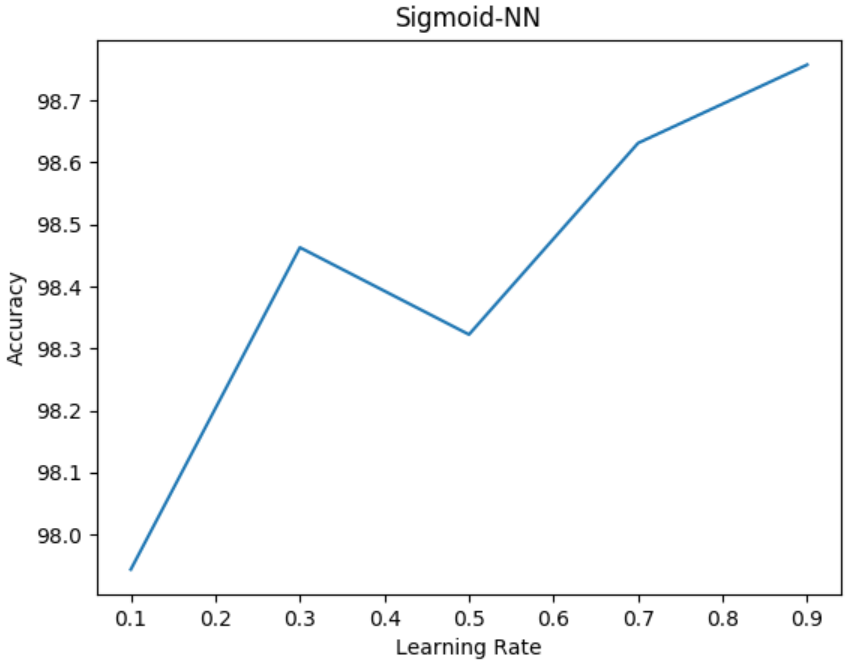
Assignment 3 Report

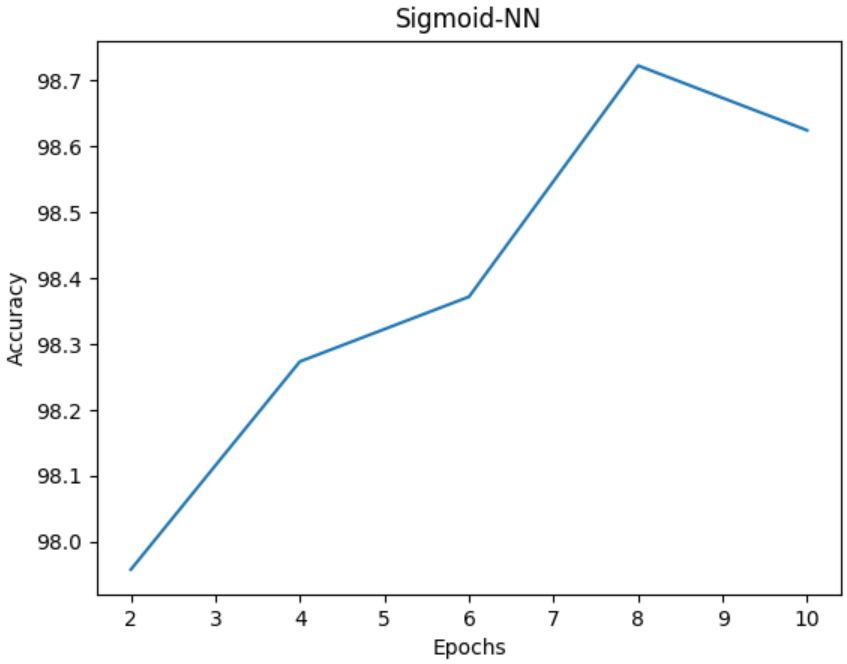
MT17036

Question 1

SiGMOID-NEURAL NETWORK

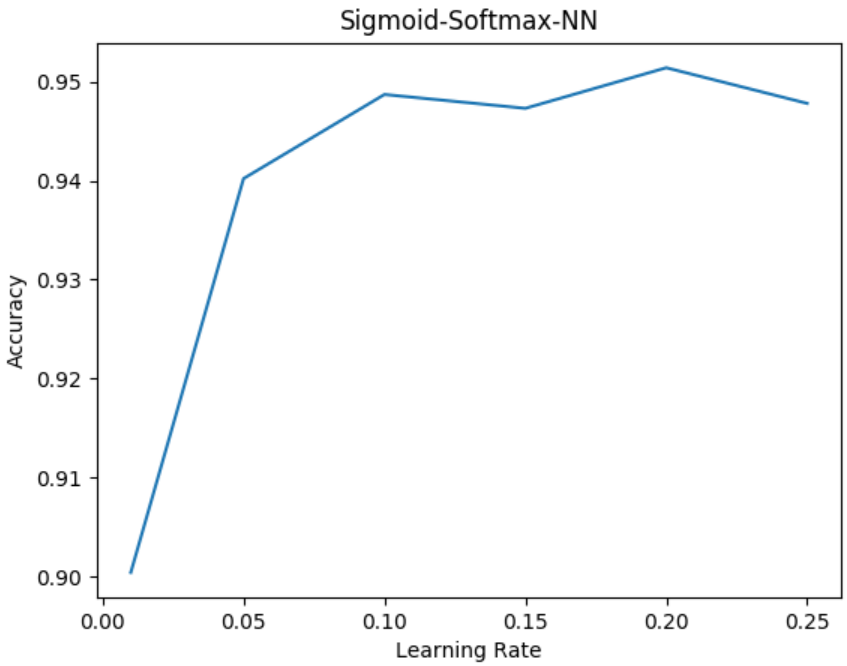


Learning Rate	Accuracy
0.1	97.94357102751263
0.3	98.46294216732173
