

```

1 /usr/local/bin/python3.8 "/Users/surajvaddi/Desktop
/TarPrint Full Journey/Machine Learning Code/Neural
-Network-NO-test.py"
2 ['norm_imperVIOUS' 'tan_imperVIOUS' '
norm_imperVIOUS' ...]
3 ['norm_imperVIOUS' 'dry_pervious' 'norm_pervious']
4 [2 5 2 ... 2 0 3]
5 2020-09-03 19:14:33.716347: I tensorflow/core/
platform/cpu_feature_guard.cc:142] This TensorFlow
binary is optimized with oneAPI Deep Neural Network
Library (oneDNN)to use the following CPU
instructions in performance-critical operations:
AVX2 FMA
6 To enable them in other operations, rebuild
TensorFlow with the appropriate compiler flags.
7 2020-09-03 19:14:33.744624: I tensorflow/compiler/
xla/service/service.cc:168] XLA service
0x7fe1cb678c80 initialized for platform Host (this
does not guarantee that XLA will be used). Devices:
8 2020-09-03 19:14:33.744637: I tensorflow/compiler/
xla/service/service.cc:176] StreamExecutor device
(0): Host, Default Version
9 [[0.30362644 0.32236881 0.29612949 ... 0.37484746 0
.38234441 0.32236881]
10 [0.38498641 0.33609925 0.26582395 ... 0.35748738 0
.32998835 0.25665761]
11 [0.32926562 0.33627127 0.29774019 ... 0.37830518 0
.381808 0.31875714]
12 ...
13 [0.31306804 0.32338897 0.28554558 ... 0.40251605 0
.40595636 0.35435174]
14 [0.42824723 0.39255996 0.27955027 ... 0.26765452 0
.28549815 0.19925392]
15 [0.21592634 0.31118796 0.19052324 ... 0.38739725 0
.450905 0.28578486]]
16 (2138, 9)
17 (2138, 7)
18 Epoch 1/350
19 143/143 [=====] - 0s 639us
/step - loss: 0.3953 - accuracy: 0.3363
20 Epoch 2/350
21 143/143 [=====] - 0s 616us
/step - loss: 0.3179 - accuracy: 0.4612
22 Epoch 3/350

```

```
23 143/143 [=====] - 0s 704us
  /step - loss: 0.2523 - accuracy: 0.6099
24 Epoch 4/350
25 143/143 [=====] - 0s 624us
  /step - loss: 0.1986 - accuracy: 0.7264
26 Epoch 5/350
27 143/143 [=====] - 0s 639us
  /step - loss: 0.1707 - accuracy: 0.7572
28 Epoch 6/350
29 143/143 [=====] - 0s 685us
  /step - loss: 0.1627 - accuracy: 0.7610
30 Epoch 7/350
31 143/143 [=====] - 0s 652us
  /step - loss: 0.1534 - accuracy: 0.7792
32 Epoch 8/350
33 143/143 [=====] - 0s 828us
  /step - loss: 0.1461 - accuracy: 0.7933
34 Epoch 9/350
35 143/143 [=====] - 0s 831us
  /step - loss: 0.1414 - accuracy: 0.7984
36 Epoch 10/350
37 143/143 [=====] - 0s 712us
  /step - loss: 0.1398 - accuracy: 0.7951
38 Epoch 11/350
39 143/143 [=====] - 0s 681us
  /step - loss: 0.1345 - accuracy: 0.8031
40 Epoch 12/350
41 143/143 [=====] - 0s 662us
  /step - loss: 0.1347 - accuracy: 0.8054
42 Epoch 13/350
43 143/143 [=====] - 0s 678us
  /step - loss: 0.1296 - accuracy: 0.8143
44 Epoch 14/350
45 143/143 [=====] - 0s 621us
  /step - loss: 0.1317 - accuracy: 0.8045
46 Epoch 15/350
47 143/143 [=====] - 0s 712us
  /step - loss: 0.1264 - accuracy: 0.8162
48 Epoch 16/350
49 143/143 [=====] - 0s 644us
  /step - loss: 0.1263 - accuracy: 0.8204
50 Epoch 17/350
51 143/143 [=====] - 0s 647us
  /step - loss: 0.1259 - accuracy: 0.8241
```

```
52 Epoch 18/350
53 143/143 [=====] - 0s 669us
    /step - loss: 0.1237 - accuracy: 0.8269
54 Epoch 19/350
55 143/143 [=====] - 0s 627us
    /step - loss: 0.1215 - accuracy: 0.8293
56 Epoch 20/350
57 143/143 [=====] - 0s 807us
    /step - loss: 0.1209 - accuracy: 0.8307
58 Epoch 21/350
59 143/143 [=====] - 0s 637us
    /step - loss: 0.1233 - accuracy: 0.8307
60 Epoch 22/350
61 143/143 [=====] - 0s 678us
    /step - loss: 0.1182 - accuracy: 0.8382
62 Epoch 23/350
63 143/143 [=====] - 0s 728us
    /step - loss: 0.1216 - accuracy: 0.8297
64 Epoch 24/350
65 143/143 [=====] - 0s 666us
    /step - loss: 0.1182 - accuracy: 0.8321
66 Epoch 25/350
67 143/143 [=====] - 0s 674us
    /step - loss: 0.1167 - accuracy: 0.8424
68 Epoch 26/350
69 143/143 [=====] - 0s 665us
    /step - loss: 0.1213 - accuracy: 0.8274
70 Epoch 27/350
71 143/143 [=====] - 0s 666us
    /step - loss: 0.1166 - accuracy: 0.8396
72 Epoch 28/350
73 143/143 [=====] - 0s 665us
    /step - loss: 0.1155 - accuracy: 0.8391
74 Epoch 29/350
75 143/143 [=====] - 0s 800us
    /step - loss: 0.1143 - accuracy: 0.8396
76 Epoch 30/350
77 143/143 [=====] - 0s 627us
    /step - loss: 0.1137 - accuracy: 0.8419
78 Epoch 31/350
79 143/143 [=====] - 0s 646us
    /step - loss: 0.1154 - accuracy: 0.8410
80 Epoch 32/350
81 143/143 [=====] - 0s 653us
```

```
81 /step - loss: 0.1140 - accuracy: 0.8419
82 Epoch 33/350
83 143/143 [=====] - 0s
