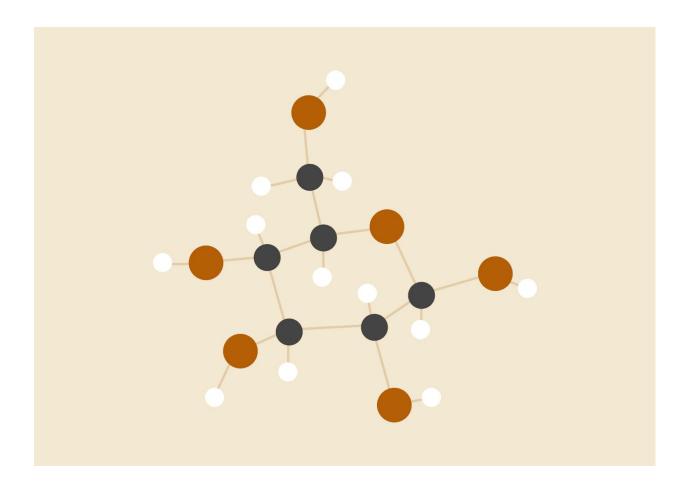
Artificial Intelligence-K-Means Clustering REPORT

On the MINST Dataset



Kareem Hossam Mohamed

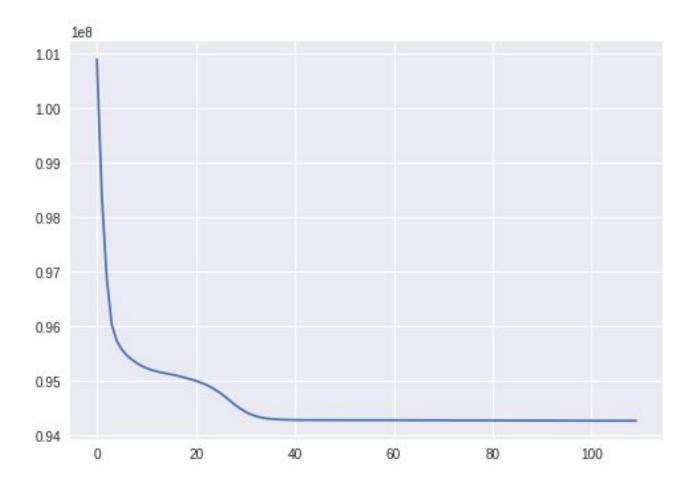
3317

1- K = 10:

Iterations: 110

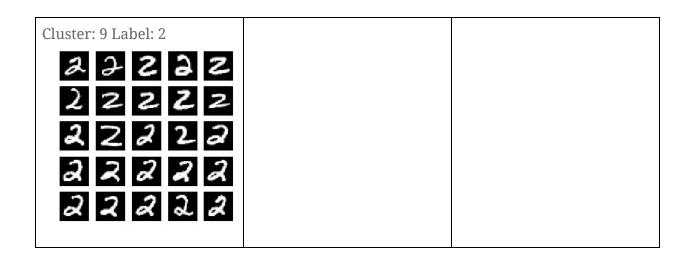
Accuracy: 64.4%

Loss:



The Following Clusters were Made:

The Following Clusters were i		T
Cluster: 0 Label: 0	Cluster: 1 Label: 6	Cluster: 2 Label: 8
00000	66666	5 3 8 8 8 8 5 3 8 8
00000	64666	88383
00000	66626	83233
00050	666666	88835
	0 2 2 0 0	
Cluster: 3 Label: 1	Cluster: 4 Label: 4	Cluster: 5 Label: 7
11113	4447	9 4 7 9 9
17311	44459	29999
1 1 1 1	91978	97179
5)411	94999	47777
	47744	47449
Cluster: 6 Label: 3	Cluster: 7 Label: 1	Cluster: 8 Label: 0
333 33	15175	00000
32933	41451	00000
37335	11111	00055
83530	87254	00005
30353	55151	50000

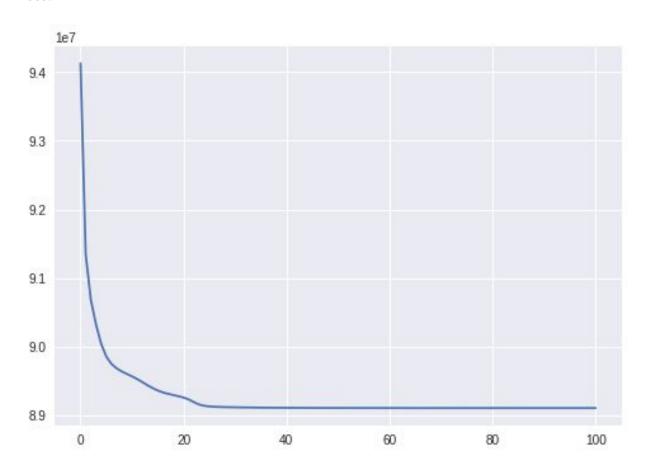


2- K = 20 (K > Number of Labels):