0.5	98.32257158899495
0.7	98.63138686131386
0.9	98.75772038180799

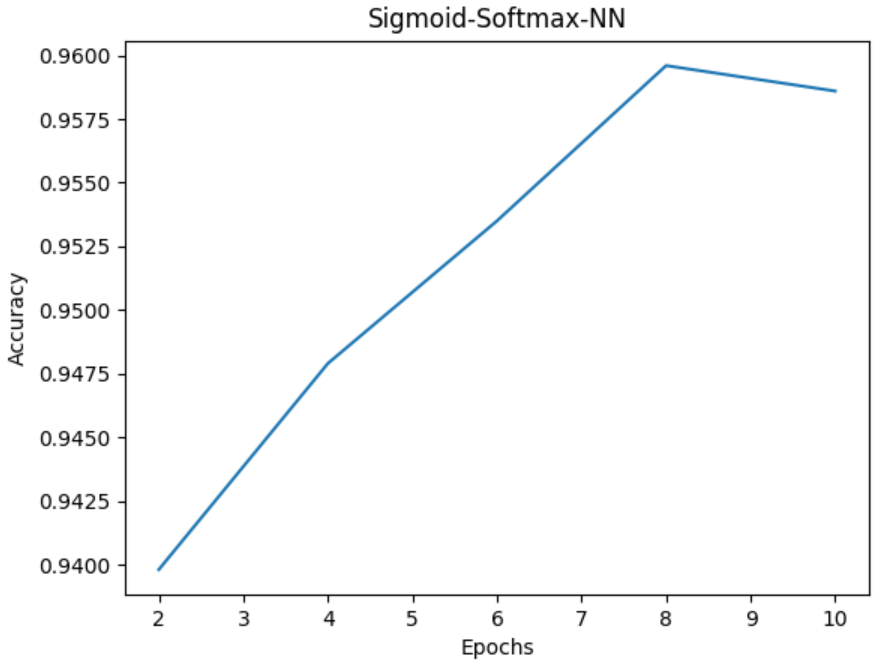


Epochs	Accuracy
2	**97.9578947368421**
4	**98.27368421052631**
6	**98.37192982456142**
8	**98.72280701754387**
10	**98.62456140350878**

