

```
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 18:15:17.286085: 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 18:15:17.295572: I tensorflow/compiler/
  xla/service/service.cc:168] XLA service
  0x7fc89bf778c0 initialized for platform Host (this
  does not guarantee that XLA will be used). Devices:
8 2020-09-03 18:15:17.295600: 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 1/150
19 214/214 [=====] - 0s 563us
  /step - loss: 1.6807 - accuracy: 0.3414
20 Epoch 2/150
21 214/214 [=====] - 0s 571us
  /step - loss: 1.2898 - accuracy: 0.5225
22 Epoch 3/150
```

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23 214/214 [=====] - 0s 568us
  /step - loss: 0.9294 - accuracy: 0.6815
24 Epoch 4/150
25 214/214 [=====] - 0s 570us
  /step - loss: 0.7645 - accuracy: 0.7362
26 Epoch 5/150
27 214/214 [=====] - 0s 552us
  /step - loss: 0.6828 - accuracy: 0.7601
28 Epoch 6/150
29 214/214 [=====] - 0s 558us
  /step - loss: 0.6426 - accuracy: 0.7774
30 Epoch 7/150
31 214/214 [=====] - 0s 683us
  /step - loss: 0.6198 - accuracy: 0.7774
32 Epoch 8/150
33 214/214 [=====] - 0s 620us
  /step - loss: 0.6126 - accuracy: 0.7820
34 Epoch 9/150
35 214/214 [=====] - 0s 551us
  /step - loss: 0.5944 - accuracy: 0.7853
36 Epoch 10/150
37 214/214 [=====] - 0s 575us
  /step - loss: 0.5853 - accuracy: 0.7862
38 Epoch 11/150
39 214/214 [=====] - 0s 546us
  /step - loss: 0.5727 - accuracy: 0.7970
40 Epoch 12/150
41 214/214 [=====] - 0s 596us
  /step - loss: 0.5776 - accuracy: 0.7942
42 Epoch 13/150
43 214/214 [=====] - 0s 540us
  /step - loss: 0.5546 - accuracy: 0.8036
44 Epoch 14/150
45 214/214 [=====] - 0s 559us
  /step - loss: 0.5486 - accuracy: 0.8007
46 Epoch 15/150
47 214/214 [=====] - 0s 533us
  /step - loss: 0.5430 - accuracy: 0.8078
48 Epoch 16/150
49 214/214 [=====] - 0s 584us
  /step - loss: 0.5365 - accuracy: 0.8064
50 Epoch 17/150
51 214/214 [=====] - 0s 532us
  /step - loss: 0.5238 - accuracy: 0.8078
```

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52 Epoch 18/150
53 214/214 [=====] - 0s 561us
    /step - loss: 0.5306 - accuracy: 0.8068
54 Epoch 19/150
55 214/214 [=====] - 0s 534us
    /step - loss: 0.5274 - accuracy: 0.8120
56 Epoch 20/150
57 214/214 [=====] - 0s 571us
    /step - loss: 0.5212 - accuracy: 0.8078
58 Epoch 21/150
59 214/214 [=====] - 0s 573us
    /step - loss: 0.5132 - accuracy: 0.8134
60 Epoch 22/150
61 214/214 [=====] - 0s 583us
    /step - loss: 0.5105 - accuracy: 0.8148
62 Epoch 23/150
63 214/214 [=====] - 0s 538us
    /step - loss: 0.5098 - accuracy: 0.8124
64 Epoch 24/150
65 214/214 [=====] - 0s 571us
    /step - loss: 0.5111 - accuracy: 0.8078
66 Epoch 25/150
67 214/214 [=====] - 0s 536us
    /step - loss: 0.5033 - accuracy: 0.8110
68 Epoch 26/150
69 214/214 [=====] - 0s 566us
    /step - loss: 0.4960 - accuracy: 0.8195
70 Epoch 27/150
71 214/214 [=====] - 0s 532us
    /step - loss: 0.4911 - accuracy: 0.8204
72 Epoch 28/150
73 214/214 [=====] - 0s 570us
    /step - loss: 0.4918 - accuracy: 0.8227
74 Epoch 29/150
75 214/214 [=====] - 0s 539us
    /step - loss: 0.4825 - accuracy: 0.8237
76 Epoch 30/150
77 214/214 [=====] - 0s 562us
    /step - loss: 0.4932 - accuracy: 0.8190
78 Epoch 31/150
79 214/214 [=====] - 0s 534us
    /step - loss: 0.4750 - accuracy: 0.8340
80 Epoch 32/150
81 214/214 [=====] - 0s 572us
```

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81 /step - loss: 0.4765 - accuracy: 0.8307
82 Epoch 33/150
83 214/214 [=====] - 0s
533us/step - loss: 0.4767 - accuracy: 0.8293
84 Epoch 34/150
85 214/214 [=====] - 0s
560us/step - loss: 0.4705 - accuracy: 0.8344
86 Epoch 35/150
87 214/214 [=====] - 0s
535us/step - loss: 0.4785 - accuracy: 0.8316
88 Epoch 36/150
89 214/214 [=====] - 0s
563us/step - loss: 0.4706 - accuracy: 0.8274
90 Epoch 37/150
91 214/214 [=====] - 0s
550us/step - loss: 0.4746 - accuracy: 0.8321
92 Epoch 38/150
93 214/214 [=====] - 0s
600us/step - loss: 0.4710 - accuracy: 0.8255
94 Epoch 39/150
95 214/214 [=====] - 0s
550us/step - loss: 0.4557 - accuracy: 0.8368
96 Epoch 40/150
97 214/214 [=====] - 0s
