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18CS30050

The code is hosted here : https://github.com/TheThinker01/LinearAlgebraMNIST

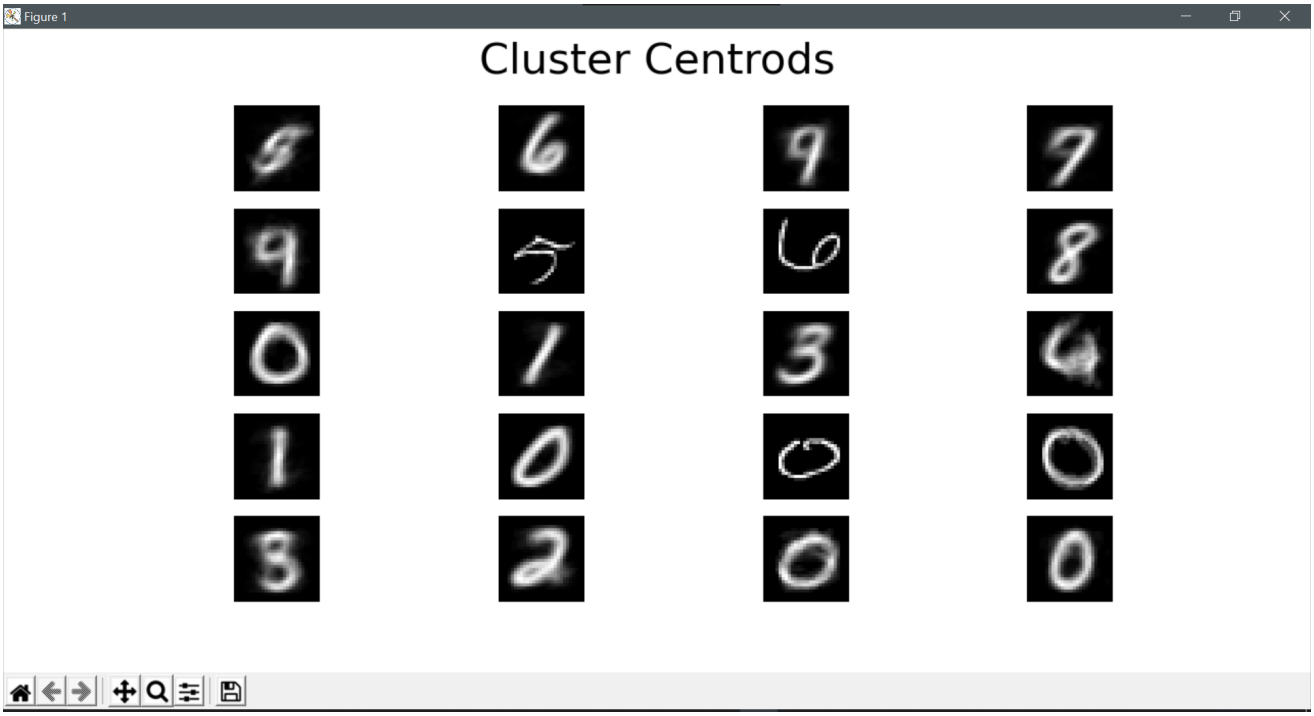
N = 10*100 = 1000 , since 10 digits and each digit has 100 examples

n = 784, since 28*28 pixels in each image

Random Init. of centroids

a. The training converged in 45 iterations.