SIGMOID-SOFTMAX NEURAL NETWORK



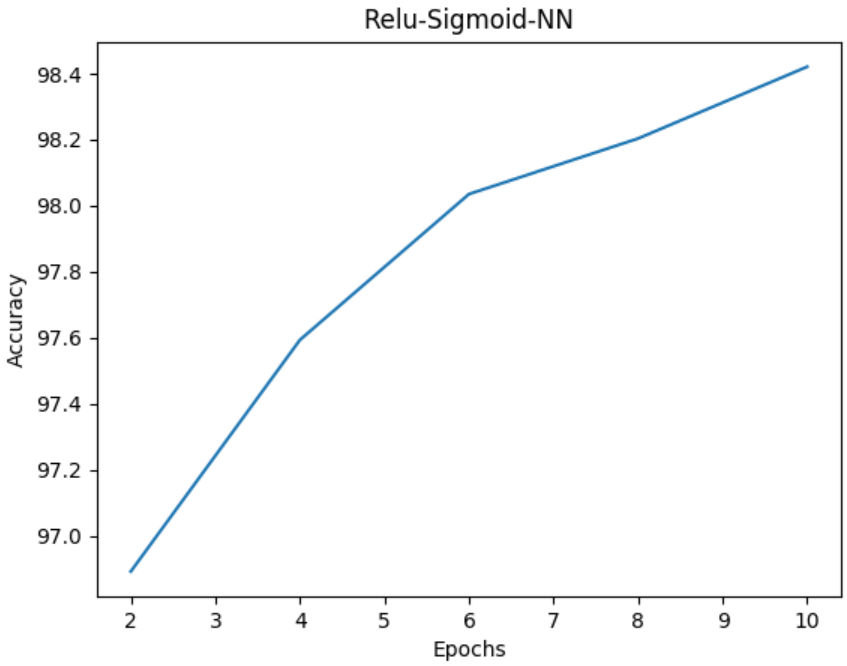
Learning Rate	Accuracy
0.01	**90.04**
0.05	**94.02**
0.10	**94.87**
0.15	**94.73**
0.20	**95.14**
0.25	**94.78**



