MLP generated for map identification

500-100-2

sets of experiments1 SGD(lr=0.0001, decay=1e-6, momentum=0.9, nesterov=True)

epochs=100, batch\_size=20 train\_time:322.6562020778656 test\_time:0.5585062503814697 Test loss:0.560961589217186 **Test accuracy:0.8149999976158142**

Precise: 0.7698412698412699,0.8918918918918919, Recall: 0.9238095238095239,0.6947368421052632, F1 Score: 0.83982683982684,0.7810650887573964

SVM generated for map identification

train size:800 test size:200

Linear kernel: value of c is: 0.5 Training acc:100.0 Testing acc:63.0 Precise: 0.5755813953488372,0.9642857142857143, Recall: 0.99,0.27, F1 Score:0.7279411764705882,0.421875, train\_time:7.638766050338745 test\_time:14.458797693252563

CNNS generated for map identification

16-64-128-256

Sets of experiments0 optimizer=keras.optimizers.SGD(lr=0.01) epochs=100, batch\_size=20 train\_time:1064.7736501693726 test\_time:0.7410175800323486 Test loss:0.9211022153496742

**Test accuracy:0.8700000047683716** Precise: 0.7983870967741935,0.9868421052631579, Recall: 0.99,0.75, F1 Score: 0.8839285714285713,0.8522727272727273,

CNNT generated for map identification

layer\_inx: -3

Training time: 228.97055840492249

2/20 [==>...........................] - ETA: 1s - loss: 0.5271 - accuracy: 0.9500WARNING:tensorflow:Callbacks method `on\_test\_batch\_end` is slow compared to the batch time (batch time: 0.0127s vs `on\_test\_batch\_end` time: 0.1030s). Check your callbacks.

20/20 [==============================] - 2s 107ms/step - loss: 0.7523 - accuracy: 0.9150

Testing time: 3.848292350769043

MLP generated for region recognition

600-200-100-5

sets of experiments2 SGD(lr=0.0001, decay=1e-6, momentum=0.9, nesterov=True)

epochs=100, batch\_size=20 train\_time:429.64785504341125 test\_time:0.4607694149017334 Test loss:1.405345368385315

**Test accuracy:0.47600001096725464** Precise: 0.4175824175824176,0.4642857142857143,0.68,0.49122807017543857,0.47619047619047616, Recall: 0.6229508196721312,0.5909090909090909,0.425,0.5283018867924528,0.19230769230769232, F1 Score: 0.5,0.52,0.5230769230769231,0.509090909090909,0.27397260273972607,

SVM generated for region recognition

train size:1000 test size:250

Polynomial kernel: value of c is: 0.5 value of alpha is: 8 value of r is: 0.25 Training acc:100.0

**Testing acc:27.6** Precise: 0.17391304347826086,0.6756756756756757,0.5294117647058824,0.25,-1, Recall: 0.7804878048780488,0.4807692307692308,0.17647058823529413,0.07317073170731707,0.0, F1 Score:0.28444444444444444,0.5617977528089888,0.2647058823529412,0.11320754716981131,-1, train\_time:10.522480010986328 test\_time:12.526976823806763

CNN generated for region recognition

16-32-64

Sets of experiments0 optimizer=keras.optimizers.SGD(lr=0.01) epochs=100, batch\_size=20 train\_time:1713.9769794940948 test\_time:0.9215714931488037 Test loss:7.772695747375488 Test accuracy:0.36800000071525574 Precise: 0.2692307692307692,0.5666666666666667,0.6111111111111112,0.5,0.3333333333333333, Recall: 0.75,0.288135593220339,0.22,0.4878048780487805,0.045454545454545456, F1 Score: 0.39622641509433965,0.38202247191011235,0.3235294117647059,0.4938271604938271,0.08,

CNNT generated for region recognition

layer\_inx: -3

Training time: 89.37634110450745

1/25 [>.............................] - ETA: 0s - loss: 1.2049 - accuracy: 0.7000WARNING:tensorflow:Callbacks method `on\_test\_batch\_end` is slow compared to the batch time (batch time: 0.0076s vs `on\_test\_batch\_end` time: 0.0247s). Check your callbacks.

25/25 [==============================] - 1s 30ms/step - loss: 2.5741 - accuracy: 0.5880

Testing time: 1.408564567565918

MLP generated for projection recognition

1000-500-200-100

sets of experiments0 SGD(lr=0.0001, decay=1e-6, momentum=0.9, nesterov=True)

epochs=100, batch\_size=20 train\_time:1500.3148770332336 test\_time:0.651252269744873 Test loss:1.6065750885009766 Test accuracy:0.2680000066757202 Precise: 0.25,0.20689655172413793,0.2962962962962963,0.375,-1, Recall: 0.62,0.1276595744680851,0.42105263157894735,0.11764705882352941,0.0, F1 Score: 0.3563218390804597,0.15789473684210525,0.34782608695652173,0.17910447761194032,-1,

SVM generated for projection recognition

sets of experiments1

train size:1000 test size:250

Linear kernel: value of c is: 0.0625 Training acc:100.0 **Testing acc:23.200000000000003** Precise: 0.0,0.25,0.21875,1.0,0.24271844660194175, Recall: 0.0,0.02040816326530612,0.6086956521739131,0.08888888888888889,0.44642857142857145, F1 Score:-1,0.037735849056603765,0.32183908045977017,0.16326530612244897,0.3144654088050315, train\_time:9.544359683990479 test\_time:16.18227481842041sets of experiments2

CNN generated for projection recognition

128-512-512-1024

Sets of experiments2 optimizer=keras.optimizers.SGD(lr=0.01) epochs=100, batch\_size=20 train\_time:29009.617646932602 test\_time:29.58191728591919 Test loss:10.672541625976562

**Test accuracy:0.2840000092983246** Precise: 0.26495726495726496,0.2727272727272727,0.2653061224489796,0.7,0.2857142857142857, Recall: 0.5636363636363636,0.061224489795918366,0.49056603773584906,0.14893617021276595,0.08695652173913043, F1 Score: 0.36046511627906974,0.1,0.34437086092715236,0.2456140350877193,0.13333333333333333,

CNNT generated for projection recognition

Training time: 81.07769799232483

1/25 [>.............................] - ETA: 0s - loss: 13.7047 - accuracy: 0.3000WARNING:tensorflow:Callbacks method `on\_test\_batch\_end` is slow compared to the batch time (batch time: 0.0062s vs `on\_test\_batch\_end` time: 0.0247s). Check your callbacks.

