpy==1.22.0

pandas==1.4.2

tqdm==4.64.0

tensorflow==2.9.1

matplotlib==3.5.1

Python==3.10.6

- **How to run the program?**

python3 RunAll_2019csb1113.py

- **Sample output**

```
sagalpreet@den:~/Assignment-2/2019csb1113$ python3 RunAll_2019csb1113.py
Running K Means Clustering
At iteration 5, Error: 9.555183398810271: : 5it [07:03, 84.66s/it]
Making Predictions on Test Set
100%|████████████████████████████████████████| 10000/10000 [04:58<00:00, 33.52it/s]
Overall Accuracy: 0.7977

```

	Class	Precision	Recall	Accuracy
0	T-shirt/top	0.763598	0.730	0.9504
1	Trouser	0.924138	0.938	0.9861
2	Pullover	0.684320	0.659	0.9355
3	Dress	0.814465	0.777	0.9600
4	Coat	0.665410	0.706	0.9351
5	Sandal	0.911550	0.876	0.9791
6	Shirt	0.531996	0.557	0.9067
7	Sneaker	0.844976	0.883	0.9721
8	Bag	0.951120	0.934	0.9886
9	Ankle boot	0.902559	0.917	0.9818

```
sagalpreet@den:~/Assignment-2/2019csb1113$
```

Dictionary