Epochs	Accuracy
2	**93.98**
4	**94.79**
6	**95.35**
8	**95.96**
10	**95.86**

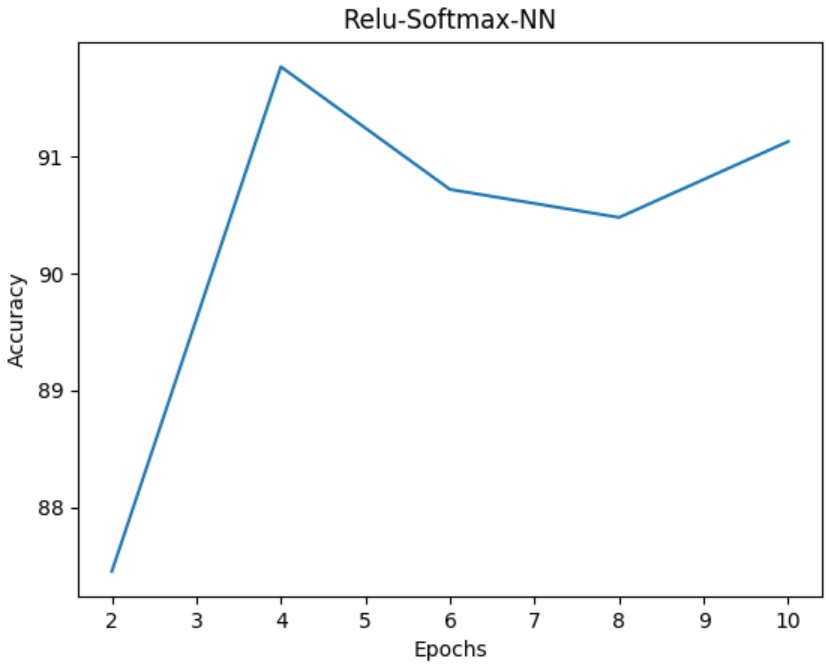
RELU-SOFTMAX NEURAL NETWORK

SUBSET DATASET



Epochs	Accuracy
2	**96.89122807017544**
4	**97.59298245614035**
6	**98.03508771929825**
8	**98.20350877192983**
10	**98.42105263157896**

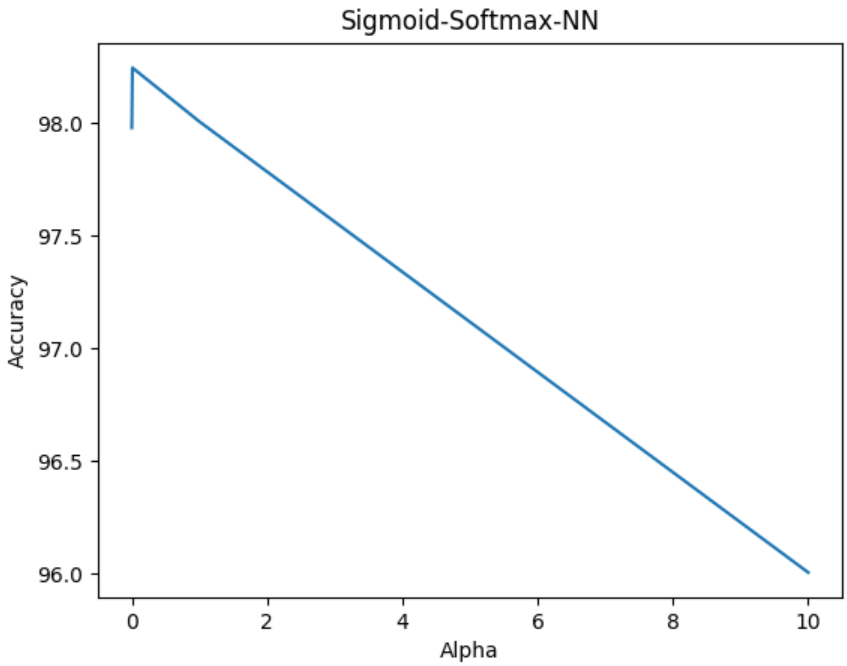
FULL MNIST DATASET



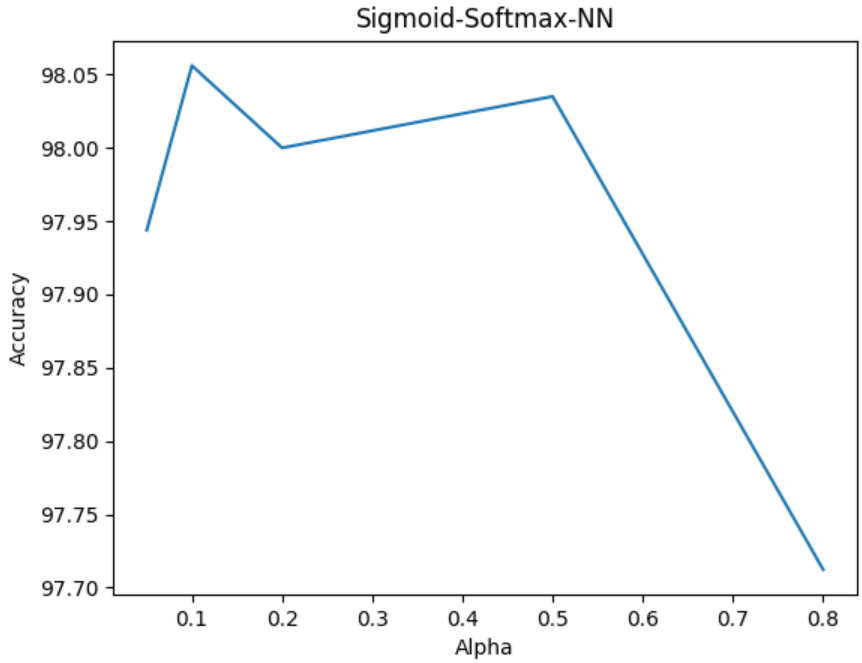
Epochs	Accuracy
2	**87.45**
4	**91.77**
6	**90.72**
8	**90.48**
10	**91.13**