25/25 [==============================] - 1s 31ms/step - loss: 15.3476 - accuracy: 0.3680

Testing time: 0.9995739459991455

MLP collected and generated for map identification

500-2

epochs=100, batch\_size=20 train\_time:346.1972975730896 test\_time:0.30518388748168945 Test loss:0.17023253031075 **Test accuracy:0.9449999928474426**

Precise: 0.9782608695652174,0.9166666666666666, Recall: 0.9090909090909091,0.9801980198019802, F1 Score: 0.9424083769633508,0.9473684210526315,

SVM collected and generated for map identification

train size:800 test size:200

Polynomial kernel: value of c is: 2 value of alpha is: 0.125 value of r is: 256 Training acc:100.0 Testing acc:92.0

Precise: 0.93,0.91, Recall: 0.9117647058823529,0.9285714285714286, F1 Score:0.9207920792079208,0.9191919191919192, train\_time:12.350789070129395 test\_time:10.623877763748169

CNN collected and generated for map identification

16-64

Sets of experiments1 optimizer=keras.optimizers.SGD(lr=0.01) epochs=100, batch\_size=20 train\_time:1906.959165096283 test\_time:0.8881340026855469 Test loss:0.18363353922963144 Test accuracy:0.9649999737739563

Precise: 0.9690721649484536,0.9611650485436893, Recall: 0.9591836734693877,0.9705882352941176, F1 Score: 0.9641025641025642,0.9658536585365852,

CNNT collected and generated for map identification

VGG19

Training time: 155.94461727142334

2/20 [==>...........................] - ETA: 0s - loss: 1.0120e-05 - accuracy: 1.0000WARNING:tensorflow:Callbacks method `on\_test\_batch\_end` is slow compared to the batch time (batch time: 0.0069s vs `on\_test\_batch\_end` time: 0.0596s). Check your callbacks.

20/20 [==============================] - 1s 70ms/step - loss: 4.2348e-04 - accuracy: 1.0000

Testing time: 2.4475109577178955

MLP collected and generated for region recognition

350-5

sets of experiments1 SGD(lr=0.0001, decay=1e-6, momentum=0.9, nesterov=True)

epochs=100, batch\_size=20 train\_time:320.52116322517395 test\_time:0.375995397567749 Test loss:0.5236528764168421 **Test accuracy:0.8533333539962769**

Precise: 0.8771929824561403,0.8615384615384616,0.7402597402597403,0.8958333333333334,0.9433962264150944, Recall: 0.7575757575757576,0.9491525423728814,0.9661016949152542,0.7288135593220338,0.8771929824561403, F1 Score: 0.8130081300813008,0.9032258064516129,0.838235294117647,0.8037383177570093,0.9090909090909091,

SVM collected and generated for region recognition

train size:1200 test size:300

Linear kernel: value of c is: 4 Training acc:100.0 Testing acc:86.0

Precise: 0.7586206896551724,0.94,0.8387096774193549,0.9322033898305084,0.8450704225352113, Recall: 0.8,0.8103448275862069,0.9285714285714286,0.8088235294117647,0.9523809523809523,

F1 Score:0.7787610619469026,0.8703703703703702,0.8813559322033898,0.8661417322834646,0.8955223880597015, train\_time:54.867637634277344 test\_time:29.607250690460205sets of experiments2

CNN collected and generated for region recognition

32-64 optimizer=keras.optimizers.SGD(lr=0.01) epochs=100, batch\_size=20 train\_time:4342.358347892761 test\_time:2.219637870788574 Test loss:0.7792073069016139

**Test accuracy:0.8866666555404663**

Precise: 0.8387096774193549,0.9148936170212766,0.8813559322033898,0.8333333333333334,0.9696969696969697,

Recall: 0.9629629629629629,0.9148936170212766,0.8125,0.8333333333333334,0.927536231884058, F1 Score: 0.896551724137931,0.9148936170212767,0.8455284552845528,0.8333333333333334,0.9481481481481482,

CNNT collected and generated for region recognition

VGG19

layer\_inx: -6

Precise: 0.9661016949152542,0.9811320754716981,0.9444444444444444,0.984375,0.9571428571428572, Recall: 0.9047619047619048,0.9629629629629629,0.9622641509433962,1.0,1.0, F1 Score: 0.9344262295081968,0.97196261682243,0.9532710280373832,0.9921259842519685,0.9781021897810219,layer\_inx: -6

Training time: 226.1662154197693

Testing time: 2.40

loss: 0.1541 - accuracy: 0.9667

world\_map184.jpg,0,2

world\_map317.jpg,0,3

us\_map3.jpg,0,2

austria\_hungary.png,2,1

south\_korea\_map73.jpg,1,0

south\_korea\_map224.jpg,2,0

india-map-of-metalindustry.jpg,1,4

generated\_other\_10.png,0,2

china\_map183.jpg,0,4

china\_map108.jpg,0,4