    724us/step - loss: 0.1175 - accuracy: 0.8368
84 Epoch 34/350
85 143/143 [=====] - 0s
    675us/step - loss: 0.1138 - accuracy: 0.8400
86 Epoch 35/350
87 143/143 [=====] - 0s
    619us/step - loss: 0.1113 - accuracy: 0.8485
88 Epoch 36/350
89 143/143 [=====] - 0s
    717us/step - loss: 0.1116 - accuracy: 0.8405
90 Epoch 37/350
91 143/143 [=====] - 0s
    622us/step - loss: 0.1111 - accuracy: 0.8457
92 Epoch 38/350
93 143/143 [=====] - 0s
    649us/step - loss: 0.1118 - accuracy: 0.8438
94 Epoch 39/350
95 143/143 [=====] - 0s
    666us/step - loss: 0.1109 - accuracy: 0.8489
96 Epoch 40/350
97 143/143 [=====] - 0s
    619us/step - loss: 0.1068 - accuracy: 0.8536
98 Epoch 41/350
99 143/143 [=====] - 0s
    717us/step - loss: 0.1091 - accuracy: 0.8494
100 Epoch 42/350
101 143/143 [=====] - 0s
    638us/step - loss: 0.1105 - accuracy: 0.8489
102 Epoch 43/350
103 143/143 [=====] - 0s
    674us/step - loss: 0.1122 - accuracy: 0.8452
104 Epoch 44/350
105 143/143 [=====] - 0s
    667us/step - loss: 0.1087 - accuracy: 0.8573
106 Epoch 45/350
107 143/143 [=====] - 0s
    618us/step - loss: 0.1075 - accuracy: 0.8541
108 Epoch 46/350
109 143/143 [=====] - 0s
    705us/step - loss: 0.1083 - accuracy: 0.8457
110 Epoch 47/350
```

```
111 143/143 [=====] - 0s
    624us/step - loss: 0.1077 - accuracy: 0.8442
112 Epoch 48/350
113 143/143 [=====] - 0s
    679us/step - loss: 0.1078 - accuracy: 0.8457
114 Epoch 49/350
115 143/143 [=====] - 0s
    692us/step - loss: 0.1070 - accuracy: 0.8475
116 Epoch 50/350
117 143/143 [=====] - 0s
    615us/step - loss: 0.1047 - accuracy: 0.8545
118 Epoch 51/350
119 143/143 [=====] - 0s
    705us/step - loss: 0.1058 - accuracy: 0.8475
120 Epoch 52/350
121 143/143 [=====] - 0s
    650us/step - loss: 0.1047 - accuracy: 0.8503
122 Epoch 53/350
123 143/143 [=====] - 0s
    639us/step - loss: 0.1057 - accuracy: 0.8550
124 Epoch 54/350
125 143/143 [=====] - 0s
    651us/step - loss: 0.1051 - accuracy: 0.8499
126 Epoch 55/350
127 143/143 [=====] - 0s
    701us/step - loss: 0.1068 - accuracy: 0.8447
128 Epoch 56/350
129 143/143 [=====] - 0s
    708us/step - loss: 0.1083 - accuracy: 0.8471
130 Epoch 57/350
131 143/143 [=====] - 0s
    606us/step - loss: 0.1065 - accuracy: 0.8442
132 Epoch 58/350
133 143/143 [=====] - 0s
    650us/step - loss: 0.1037 - accuracy: 0.8513
134 Epoch 59/350
135 143/143 [=====] - 0s
    690us/step - loss: 0.1035 - accuracy: 0.8466
136 Epoch 60/350
137 143/143 [=====] - 0s
    646us/step - loss: 0.1049 - accuracy: 0.8485
138 Epoch 61/350
139 143/143 [=====] - 0s
    730us/step - loss: 0.1035 - accuracy: 0.8466
```

```
140 Epoch 62/350
141 143/143 [=====] - 0s
    623us/step - loss: 0.1029 - accuracy: 0.8541
142 Epoch 63/350
143 143/143 [=====] - 0s
    653us/step - loss: 0.1015 - accuracy: 0.8545
144 Epoch 64/350
145 143/143 [=====] - 0s
    649us/step - loss: 0.1011 - accuracy: 0.8494
146 Epoch 65/350
147 143/143 [=====] - 0s
    639us/step - loss: 0.0991 - accuracy: 0.8569
148 Epoch 66/350
149 143/143 [=====] - 0s
    714us/step - loss: 0.1012 - accuracy: 0.8573
150 Epoch 67/350
151 143/143 [=====] - 0s
    640us/step - loss: 0.1033 - accuracy: 0.8503
152 Epoch 68/350
153 143/143 [=====] - 0s
    648us/step - loss: 0.1010 - accuracy: 0.8555
154 Epoch 69/350
155 143/143 [=====] - 0s
    630us/step - loss: 0.1013 - accuracy: 0.8499
156 Epoch 70/350
157 143/143 [=====] - 0s
    661us/step - loss: 0.0975 - accuracy: 0.8564
158 Epoch 71/350
159 143/143 [=====] - 0s
    758us/step - loss: 0.0968 - accuracy: 0.8648
160 Epoch 72/350
161 143/143 [=====] - 0s
    623us/step - loss: 0.0990 - accuracy: 0.8644
162 Epoch 73/350
163 143/143 [=====] - 0s
    621us/step - loss: 0.0989 - accuracy: 0.8606
164 Epoch 74/350
165 143/143 [=====] - 0s
    633us/step - loss: 0.0979 - accuracy: 0.8658
166 Epoch 75/350
167 143/143 [=====] - 0s
    601us/step - loss: 0.0980 - accuracy: 0.8620
168 Epoch 76/350
169 143/143 [=====] - 0s
```

```
169 712us/step - loss: 0.0985 - accuracy: 0.8601
170 Epoch 77/350
171 143/143 [=====] - 0s
    630us/step - loss: 0.1002 - accuracy: 0.8559
172 Epoch 78/350
173 143/143 [=====] - 0s
    686us/step - loss: 0.0993 - accuracy: 0.8592
174 Epoch 79/350
175 143/143 [=====] - 0s
    685us/step - loss: 0.0955 - accuracy: 0.8662
176 Epoch 80/350
177 143/143 [=====] - 0s
    617us/step - loss: 0.0962 - accuracy: 0.8569
178 Epoch 81/350