Question 2

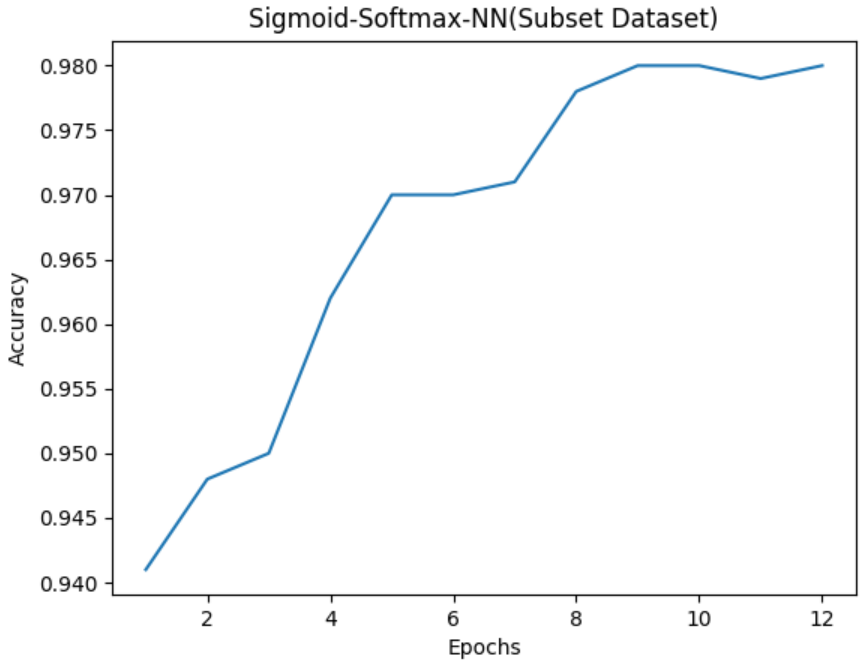
SIGMOID-SOFTMAX NEURAL NETWORK (DATASET SUBSET)



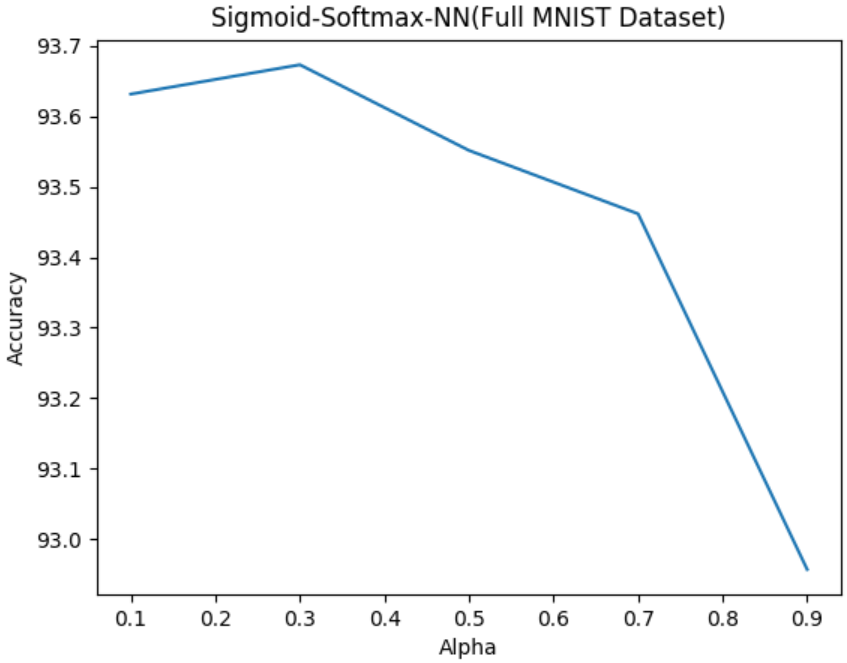
Alpha(L2)	Accuracy
0.001	**97.97894736842105**
0.1	**98.24561403508771**
1	**98.00701754385965**
10	**96.00701754385963**



