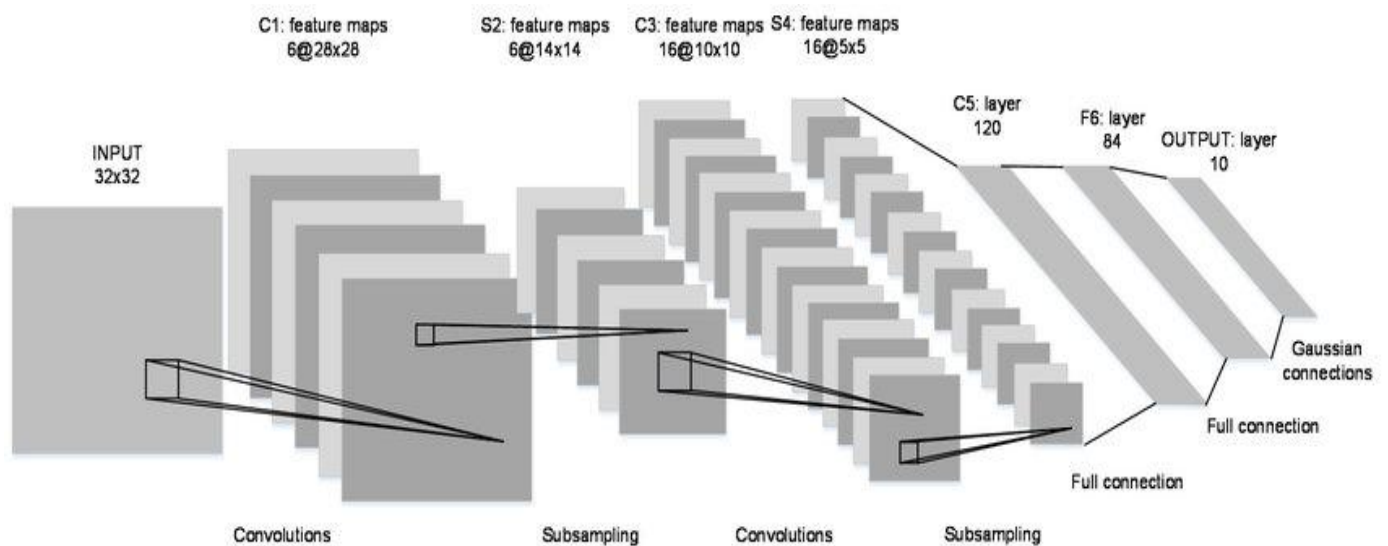


Bangla Character Recognition Challenge

Convolutional Neural Network



Saem Hasan

1705027

A-1, CSE, BUET

Loss & Accuracy Report

MODEL : LENET-5

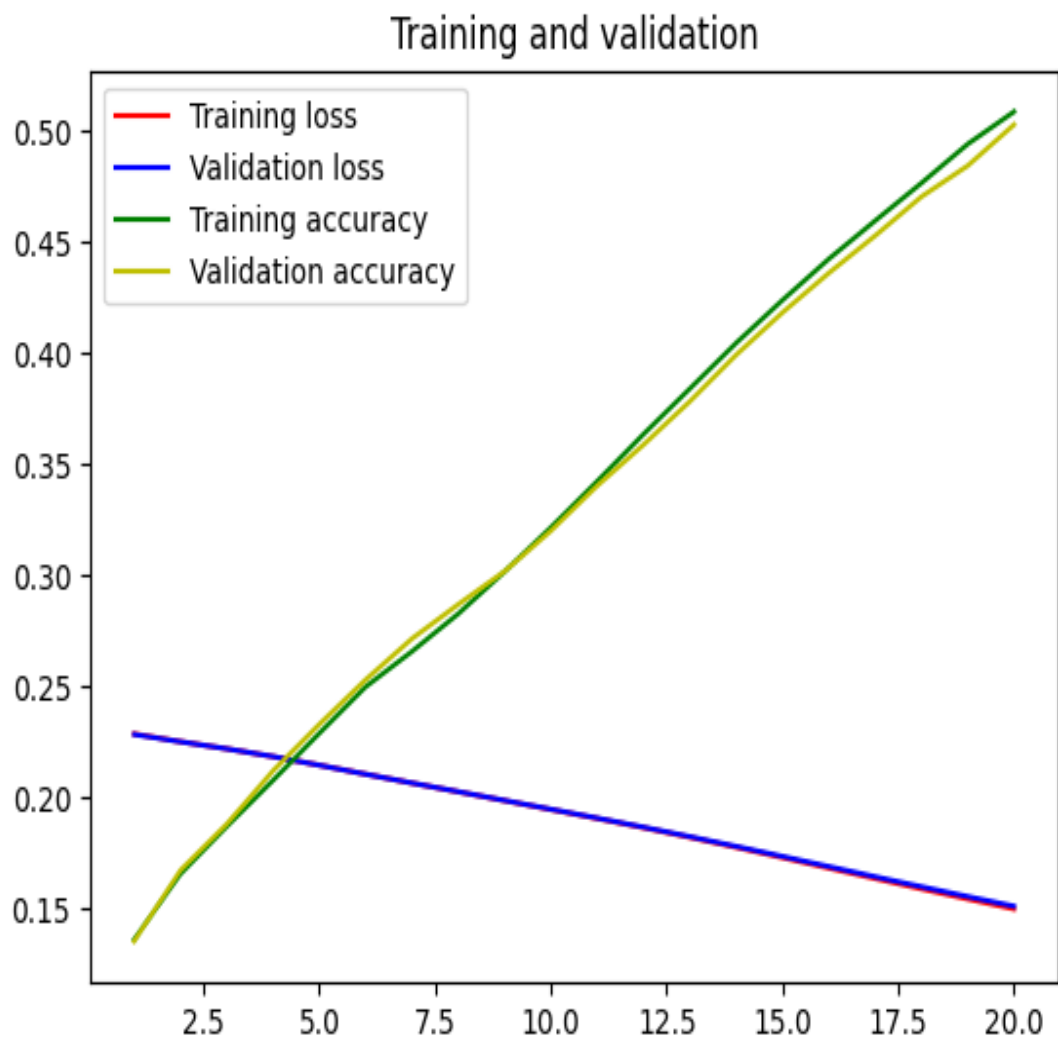
a. Learning Rate : 0.001

Batch Size	64
Learning Rate	0.001
Number of Epoch	20
Validation Set	20%

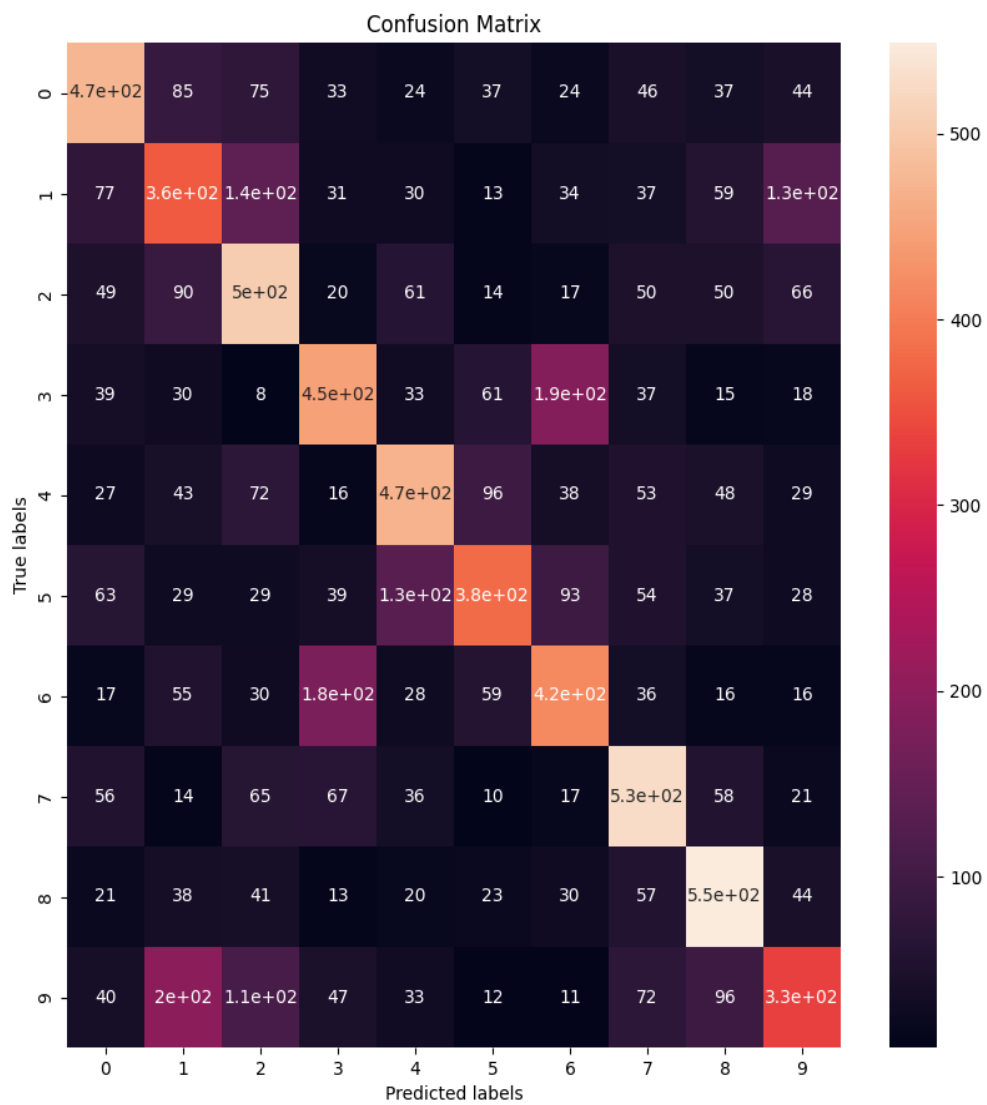
Epoch	Train Loss	Train Accuracy	Validation Loss	Validation Accuracy	F1 Score
1	0.2284955978	13.58525657	0.228274624	13.51442741	0.1159987267
2	0.225001962	16.54126863	0.2249681126	16.70423805	0.1543921287