179 143/143 [=====] - 0s
    771us/step - loss: 0.0968 - accuracy: 0.8569
180 Epoch 82/350
181 143/143 [=====] - 0s
    618us/step - loss: 0.0954 - accuracy: 0.8634
182 Epoch 83/350
183 143/143 [=====] - 0s
    652us/step - loss: 0.0956 - accuracy: 0.8592
184 Epoch 84/350
185 143/143 [=====] - 0s
    650us/step - loss: 0.0949 - accuracy: 0.8616
186 Epoch 85/350
187 143/143 [=====] - 0s
    647us/step - loss: 0.0948 - accuracy: 0.8630
188 Epoch 86/350
189 143/143 [=====] - 0s
    669us/step - loss: 0.0953 - accuracy: 0.8676
190 Epoch 87/350
191 143/143 [=====] - 0s
    617us/step - loss: 0.0936 - accuracy: 0.8658
192 Epoch 88/350
193 143/143 [=====] - 0s
    712us/step - loss: 0.0959 - accuracy: 0.8634
194 Epoch 89/350
195 143/143 [=====] - 0s
    644us/step - loss: 0.0923 - accuracy: 0.8616
196 Epoch 90/350
197 143/143 [=====] - 0s
    648us/step - loss: 0.0921 - accuracy: 0.8667
198 Epoch 91/350
```

```
199 143/143 [=====] - 0s
    679us/step - loss: 0.0949 - accuracy: 0.8644
200 Epoch 92/350
201 143/143 [=====] - 0s
    620us/step - loss: 0.0951 - accuracy: 0.8573
202 Epoch 93/350
203 143/143 [=====] - 0s
    725us/step - loss: 0.0983 - accuracy: 0.8606
204 Epoch 94/350
205 143/143 [=====] - 0s
    632us/step - loss: 0.0920 - accuracy: 0.8695
206 Epoch 95/350
207 143/143 [=====] - 0s
    652us/step - loss: 0.0936 - accuracy: 0.8690
208 Epoch 96/350
209 143/143 [=====] - 0s
    671us/step - loss: 0.0908 - accuracy: 0.8709
210 Epoch 97/350
211 143/143 [=====] - 0s
    621us/step - loss: 0.0927 - accuracy: 0.8676
212 Epoch 98/350
213 143/143 [=====] - 0s
    717us/step - loss: 0.0933 - accuracy: 0.8630
214 Epoch 99/350
215 143/143 [=====] - 0s
    639us/step - loss: 0.0908 - accuracy: 0.8709
216 Epoch 100/350
217 143/143 [=====] - 0s
    651us/step - loss: 0.0897 - accuracy: 0.8728
218 Epoch 101/350
219 143/143 [=====] - 0s
    657us/step - loss: 0.0917 - accuracy: 0.8690
220 Epoch 102/350
221 143/143 [=====] - 0s
    646us/step - loss: 0.0910 - accuracy: 0.8718
222 Epoch 103/350
223 143/143 [=====] - 0s
    716us/step - loss: 0.0913 - accuracy: 0.8681
224 Epoch 104/350
225 143/143 [=====] - 0s
    605us/step - loss: 0.0947 - accuracy: 0.8714
226 Epoch 105/350
227 143/143 [=====] - 0s
    653us/step - loss: 0.0891 - accuracy: 0.8728
```

```
228 Epoch 106/350
229 143/143 [=====] - 0s
    701us/step - loss: 0.0909 - accuracy: 0.8681
230 Epoch 107/350
231 143/143 [=====] - 0s
    682us/step - loss: 0.0887 - accuracy: 0.8746
232 Epoch 108/350
233 143/143 [=====] - 0s
    707us/step - loss: 0.0874 - accuracy: 0.8761
234 Epoch 109/350
235 143/143 [=====] - 0s
    615us/step - loss: 0.0913 - accuracy: 0.8718
236 Epoch 110/350
237 143/143 [=====] - 0s
    741us/step - loss: 0.0896 - accuracy: 0.8723
238 Epoch 111/350
239 143/143 [=====] - 0s
    622us/step - loss: 0.0871 - accuracy: 0.8789
240 Epoch 112/350
241 143/143 [=====] - 0s
    679us/step - loss: 0.0884 - accuracy: 0.8681
242 Epoch 113/350
243 143/143 [=====] - 0s
    649us/step - loss: 0.0899 - accuracy: 0.8681
244 Epoch 114/350
245 143/143 [=====] - 0s
    611us/step - loss: 0.0864 - accuracy: 0.8723
246 Epoch 115/350
247 143/143 [=====] - 0s
    700us/step - loss: 0.0904 - accuracy: 0.8737
248 Epoch 116/350
249 143/143 [=====] - 0s
    686us/step - loss: 0.0871 - accuracy: 0.8761
250 Epoch 117/350
251 143/143 [=====] - 0s
    683us/step - loss: 0.0897 - accuracy: 0.8770
252 Epoch 118/350
253 143/143 [=====] - 0s
    647us/step - loss: 0.0906 - accuracy: 0.8667
254 Epoch 119/350
255 143/143 [=====] - 0s
    617us/step - loss: 0.0898 - accuracy: 0.8686
256 Epoch 120/350
257 143/143 [=====] - 0s
```

```
257 715us/step - loss: 0.0859 - accuracy: 0.8789
258 Epoch 121/350
259 143/143 [=====] - 0s
    643us/step - loss: 0.0871 - accuracy: 0.8784
260 Epoch 122/350
261 143/143 [=====] - 0s
    673us/step - loss: 0.0870 - accuracy: 0.8751
262 Epoch 123/350
263 143/143 [=====] - 0s
    651us/step - loss: 0.0868 - accuracy: 0.8704
264 Epoch 124/350
265 143/143 [=====] - 0s
    653us/step - loss: 0.0861 - accuracy: 0.8770
266 Epoch 125/350
267 143/143 [=====] - 0s
    655us/step - loss: 0.0858 - accuracy: 0.8761
268 Epoch 126/350
269 143/143 [=====] - 0s
    615us/step - loss: 0.0847 - accuracy: 0.8803
270 Epoch 127/350
271 143/143 [=====] - 0s
    714us/step - loss: 0.0863 - accuracy: 0.8756
272 Epoch 128/350