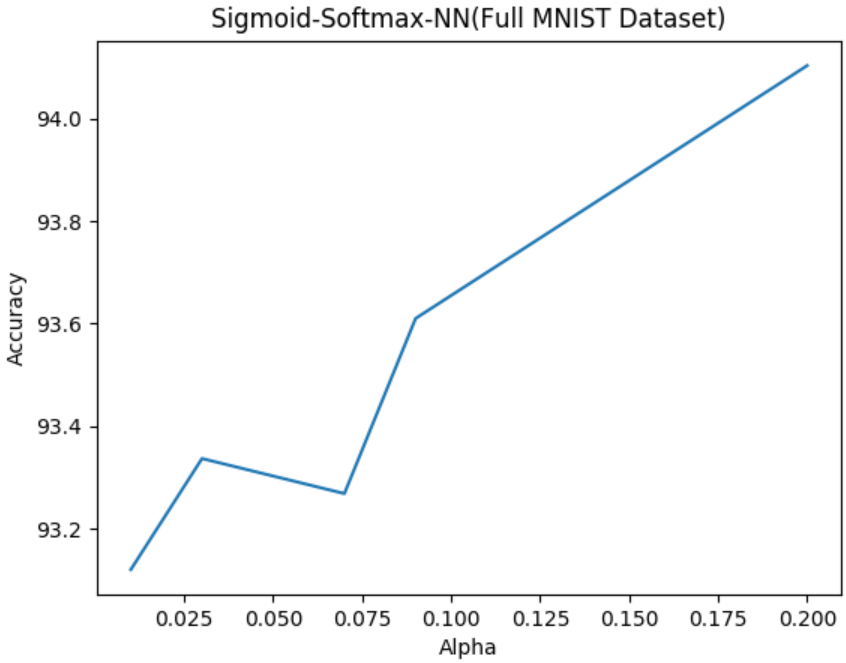
Alpha	Accuracy
0.05	**97.9438596491228**
0.1	**98.0561403508772**
0.2	**98.0**
0.5	**98.03508771929825**
0.8	**97.7122807017544**


Sigmoid-Softmax-NN(Subset Dataset)
Accuracy
Epochs
0.980
0.975
0.970
0.965
0.960
0.955
0.950
0.945
0.940
2
4
6
8
10
12