3	0.2217934823	18.6772621	0.2217998972	18.78944995	0.1795964364
4	0.2182831472	20.75689689	0.218316503	21.1902615	0.2009425726
5	0.2144008563	22.87880069	0.2143834417	23.28674482	0.2208358982
6	0.2103497495	24.97252515	0.2103370578	25.29305681	0.240922326
7	0.2063334634	26.56465748	0.2063728446	27.14156898	0.2568656079
8	0.2024123823	28.26105334	0.2024811787	28.68575293	0.2743027902
9	0.1984410794	30.16034041	0.1985285784	30.1735798	0.2936152583
10	0.194428572	32.15261927	0.1945779459	31.99954914	0.314620975
11	0.1904029053	34.23225406	0.1905892732	34.02840397	0.3366191498
12	0.1862491269	36.35415786	0.1864967926	35.87691614	0.3591052347
13	0.1819123627	38.40279539	0.1822358299	37.82687106	0.3804074448
14	0.1774067636	40.45988672	0.1778402865	39.92335437	0.4016386045
15	0.1727594501	42.39017105	0.1733413263	41.82822362	0.4214147305

16	0.1680406482	44.24437118	0.1687597037	43.6091073	0.4403299531
17	0.1633502704	45.96331051	0.1641858538	45.28854824	0.4576117703
18	0.1586851652	47.6625243	0.1596747749	47.04688909	0.47473358
19	0.1541169046	49.4209147	0.1552487039	48.44454463	0.4923424589
20	0.1496481697	50.87778623	0.1508937736	50.29305681	0.5069011338

Graph:



Confusion Matrix:



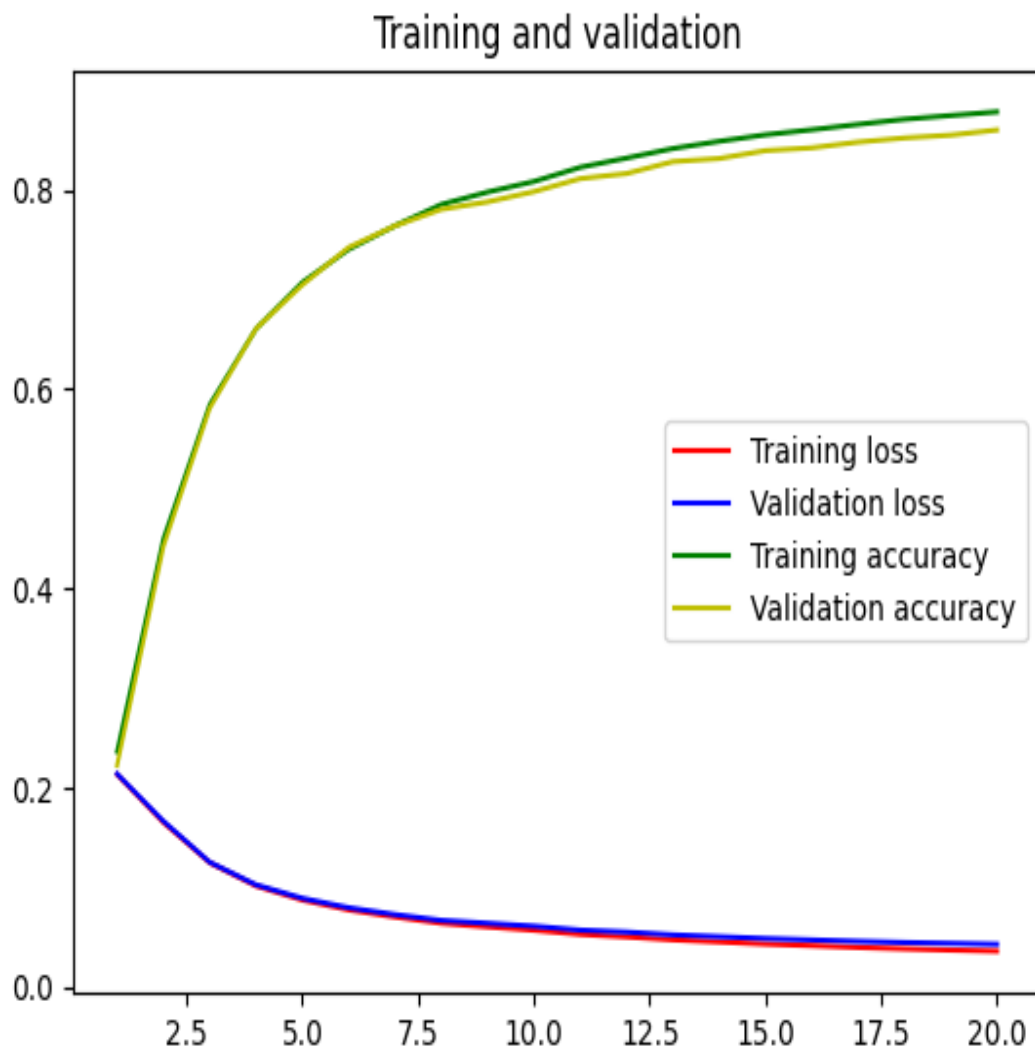
b. Learning Rate : 0.01

Batch Size	64
Learning Rate	0.01
Number of Epoch	20
Validation Set	20%

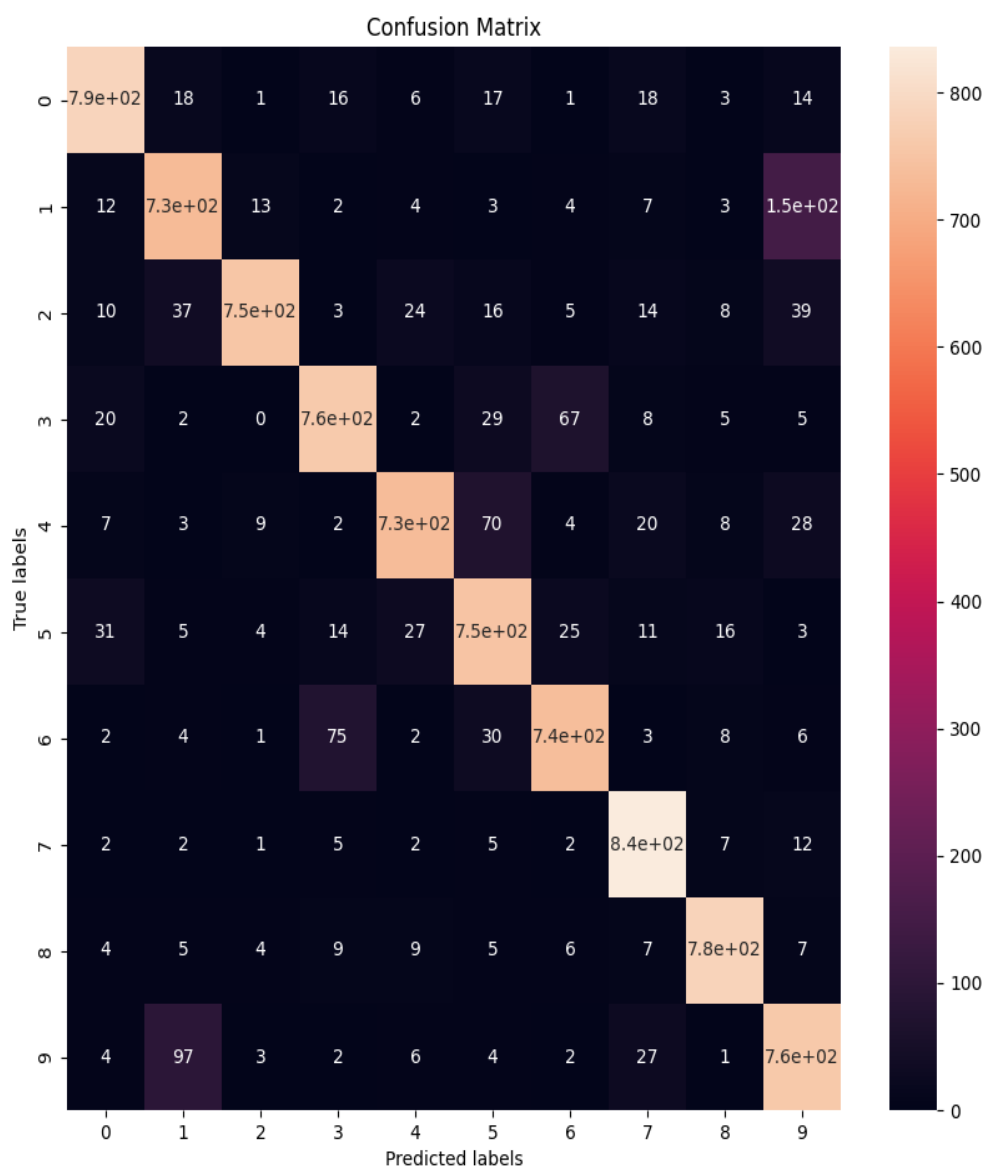
Epoch	Train Loss	Train Accuracy	Validation Loss	Validation Accuracy	F1 Score
1	0.2135780849	23.66782202	0.2142658325	22.29486023	0.2148122942
2	0.1654821661	45.00239524	0.1669104683	44.24030658	0.4373692801
3	0.1251006093	58.45239102	0.1256975589	58.10414788	0.5807273612
4	0.101858178	66.060811	0.103007921	66.07303877	0.6602831334
5	0.08772980735	70.71885479	0.08951133922	70.46889089	0.708008695
6	0.07783392202	74.02429059	0.08001835953	74.22227232	0.7412118228
7	0.07072095352	76.39135458	0.07317125051	76.38638413	0.7647603928
8	0.06446796474	78.52734804	0.06729701653	78.04328224	0.7861143102
9	0.06080098954	79.77287457	0.06442339505	78.78719567	0.7978447535
10	0.0574480289	80.83241751	0.06151039685	79.8128945	0.8084199047
11	0.0533194882	82.25547384	0.05756842189	81.12037872	0.8229880875
12	0.05075988398	83.17975597	0.05558395494	81.62759243	0.8320187581
13	0.04783519183	84.1378533	0.05279850671	82.82236249	0.8416800567
14	0.04572325547	84.86206216	0.05095000003	83.13796213	0.8489229554
15	0.04360891498	85.51864063	0.04913459135	83.92696123	0.8553855725
16	0.04200323102	86.02305069	0.0477440471	84.20874662	0.8605341746
17	0.0401654864	86.56127596	0.04626922106	84.78358882	0.8657756103
18	0.03876748221	87.07413983	0.04510721201	85.2006312	0.8708451541

19	0.03753119785	87.44892496	0.04425875892	85.48241659	0.8745912318
20	0.03648011901	87.81807422	0.04338882561	86.00090171	0.8782417558

Graph:



Confusion Matrix:



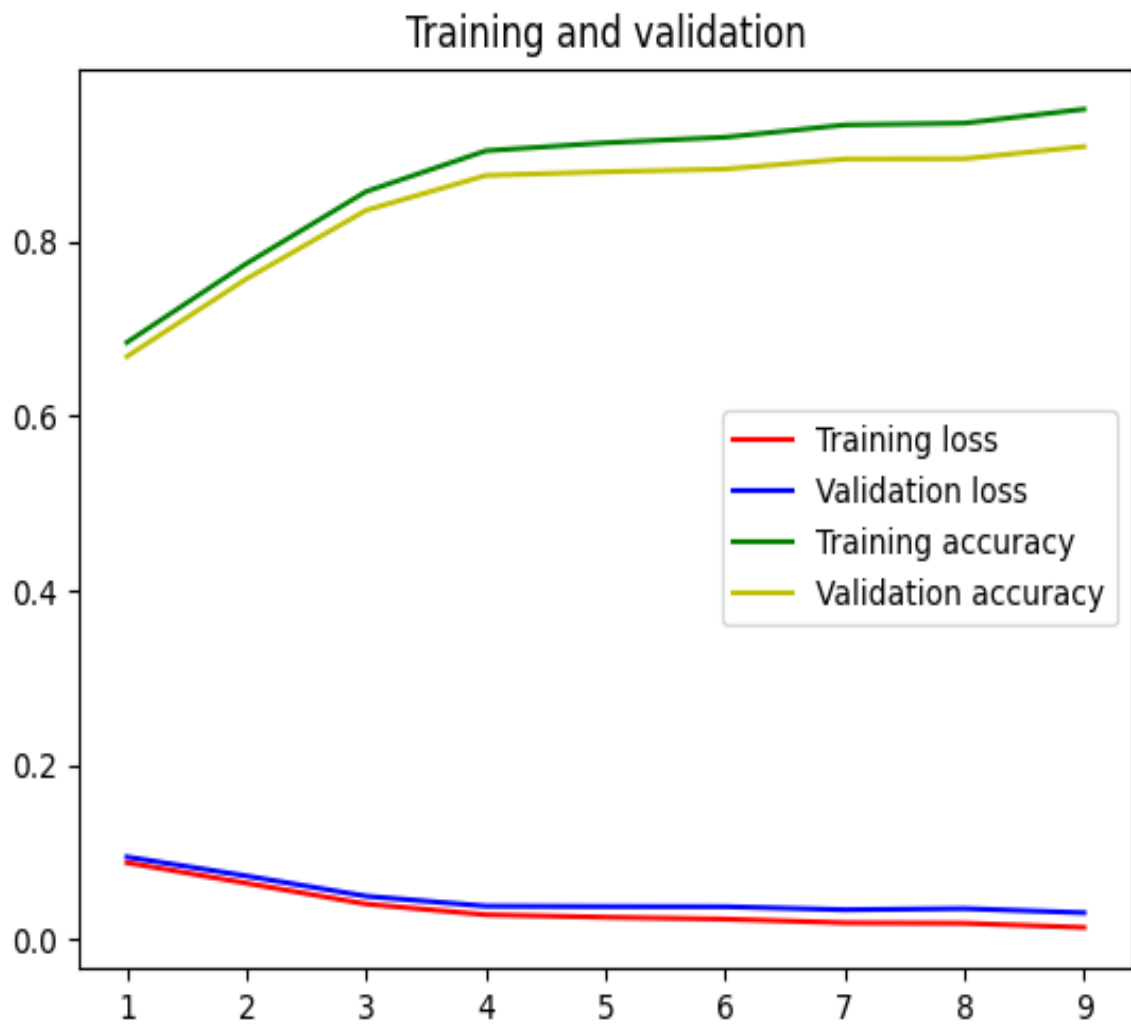
c. Learning Rate: 0.1

Batch Size	64
Learning Rate	0.1
Number of Epoch	20
Validation Set	20%

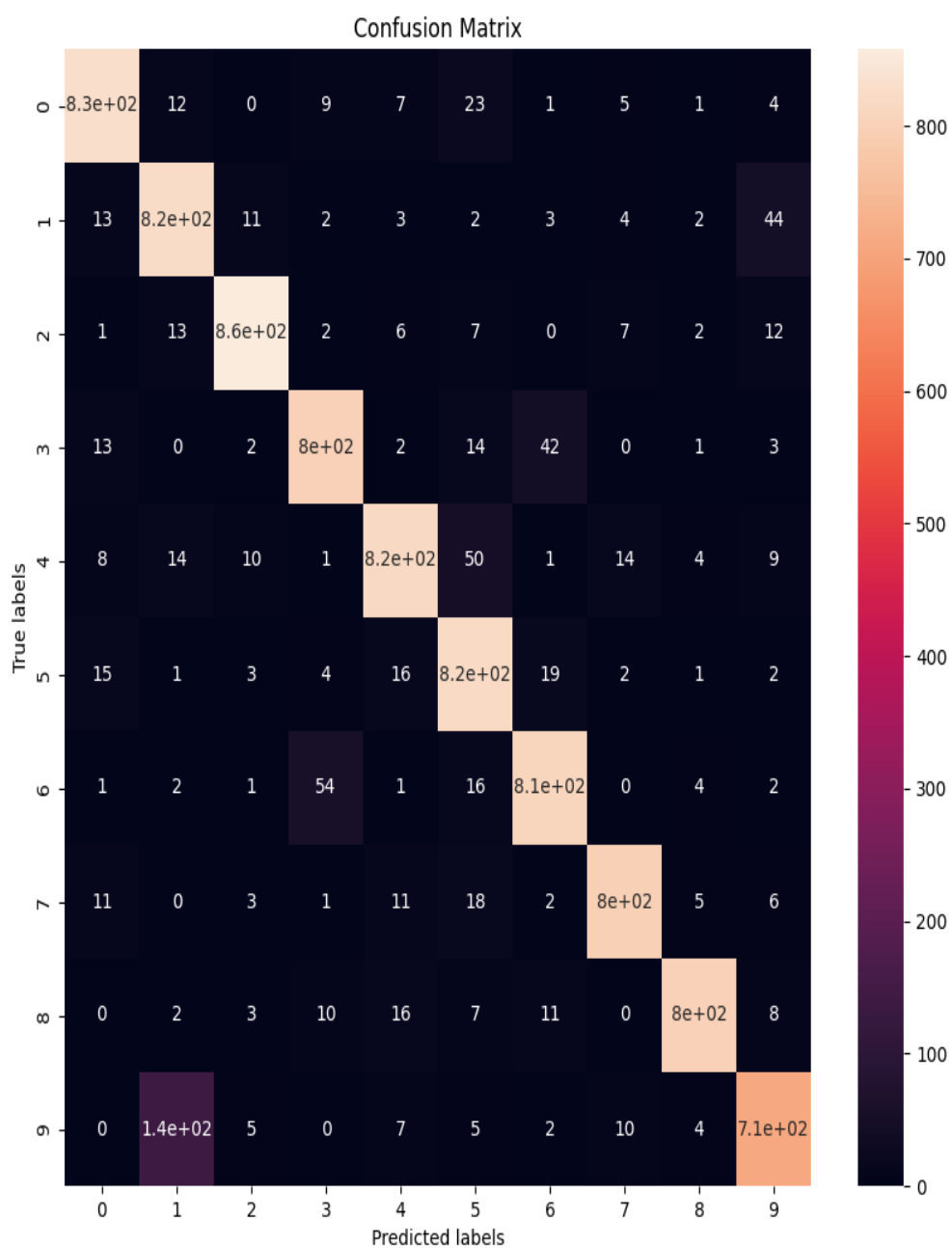
Epoch	Train Loss	Train Accuracy	Validation Loss	Validation Accuracy	F1 Score
1	0.08825697215	68.39687773	0.09484156169	66.78313796	0.6692905791
2	0.06470637011	77.44244371	0.07299156212	75.68755636	0.7700473852
3	0.04084896025	85.69053456	0.04983142329	83.54373309	0.856119778
4	0.02852522347	90.35703215	0.03844117167	87.53381425	0.9034554793
5	0.02564817084	91.27286048	0.03796181707	87.95085663	0.9127428975
6	0.02359275064	91.90971342	0.03778982418	88.26645627	0.9190627642
7	0.01934469329	93.32149801	0.03426437455	89.41614067	0.9329737784
8	0.01880648796	93.52157128	0.03557623512	89.44995491	0.9351373377
9	0.01396296777	95.12215741	0.03083295614	90.84761046	0.9512199127
10					
11					
12					
13					
14					
15					
16					
17					
18					

19					
20					

Graph:



Confusion Matrix:



F1 Scores:

Learning Rate	F1 Score
0.1	0.9512199
0.01	0.87824
0.001	0.5069

Best Model Condition:

Batch Size	64
Learning Rate	0.1
Number of Epoch	20
Validation Set	20%

TEST PERFORMANCE

The test accuracy of the model on independent test set(Training-d) is :

90.15401540154015 %