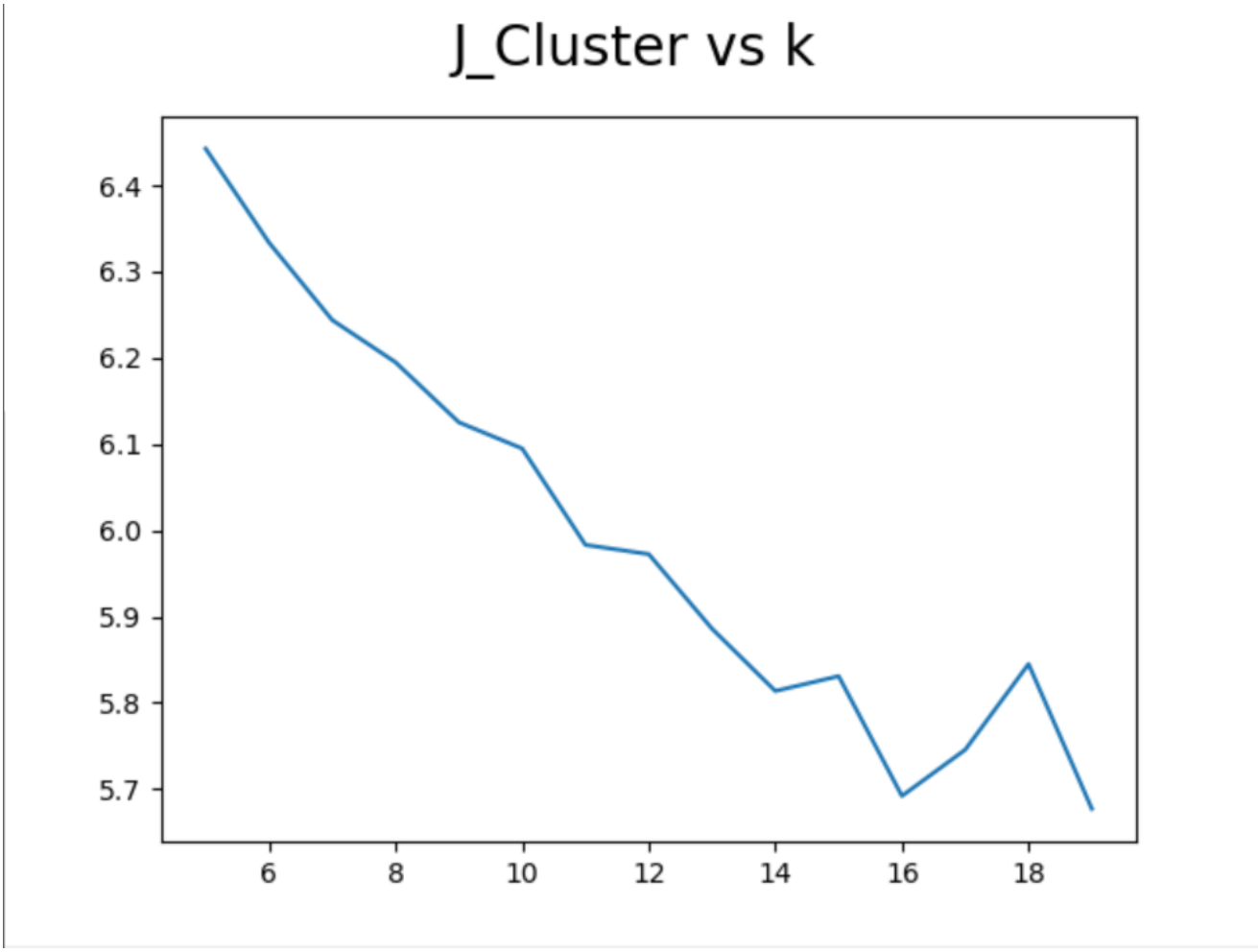
The Cluster representatives were :



b. The accuracy on these 50 images were : 0.579

```
At Iteration 42 ...
At Iteration 43 ...
At Iteration 44 ...
At Iteration 45 ...
The training convered at 45
Final Cluster Loss : 5.706848560025614
The Accuracy on the 50 images is : 0.5799999833106995
```

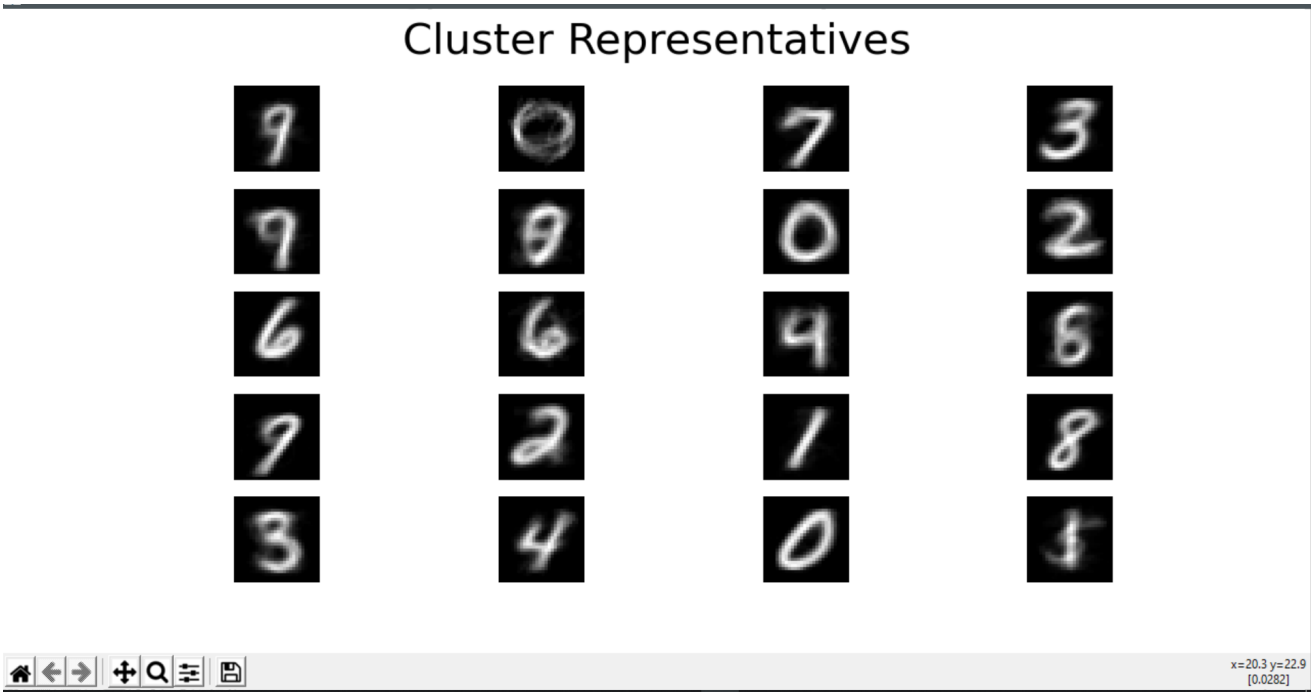
c.