273 143/143 [=====] - 0s
    670us/step - loss: 0.0846 - accuracy: 0.8793
274 Epoch 129/350
275 143/143 [=====] - 0s
    647us/step - loss: 0.0834 - accuracy: 0.8812
276 Epoch 130/350
277 143/143 [=====] - 0s
    651us/step - loss: 0.0869 - accuracy: 0.8723
278 Epoch 131/350
279 143/143 [=====] - 0s
    615us/step - loss: 0.0852 - accuracy: 0.8765
280 Epoch 132/350
281 143/143 [=====] - 0s
    698us/step - loss: 0.0842 - accuracy: 0.8761
282 Epoch 133/350
283 143/143 [=====] - 0s
    682us/step - loss: 0.0822 - accuracy: 0.8798
284 Epoch 134/350
285 143/143 [=====] - 0s
    660us/step - loss: 0.0820 - accuracy: 0.8826
286 Epoch 135/350
```

```
287 143/143 [=====] - 0s
    655us/step - loss: 0.0854 - accuracy: 0.8849
288 Epoch 136/350
289 143/143 [=====] - 0s
    649us/step - loss: 0.0851 - accuracy: 0.8789
290 Epoch 137/350
291 143/143 [=====] - 0s
    652us/step - loss: 0.0859 - accuracy: 0.8817
292 Epoch 138/350
293 143/143 [=====] - 0s
    645us/step - loss: 0.0839 - accuracy: 0.8751
294 Epoch 139/350
295 143/143 [=====] - 0s
    736us/step - loss: 0.0826 - accuracy: 0.8831
296 Epoch 140/350
297 143/143 [=====] - 0s
    625us/step - loss: 0.0822 - accuracy: 0.8915
298 Epoch 141/350
299 143/143 [=====] - 0s
    668us/step - loss: 0.0826 - accuracy: 0.8863
300 Epoch 142/350
301 143/143 [=====] - 0s
    653us/step - loss: 0.0838 - accuracy: 0.8798
302 Epoch 143/350
303 143/143 [=====] - 0s
    643us/step - loss: 0.0834 - accuracy: 0.8812
304 Epoch 144/350
305 143/143 [=====] - 0s
    722us/step - loss: 0.0821 - accuracy: 0.8798
306 Epoch 145/350
307 143/143 [=====] - 0s
    633us/step - loss: 0.0828 - accuracy: 0.8789
308 Epoch 146/350
309 143/143 [=====] - 0s
    649us/step - loss: 0.0800 - accuracy: 0.8877
310 Epoch 147/350
311 143/143 [=====] - 0s
    657us/step - loss: 0.0848 - accuracy: 0.8765
312 Epoch 148/350
313 143/143 [=====] - 0s
    614us/step - loss: 0.0808 - accuracy: 0.8803
314 Epoch 149/350
315 143/143 [=====] - 0s
    766us/step - loss: 0.0805 - accuracy: 0.8891
```

```
316 Epoch 150/350
317 143/143 [=====] - 0s
    620us/step - loss: 0.0799 - accuracy: 0.8821
318 Epoch 151/350
319 143/143 [=====] - 0s
    651us/step - loss: 0.0830 - accuracy: 0.8845
320 Epoch 152/350
321 143/143 [=====] - 0s
    653us/step - loss: 0.0817 - accuracy: 0.8849
322 Epoch 153/350
323 143/143 [=====] - 0s
    614us/step - loss: 0.0847 - accuracy: 0.8779
324 Epoch 154/350
325 143/143 [=====] - 0s
    778us/step - loss: 0.0793 - accuracy: 0.8891
326 Epoch 155/350
327 143/143 [=====] - 0s
    620us/step - loss: 0.0791 - accuracy: 0.8854
328 Epoch 156/350
329 143/143 [=====] - 0s
    641us/step - loss: 0.0806 - accuracy: 0.8891
330 Epoch 157/350
331 143/143 [=====] - 0s
    652us/step - loss: 0.0812 - accuracy: 0.8812
332 Epoch 158/350
333 143/143 [=====] - 0s
    697us/step - loss: 0.0811 - accuracy: 0.8840
334 Epoch 159/350
335 143/143 [=====] - 0s
    680us/step - loss: 0.0814 - accuracy: 0.8831
336 Epoch 160/350
337 143/143 [=====] - 0s
    617us/step - loss: 0.0804 - accuracy: 0.8859
338 Epoch 161/350
339 143/143 [=====] - 0s
    749us/step - loss: 0.0761 - accuracy: 0.8929
340 Epoch 162/350
341 143/143 [=====] - 0s
    621us/step - loss: 0.0761 - accuracy: 0.8938
342 Epoch 163/350
343 143/143 [=====] - 0s
    650us/step - loss: 0.0810 - accuracy: 0.8746
344 Epoch 164/350
345 143/143 [=====] - 0s
```

```
345 680us/step - loss: 0.0805 - accuracy: 0.8845
346 Epoch 165/350
347 143/143 [=====] - 0s
    612us/step - loss: 0.0800 - accuracy: 0.8840
348 Epoch 166/350
349 143/143 [=====] - 0s
    741us/step - loss: 0.0817 - accuracy: 0.8784
350 Epoch 167/350
351 143/143 [=====] - 0s
    619us/step - loss: 0.0783 - accuracy: 0.8891
352 Epoch 168/350
353 143/143 [=====] - 0s
    650us/step - loss: 0.0791 - accuracy: 0.8906
354 Epoch 169/350
355 143/143 [=====] - 0s
    678us/step - loss: 0.0791 - accuracy: 0.8896
356 Epoch 170/350
357 143/143 [=====] - 0s
    616us/step - loss: 0.0785 - accuracy: 0.8924
358 Epoch 171/350
359 143/143 [=====] - 0s
    742us/step - loss: 0.0748 - accuracy: 0.8929
360 Epoch 172/350
361 143/143 [=====] - 0s
    619us/step - loss: 0.0774 - accuracy: 0.8901
362 Epoch 173/350
363 143/143 [=====] - 0s
    640us/step - loss: 0.0782 - accuracy: 0.8873
364 Epoch 174/350
365 143/143 [=====] - 0s
    634us/step - loss: 0.0761 - accuracy: 0.8906
366 Epoch 175/350