Iteration: 100

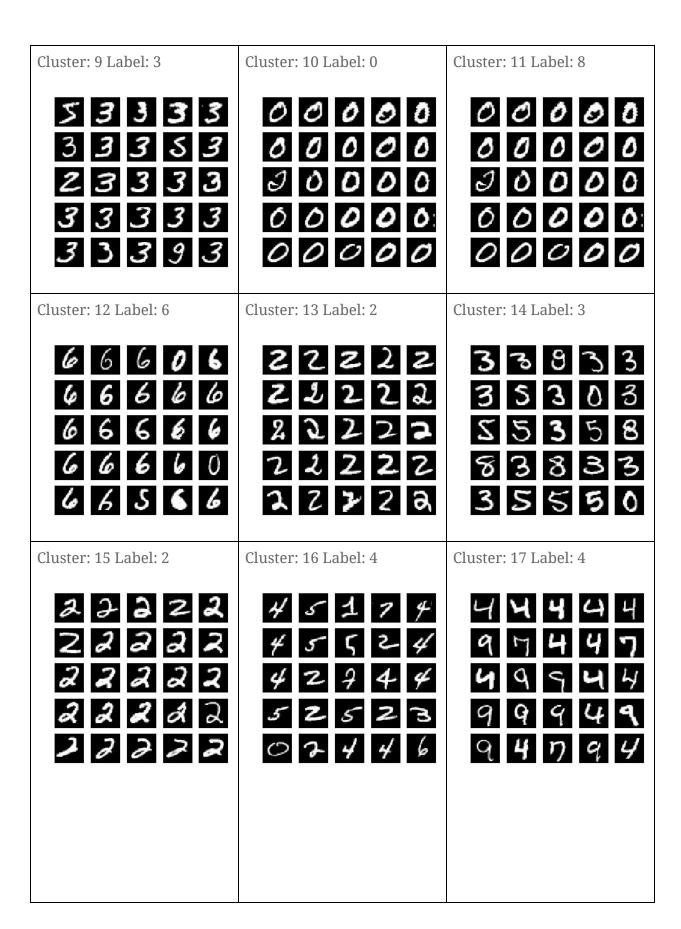
Accuracy: 73.2%

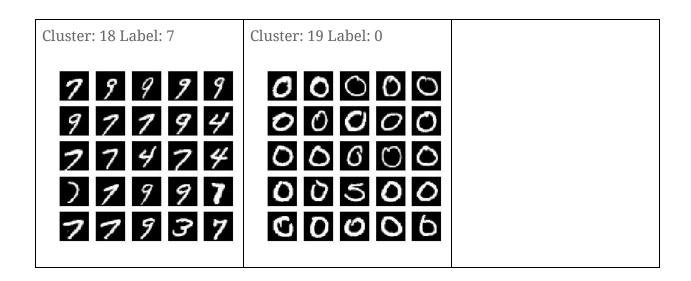
Loss:



The following clusters were made:

Cluster: 0 Label: 7	Cluster: 1 Label: 1	Cluster: 2 Label: 6
2 7 7 7 9 7 7 7 7 9 9 7 7 7 9 7 9 7 7 7 7 7 7 7	T. I I I I I. I. I. I. I. I. I. I. I.<	4 6
Cluster: 3 Label: 1	Cluster: 4 Label: 3	Cluster: 5 Label: 9
1	3 9 3 3 3 N 8 8 0 3 8 5 3 S 5 5 5 5 5 3 3 4 S 8 6	9 4 9 9 9 9 4 9 9 4 9 4 9 4 4 9 9 4 4
Cluster: 6 Label: 1	Cluster: 7 Label: 8	Cluster: 8 Label: 5
/ / / / / / / / / / / / / / / / / /	8 8 8 8 8 8 8 8 8 3 8 3 1 8 8 8 8 8 3 8 8 8 8	5 5 5 8 5 5 5 2 5 5 5 5 5 5 5 5 5 6 5 5 5 6 5 5



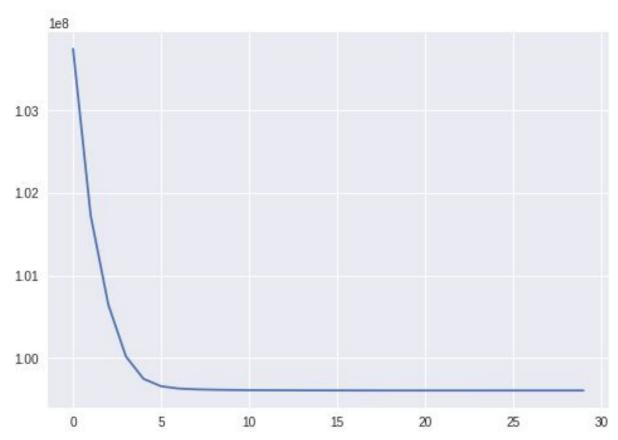


3- K = 5 (K < Number of Labels):

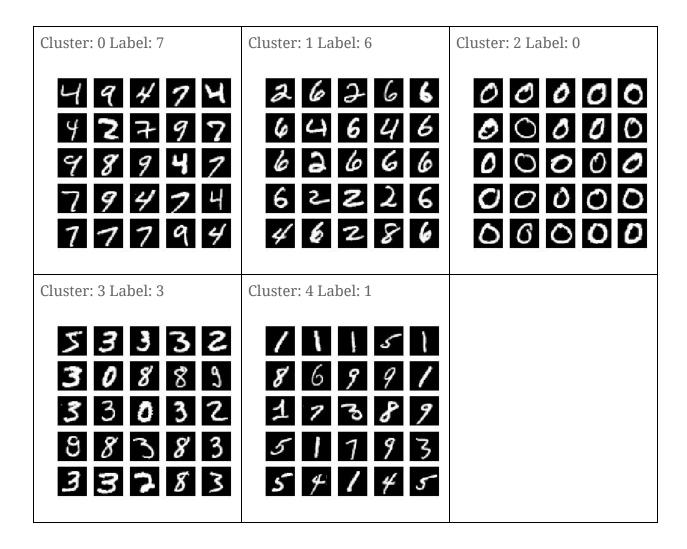
Iteration: 29

Accuracy: 51.6%

Loss:



The Following Clusters were made:



RESULTS:

We notice that as we increase K, It gives us higher accuracy because more variations are clustered together, the downside being that gives slower performance (i.e. it takes more iterations to converge)