Clearly the minimum value occurs at k=19 and is 5.677212679697683

Initialisation from dataset

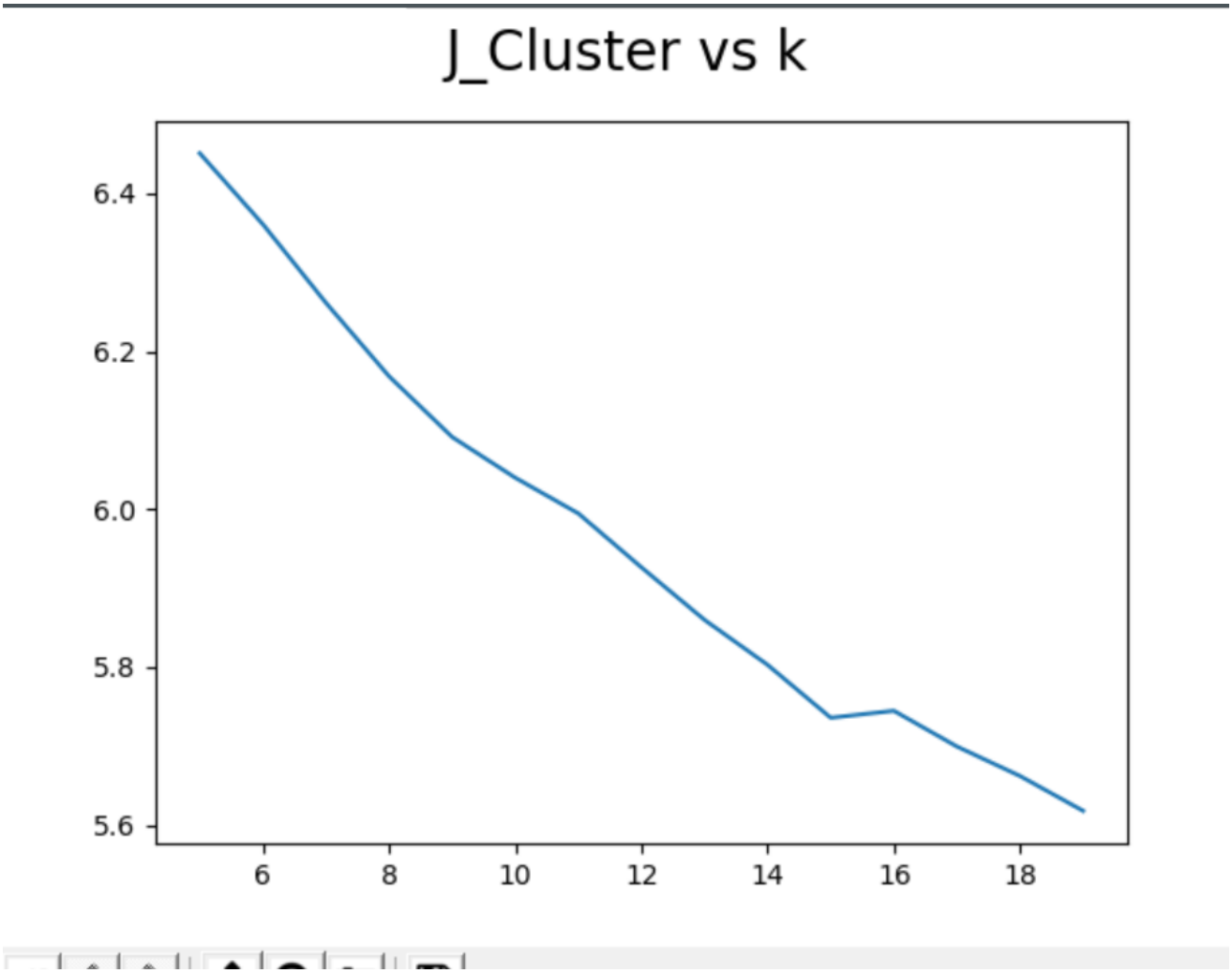
a. The training converged in 17 iterations



b. The accuracy on 50 images is 0.6999

```
At Iteration 15 ...
At Iteration 16 ...
At Iteration 17 ...
The training convered at 17
Final Cluster Loss : 5.636743463856998
The Accuracy on the 50 images is : 0.699999988079071
At Iteration 0
```

c.



Yet again the minimum occurs at k = 19 and is 5.617