367 143/143 [=====] - 0s
    620us/step - loss: 0.0820 - accuracy: 0.8840
368 Epoch 176/350
369 143/143 [=====] - 0s
    719us/step - loss: 0.0757 - accuracy: 0.8920
370 Epoch 177/350
371 143/143 [=====] - 0s
    657us/step - loss: 0.0777 - accuracy: 0.8901
372 Epoch 178/350
373 143/143 [=====] - 0s
    669us/step - loss: 0.0749 - accuracy: 0.8873
374 Epoch 179/350
```

```
375 143/143 [=====] - 0s
    655us/step - loss: 0.0756 - accuracy: 0.8929
376 Epoch 180/350
377 143/143 [=====] - 0s
    662us/step - loss: 0.0763 - accuracy: 0.8957
378 Epoch 181/350
379 143/143 [=====] - 0s
    698us/step - loss: 0.0762 - accuracy: 0.8938
380 Epoch 182/350
381 143/143 [=====] - 0s
    640us/step - loss: 0.0754 - accuracy: 0.8896
382 Epoch 183/350
383 143/143 [=====] - 0s
    745us/step - loss: 0.0766 - accuracy: 0.8938
384 Epoch 184/350
385 143/143 [=====] - 0s
    613us/step - loss: 0.0744 - accuracy: 0.8934
386 Epoch 185/350
387 143/143 [=====] - 0s
    668us/step - loss: 0.0744 - accuracy: 0.8952
388 Epoch 186/350
389 143/143 [=====] - 0s
    640us/step - loss: 0.0734 - accuracy: 0.8920
390 Epoch 187/350
391 143/143 [=====] - 0s
    616us/step - loss: 0.0742 - accuracy: 0.9013
392 Epoch 188/350
393 143/143 [=====] - 0s
    785us/step - loss: 0.0743 - accuracy: 0.8938
394 Epoch 189/350
395 143/143 [=====] - 0s
    616us/step - loss: 0.0746 - accuracy: 0.8971
396 Epoch 190/350
397 143/143 [=====] - 0s
    678us/step - loss: 0.0724 - accuracy: 0.8920
398 Epoch 191/350
399 143/143 [=====] - 0s
    639us/step - loss: 0.0742 - accuracy: 0.8957
400 Epoch 192/350
401 143/143 [=====] - 0s
    643us/step - loss: 0.0750 - accuracy: 0.8952
402 Epoch 193/350
403 143/143 [=====] - 0s
    698us/step - loss: 0.0715 - accuracy: 0.9004
```

```
404 Epoch 194/350
405 143/143 [=====] - 0s
    618us/step - loss: 0.0708 - accuracy: 0.8980
406 Epoch 195/350
407 143/143 [=====] - 0s
    756us/step - loss: 0.0762 - accuracy: 0.8873
408 Epoch 196/350
409 143/143 [=====] - 0s
    628us/step - loss: 0.0757 - accuracy: 0.8920
410 Epoch 197/350
411 143/143 [=====] - 0s
    648us/step - loss: 0.0739 - accuracy: 0.8966
412 Epoch 198/350
413 143/143 [=====] - 0s
    653us/step - loss: 0.0737 - accuracy: 0.8938
414 Epoch 199/350
415 143/143 [=====] - 0s
    632us/step - loss: 0.0722 - accuracy: 0.8948
416 Epoch 200/350
417 143/143 [=====] - 0s
    734us/step - loss: 0.0737 - accuracy: 0.8920
418 Epoch 201/350
419 143/143 [=====] - 0s
    651us/step - loss: 0.0730 - accuracy: 0.8994
420 Epoch 202/350
421 143/143 [=====] - 0s
    654us/step - loss: 0.0701 - accuracy: 0.9032
422 Epoch 203/350
423 143/143 [=====] - 0s
    647us/step - loss: 0.0701 - accuracy: 0.8994
424 Epoch 204/350
425 143/143 [=====] - 0s
    660us/step - loss: 0.0698 - accuracy: 0.9022
426 Epoch 205/350
427 143/143 [=====] - 0s
    650us/step - loss: 0.0697 - accuracy: 0.9008
428 Epoch 206/350
429 143/143 [=====] - 0s
    639us/step - loss: 0.0725 - accuracy: 0.8957
430 Epoch 207/350
431 143/143 [=====] - 0s
    737us/step - loss: 0.0740 - accuracy: 0.8980
432 Epoch 208/350
433 143/143 [=====] - 0s
```

```
433 620us/step - loss: 0.0737 - accuracy: 0.8957
434 Epoch 209/350
435 143/143 [=====] - 0s
    651us/step - loss: 0.0687 - accuracy: 0.9027
436 Epoch 210/350
437 143/143 [=====] - 0s
    650us/step - loss: 0.0733 - accuracy: 0.8962
438 Epoch 211/350
439 143/143 [=====] - 0s
    638us/step - loss: 0.0683 - accuracy: 0.9102
440 Epoch 212/350
441 143/143 [=====] - 0s
    731us/step - loss: 0.0708 - accuracy: 0.8999
442 Epoch 213/350
443 143/143 [=====] - 0s
    620us/step - loss: 0.0696 - accuracy: 0.8994
444 Epoch 214/350
445 143/143 [=====] - 0s
    656us/step - loss: 0.0701 - accuracy: 0.8971
446 Epoch 215/350
447 143/143 [=====] - 0s
    655us/step - loss: 0.0686 - accuracy: 0.9079
448 Epoch 216/350
449 143/143 [=====] - 0s
    637us/step - loss: 0.0693 - accuracy: 0.9036
450 Epoch 217/350
451 143/143 [=====] - 0s
    737us/step - loss: 0.0722 - accuracy: 0.8990
452 Epoch 218/350
453 143/143 [=====] - 0s
    623us/step - loss: 0.0660 - accuracy: 0.9093
454 Epoch 219/350
455 143/143 [=====] - 0s
    653us/step - loss: 0.0712 - accuracy: 0.9060
456 Epoch 220/350
457 143/143 [=====] - 0s
    654us/step - loss: 0.0682 - accuracy: 0.9036
458 Epoch 221/350
459 143/143 [=====] - 0s
    616us/step - loss: 0.0687 - accuracy: 0.9060
460 Epoch 222/350