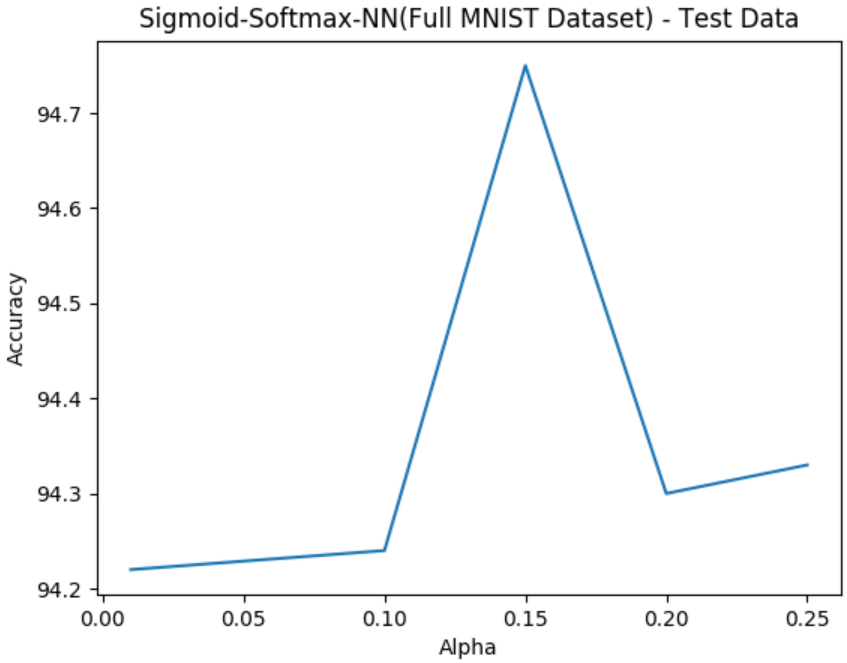
SIGMOID-SOFTMAX NEURAL NETWORK (FULL DATASET)



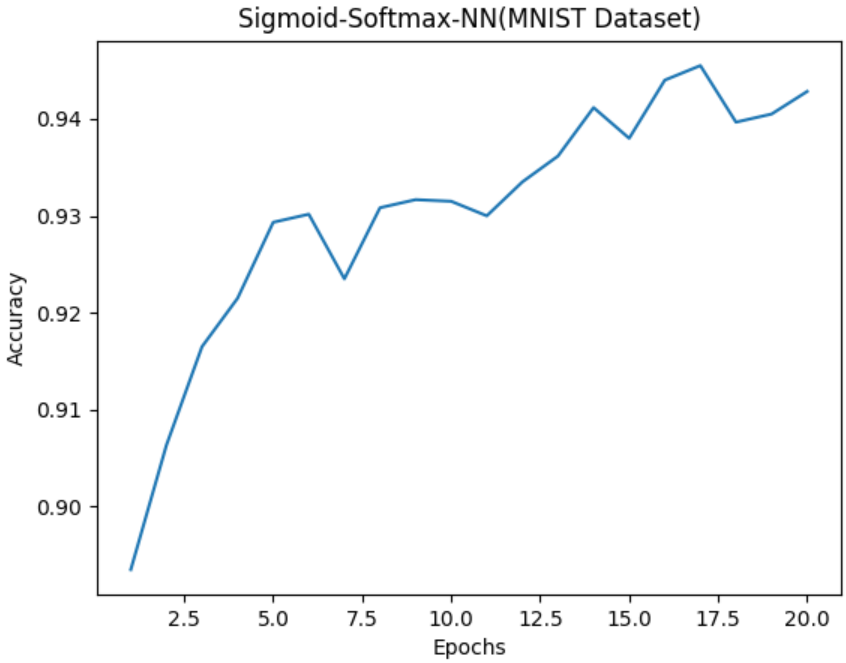
Alpha	Accuracy
0.1	93.63166666666667
0.3	93.67333333333333
0.5	93.55166666666666
0.7	93.46166666666667
0.9	92.95666666666666



Alpha	Accuracy
0.01	93.11999999999999
0.03	93.33666666666666
0.07	93.26833333333335
0.09	93.61
0.20	94.10333333333334



Alpha	Accuracy
0.01	**94.22**
0.1	**94.24**
0.15	**94.75**
0.2	**94.3**
0.25	**94.33**



Question 3

1. **Hidden Layers: 700,250,350,50**

   Alpha:0.75

   Accuracy Achieved Against Test data: 97.35

2. **Hidden Layers: 400,150,50**

   Alpha: 0.01

   Accuracy Achieved Against Test data :97.33

3. **Hidden Layers: 900**

   Alpha:0.1

   Accuracy Achieved: 97.51