461 143/143 [=====] - 0s
    759us/step - loss: 0.0694 - accuracy: 0.9027
462 Epoch 223/350
```

```
463 143/143 [=====] - 0s
    624us/step - loss: 0.0670 - accuracy: 0.9060
464 Epoch 224/350
465 143/143 [=====] - 0s
    652us/step - loss: 0.0714 - accuracy: 0.8966
466 Epoch 225/350
467 143/143 [=====] - 0s
    655us/step - loss: 0.0696 - accuracy: 0.9060
468 Epoch 226/350
469 143/143 [=====] - 0s
    611us/step - loss: 0.0704 - accuracy: 0.9013
470 Epoch 227/350
471 143/143 [=====] - 0s
    767us/step - loss: 0.0669 - accuracy: 0.9074
472 Epoch 228/350
473 143/143 [=====] - 0s
    621us/step - loss: 0.0671 - accuracy: 0.9069
474 Epoch 229/350
475 143/143 [=====] - 0s
    648us/step - loss: 0.0673 - accuracy: 0.9069
476 Epoch 230/350
477 143/143 [=====] - 0s
    654us/step - loss: 0.0686 - accuracy: 0.9065
478 Epoch 231/350
479 143/143 [=====] - 0s
    651us/step - loss: 0.0680 - accuracy: 0.9008
480 Epoch 232/350
481 143/143 [=====] - 0s
    675us/step - loss: 0.0687 - accuracy: 0.9036
482 Epoch 233/350
483 143/143 [=====] - 0s
    616us/step - loss: 0.0663 - accuracy: 0.9135
484 Epoch 234/350
485 143/143 [=====] - 0s
    736us/step - loss: 0.0665 - accuracy: 0.9032
486 Epoch 235/350
487 143/143 [=====] - 0s
    668us/step - loss: 0.0699 - accuracy: 0.8980
488 Epoch 236/350
489 143/143 [=====] - 0s
    652us/step - loss: 0.0679 - accuracy: 0.9036
490 Epoch 237/350
491 143/143 [=====] - 0s
    663us/step - loss: 0.0669 - accuracy: 0.9093
```

```
492 Epoch 238/350
493 143/143 [=====] - 0s
    658us/step - loss: 0.0702 - accuracy: 0.8952
494 Epoch 239/350
495 143/143 [=====] - 0s
    669us/step - loss: 0.0640 - accuracy: 0.9130
496 Epoch 240/350
497 143/143 [=====] - 0s
    598us/step - loss: 0.0658 - accuracy: 0.9055
498 Epoch 241/350
499 143/143 [=====] - 0s
    772us/step - loss: 0.0658 - accuracy: 0.9121
500 Epoch 242/350
501 143/143 [=====] - 0s
    674us/step - loss: 0.0656 - accuracy: 0.9111
502 Epoch 243/350
503 143/143 [=====] - 0s
    671us/step - loss: 0.0653 - accuracy: 0.9088
504 Epoch 244/350
505 143/143 [=====] - 0s
    650us/step - loss: 0.0646 - accuracy: 0.9069
506 Epoch 245/350
507 143/143 [=====] - 0s
    648us/step - loss: 0.0632 - accuracy: 0.9139
508 Epoch 246/350
509 143/143 [=====] - 0s
    658us/step - loss: 0.0653 - accuracy: 0.9093
510 Epoch 247/350
511 143/143 [=====] - 0s
    613us/step - loss: 0.0678 - accuracy: 0.9051
512 Epoch 248/350
513 143/143 [=====] - 0s
    794us/step - loss: 0.0641 - accuracy: 0.9121
514 Epoch 249/350
515 143/143 [=====] - 0s
    623us/step - loss: 0.0635 - accuracy: 0.9149
516 Epoch 250/350
517 143/143 [=====] - 0s
    648us/step - loss: 0.0646 - accuracy: 0.9046
518 Epoch 251/350
519 143/143 [=====] - 0s
    648us/step - loss: 0.0652 - accuracy: 0.9111
520 Epoch 252/350
521 143/143 [=====] - 0s
```

```
521 656us/step - loss: 0.0653 - accuracy: 0.9074
522 Epoch 253/350
523 143/143 [=====] - 0s
    665us/step - loss: 0.0642 - accuracy: 0.9088
524 Epoch 254/350
525 143/143 [=====] - 0s
    614us/step - loss: 0.0626 - accuracy: 0.9097
526 Epoch 255/350
527 143/143 [=====] - 0s
    717us/step - loss: 0.0666 - accuracy: 0.9116
528 Epoch 256/350
529 143/143 [=====] - 0s
    645us/step - loss: 0.0659 - accuracy: 0.9041
530 Epoch 257/350
531 143/143 [=====] - 0s
    686us/step - loss: 0.0665 - accuracy: 0.9083
532 Epoch 258/350
533 143/143 [=====] - 0s
    676us/step - loss: 0.0638 - accuracy: 0.9093
534 Epoch 259/350
535 143/143 [=====] - 0s
    614us/step - loss: 0.0622 - accuracy: 0.9055
536 Epoch 260/350
537 143/143 [=====] - 0s
    774us/step - loss: 0.0640 - accuracy: 0.9093
538 Epoch 261/350
539 143/143 [=====] - 0s
    618us/step - loss: 0.0618 - accuracy: 0.9135
540 Epoch 262/350
541 143/143 [=====] - 0s
    650us/step - loss: 0.0649 - accuracy: 0.9088
542 Epoch 263/350
543 143/143 [=====] - 0s
    683us/step - loss: 0.0635 - accuracy: 0.9125
544 Epoch 264/350
545 143/143 [=====] - 0s
    652us/step - loss: 0.0635 - accuracy: 0.9125
546 Epoch 265/350
547 143/143 [=====] - 0s
    649us/step - loss: 0.0635 - accuracy: 0.9107
548 Epoch 266/350
549 143/143 [=====] - 0s
    601us/step - loss: 0.0622 - accuracy: 0.9116
550 Epoch 267/350
```

```
551 143/143 [=====] - 0s
    779us/step - loss: 0.0662 - accuracy: 0.9051
552 Epoch 268/350
553 143/143 [=====] - 0s
    659us/step - loss: 0.0615 - accuracy: 0.9167
554 Epoch 269/350
555 143/143 [=====] - 0s
    653us/step - loss: 0.0613 - accuracy: 0.9172
556 Epoch 270/350
557 143/143 [=====] - 0s
    653us/step - loss: 0.0632 - accuracy: 0.9139
558 Epoch 271/350
559 143/143 [=====] - 0s
    655us/step - loss: 0.0626 - accuracy: 0.9135
560 Epoch 272/350
561 143/143 [=====] - 0s
    651us/step - loss: 0.0647 - accuracy: 0.9135
562 Epoch 273/350
563 143/143 [=====] - 0s
    613us/step - loss: 0.0625 - accuracy: 0.9079
564 Epoch 274/350
565 143/143 [=====] - 0s
    758us/step - loss: 0.0579 - accuracy: 0.9186
566 Epoch 275/350
567 143/143 [=====] - 0s
    630us/step - loss: 0.0644 - accuracy: 0.9158
568 Epoch 276/350
569 143/143 [=====] - 0s
    648us/step - loss: 0.0618 - accuracy: 0.9093
570 Epoch 277/350
571 143/143 [=====] - 0s
    646us/step - loss: 0.0600 - accuracy: 0.9224
572 Epoch 278/350
573 143/143 [=====] - 0s
    613us/step - loss: 0.0620 - accuracy: 0.9130
574 Epoch 279/350
575 143/143 [=====] - 0s
    768us/step - loss: 0.0626 - accuracy: 0.9158
576 Epoch 280/350
577 143/143 [=====] - 0s
    619us/step - loss: 0.0608 - accuracy: 0.9144
578 Epoch 281/350
579 143/143 [=====] - 0s
    650us/step - loss: 0.0643 - accuracy: 0.9065
```

```
580 Epoch 282/350
581 143/143 [=====] - 0s
    651us/step - loss: 0.0592 - accuracy: 0.9196
582 Epoch 283/350
583 143/143 [=====] - 0s
    648us/step - loss: 0.0582 - accuracy: 0.9200
584 Epoch 284/350
585 143/143 [=====] - 0s
    659us/step - loss: 0.0617 - accuracy: 0.9214
586 Epoch 285/350
587 143/143 [=====] - 0s
    627us/step - loss: 0.0607 - accuracy: 0.9163
588 Epoch 286/350
589 143/143 [=====] - 0s
    755us/step - loss: 0.0567 - accuracy: 0.9224
590 Epoch 287/350
591 143/143 [=====] - 0s
    619us/step - loss: 0.0592 - accuracy: 0.9247
592 Epoch 288/350
593 143/143 [=====] - 0s
    650us/step - loss: 0.0604 - accuracy: 0.9196
594 Epoch 289/350
595 143/143 [=====] - 0s
    673us/step - loss: 0.0569 - accuracy: 0.9247
596 Epoch 290/350
597 143/143 [=====] - 0s
    621us/step - loss: 0.0628 - accuracy: 0.9102
598 Epoch 291/350
599 143/143 [=====] - 0s
    736us/step - loss: 0.0575 - accuracy: 0.9205
600 Epoch 292/350
601 143/143 [=====] - 0s
    619us/step - loss: 0.0573 - accuracy: 0.9219
602 Epoch 293/350
603 143/143 [=====] - 0s
    654us/step - loss: 0.0596 - accuracy: 0.9139
604 Epoch 294/350
605 143/143 [=====] - 0s
    648us/step - loss: 0.0588 - accuracy: 0.9163
606 Epoch 295/350
607 143/143 [=====] - 0s
    640us/step - loss: 0.0581 - accuracy: 0.9191
608 Epoch 296/350
609 143/143 [=====] - 0s
```

```
609 738us/step - loss: 0.0631 - accuracy: 0.9116
610 Epoch 297/350
611 143/143 [=====] - 0s
    624us/step - loss: 0.0582 - accuracy: 0.9163
612 Epoch 298/350
613 143/143 [=====] - 0s
    648us/step - loss: 0.0593 - accuracy: 0.9093
614 Epoch 299/350
615 143/143 [=====] - 0s
    648us/step - loss: 0.0579 - accuracy: 0.9200
616 Epoch 300/350
617 143/143 [=====] - 0s
    642us/step - loss: 0.0567 - accuracy: 0.9210
618 Epoch 301/350
619 143/143 [=====] - 0s
    720us/step - loss: 0.0594 - accuracy: 0.9158
620 Epoch 302/350
621 143/143 [=====] - 0s
    651us/step - loss: 0.0588 - accuracy: 0.9172
622 Epoch 303/350
623 143/143 [=====] - 0s
    670us/step - loss: 0.0571 - accuracy: 0.9167
624 Epoch 304/350
625 143/143 [=====] - 0s
    645us/step - loss: 0.0582 - accuracy: 0.9153
626 Epoch 305/350
627 143/143 [=====] - 0s
    621us/step - loss: 0.0570 - accuracy: 0.9200
628 Epoch 306/350
629 143/143 [=====] - 0s
    785us/step - loss: 0.0599 - accuracy: 0.9163
630 Epoch 307/350
631 143/143 [=====] - 0s
    627us/step - loss: 0.0598 - accuracy: 0.9074
632 Epoch 308/350
633 143/143 [=====] - 0s
    631us/step - loss: 0.0570 - accuracy: 0.9196
634 Epoch 309/350
635 143/143 [=====] - 0s
    633us/step - loss: 0.0541 - accuracy: 0.9256
636 Epoch 310/350
637 143/143 [=====] - 0s
    691us/step - loss: 0.0560 - accuracy: 0.9196
638 Epoch 311/350
```

```
639 143/143 [=====] - 0s
    659us/step - loss: 0.0599 - accuracy: 0.9191
640 Epoch 312/350
641 143/143 [=====] - 0s
    613us/step - loss: 0.0539 - accuracy: 0.9289
642 Epoch 313/350
643 143/143 [=====] - 0s
    779us/step - loss: 0.0578 - accuracy: 0.9261
644 Epoch 314/350
645 143/143 [=====] - 0s
    615us/step - loss: 0.0551 - accuracy: 0.9228
646 Epoch 315/350
647 143/143 [=====] - 0s
    673us/step - loss: 0.0560 - accuracy: 0.9233
648 Epoch 316/350
649 143/143 [=====] - 0s
    649us/step - loss: 0.0538 - accuracy: 0.9261
650 Epoch 317/350
651 143/143 [=====] - 0s
    634us/step - loss: 0.0544 - accuracy: 0.9256
652 Epoch 318/350
653 143/143 [=====] - 0s
    630us/step - loss: 0.0589 - accuracy: 0.9158
654 Epoch 319/350
655 143/143 [=====] - 0s
    601us/step - loss: 0.0527 - accuracy: 0.9242
656 Epoch 320/350
657 143/143 [=====] - 0s
    743us/step - loss: 0.0545 - accuracy: 0.9224
658 Epoch 321/350
659 143/143 [=====] - 0s
    684us/step - loss: 0.0535 - accuracy: 0.9238
660 Epoch 322/350
661 143/143 [=====] - 0s
    653us/step - loss: 0.0538 - accuracy: 0.9210
662 Epoch 323/350
663 143/143 [=====] - 0s
    651us/step - loss: 0.0584 - accuracy: 0.9196
664 Epoch 324/350
665 143/143 [=====] - 0s
    658us/step - loss: 0.0563 - accuracy: 0.9219
666 Epoch 325/350
667 143/143 [=====] - 0s
    648us/step - loss: 0.0534 - accuracy: 0.9233
```

```
668 Epoch 326/350
669 143/143 [=====] - 0s
    644us/step - loss: 0.0591 - accuracy: 0.9177
670 Epoch 327/350
671 143/143 [=====] - 0s
    722us/step - loss: 0.0550 - accuracy: 0.9238
672 Epoch 328/350
673 143/143 [=====] - 0s
    685us/step - loss: 0.0534 - accuracy: 0.9266
674 Epoch 329/350
675 143/143 [=====] - 0s
    684us/step - loss: 0.0560 - accuracy: 0.9196
676 Epoch 330/350
677 143/143 [=====] - 0s
    659us/step - loss: 0.0553 - accuracy: 0.9284
678 Epoch 331/350
679 143/143 [=====] - 0s
    675us/step - loss: 0.0543 - accuracy: 0.9242
680 Epoch 332/350
681 143/143 [=====] - 0s
    648us/step - loss: 0.0548 - accuracy: 0.9252
682 Epoch 333/350
683 143/143 [=====] - 0s
    615us/step - loss: 0.0582 - accuracy: 0.9186
684 Epoch 334/350
685 143/143 [=====] - 0s
    717us/step - loss: 0.0571 - accuracy: 0.9177
686 Epoch 335/350
687 143/143 [=====] - 0s
    619us/step - loss: 0.0552 - accuracy: 0.9210
688 Epoch 336/350
689 143/143 [=====] - 0s
    720us/step - loss: 0.0555 - accuracy: 0.9247
690 Epoch 337/350
691 143/143 [=====] - 0s
    662us/step - loss: 0.0555 - accuracy: 0.9205
692 Epoch 338/350
693 143/143 [=====] - 0s
    614us/step - loss: 0.0535 - accuracy: 0.9233
694 Epoch 339/350
695 143/143 [=====] - 0s
    734us/step - loss: 0.0520 - accuracy: 0.9298
696 Epoch 340/350
697 143/143 [=====] - 0s
```

```
697 608us/step - loss: 0.0512 - accuracy: 0.9294
698 Epoch 341/350
699 143/143 [=====] - 0s
    623us/step - loss: 0.0570 - accuracy: 0.9200
700 Epoch 342/350
701 143/143 [=====] - 0s
    659us/step - loss: 0.0530 - accuracy: 0.9303
702 Epoch 343/350
703 143/143 [=====] - 0s
    596us/step - loss: 0.0528 - accuracy: 0.9252
704 Epoch 344/350
705 143/143 [=====] - 0s
    758us/step - loss: 0.0537 - accuracy: 0.9242
706 Epoch 345/350
707 143/143 [=====] - 0s
    654us/step - loss: 0.0505 - accuracy: 0.9280
708 Epoch 346/350
709 143/143 [=====] - 0s
    649us/step - loss: 0.0523 - accuracy: 0.9242
710 Epoch 347/350
711 143/143 [=====] - 0s
    670us/step - loss: 0.0529 - accuracy: 0.9322
712 Epoch 348/350
713 143/143 [=====] - 0s
    655us/step - loss: 0.0521 - accuracy: 0.9270
714 Epoch 349/350
715 143/143 [=====] - 0s
    653us/step - loss: 0.0537 - accuracy: 0.9266
716 Epoch 350/350
717 143/143 [=====] - 0s
    614us/step - loss: 0.0506 - accuracy: 0.9298
718 WARNING:tensorflow:From /Library/Frameworks/Python
.framework/Versions/3.8/lib/python3.8/site-
packages/tensorflow/python/training/tracking/
tracking.py:111: Model.state_updates (from
tensorflow.python.keras.engine.training) is
deprecated and will be removed in a future version
.
719 Instructions for updating:
720 This property should not be used in TensorFlow 2.0
, as updates are applied automatically.
721 2020-09-03 19:15:08.023494: W tensorflow/python/
util/util.cc:348] Sets are not currently
considered sequences, but this may change in the
```

```
721 future, so consider avoiding using them.  
722 WARNING:tensorflow:From /Library/Frameworks/Python  
.framework/Versions/3.8/lib/python3.8/site-  
packages/tensorflow/python/training/tracking/  
tracking.py:111: Layer.updates (from tensorflow.  
python.keras.engine.base_layer) is deprecated and  
will be removed in a future version.  
723 Instructions for updating:  
724 This property should not be used in TensorFlow 2.0  
, as updates are applied automatically.  
725  
726 Process finished with exit code 0  
727
```