571us/step - loss: 0.4616 - accuracy: 0.8358
98 Epoch 41/150
99 214/214 [=====] - 0s
584us/step - loss: 0.4620 - accuracy: 0.8307
100 Epoch 42/150
101 214/214 [=====] - 0s
598us/step - loss: 0.4557 - accuracy: 0.8297
102 Epoch 43/150
103 214/214 [=====] - 0s
532us/step - loss: 0.4650 - accuracy: 0.8368
104 Epoch 44/150
105 214/214 [=====] - 0s
562us/step - loss: 0.4484 - accuracy: 0.8428
106 Epoch 45/150
107 214/214 [=====] - 0s
543us/step - loss: 0.4455 - accuracy: 0.8410
108 Epoch 46/150
109 214/214 [=====] - 0s
561us/step - loss: 0.4432 - accuracy: 0.8335
110 Epoch 47/150
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111 214/214 [=====] - 0s
    535us/step - loss: 0.4444 - accuracy: 0.8433
112 Epoch 48/150
113 214/214 [=====] - 0s
    565us/step - loss: 0.4617 - accuracy: 0.8312
114 Epoch 49/150
115 214/214 [=====] - 0s
    543us/step - loss: 0.4404 - accuracy: 0.8382
116 Epoch 50/150
117 214/214 [=====] - 0s
    604us/step - loss: 0.4496 - accuracy: 0.8410
118 Epoch 51/150
119 214/214 [=====] - 0s
    531us/step - loss: 0.4495 - accuracy: 0.8340
120 Epoch 52/150
121 214/214 [=====] - 0s
    593us/step - loss: 0.4391 - accuracy: 0.8438
122 Epoch 53/150
123 214/214 [=====] - 0s
    568us/step - loss: 0.4377 - accuracy: 0.8377
124 Epoch 54/150
125 214/214 [=====] - 0s
    576us/step - loss: 0.4313 - accuracy: 0.8442
126 Epoch 55/150
127 214/214 [=====] - 0s
    532us/step - loss: 0.4396 - accuracy: 0.8471
128 Epoch 56/150
129 214/214 [=====] - 0s
    561us/step - loss: 0.4335 - accuracy: 0.8475
130 Epoch 57/150
131 214/214 [=====] - 0s
    548us/step - loss: 0.4383 - accuracy: 0.8461
132 Epoch 58/150
133 214/214 [=====] - 0s
    564us/step - loss: 0.4326 - accuracy: 0.8414
134 Epoch 59/150
135 214/214 [=====] - 0s
    530us/step - loss: 0.4406 - accuracy: 0.8419
136 Epoch 60/150
137 214/214 [=====] - 0s
    565us/step - loss: 0.4267 - accuracy: 0.8438
138 Epoch 61/150
139 214/214 [=====] - 0s
    540us/step - loss: 0.4344 - accuracy: 0.8447
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140 Epoch 62/150
141 214/214 [=====] - 0s
    567us/step - loss: 0.4171 - accuracy: 0.8494
142 Epoch 63/150
143 214/214 [=====] - 0s
    530us/step - loss: 0.4246 - accuracy: 0.8480
144 Epoch 64/150
145 214/214 [=====] - 0s
    567us/step - loss: 0.4182 - accuracy: 0.8466
146 Epoch 65/150
147 214/214 [=====] - 0s
    534us/step - loss: 0.4248 - accuracy: 0.8405
148 Epoch 66/150
149 214/214 [=====] - 0s
    576us/step - loss: 0.4178 - accuracy: 0.8471
150 Epoch 67/150
151 214/214 [=====] - 0s
    536us/step - loss: 0.4140 - accuracy: 0.8489
152 Epoch 68/150
153 214/214 [=====] - 0s
    566us/step - loss: 0.4176 - accuracy: 0.8499
154 Epoch 69/150
155 214/214 [=====] - 0s
    535us/step - loss: 0.4139 - accuracy: 0.8555
156 Epoch 70/150
157 214/214 [=====] - 0s
    608us/step - loss: 0.4132 - accuracy: 0.8513
158 Epoch 71/150
159 214/214 [=====] - 0s
    544us/step - loss: 0.4024 - accuracy: 0.8541
160 Epoch 72/150
161 214/214 [=====] - 0s
    571us/step - loss: 0.4200 - accuracy: 0.8494
162 Epoch 73/150
163 214/214 [=====] - 0s
    530us/step - loss: 0.4022 - accuracy: 0.8489
164 Epoch 74/150
165 214/214 [=====] - 0s
    572us/step - loss: 0.4032 - accuracy: 0.8555
166 Epoch 75/150
167 214/214 [=====] - 0s
    534us/step - loss: 0.4145 - accuracy: 0.8480
168 Epoch 76/150
169 214/214 [=====] - 0s
```

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169 563us/step - loss: 0.4093 - accuracy: 0.8508
170 Epoch 77/150
171 214/214 [=====] - 0s
    529us/step - loss: 0.4009 - accuracy: 0.8573
172 Epoch 78/150
173 214/214 [=====] - 0s
    568us/step - loss: 0.3957 - accuracy: 0.8564
174 Epoch 79/150
175 214/214 [=====] - 0s
    532us/step - loss: 0.4019 - accuracy: 0.8522
176 Epoch 80/150
177 214/214 [=====] - 0s
    587us/step - loss: 0.4051 - accuracy: 0.8587
178 Epoch 81/150
179 214/214 [=====] - 0s
    539us/step - loss: 0.3947 - accuracy: 0.8564
180 Epoch 82/150
181 214/214 [=====] - 0s
    595us/step - loss: 0.3894 - accuracy: 0.8583
182 Epoch 83/150
183 214/214 [=====] - 0s
    548us/step - loss: 0.3937 - accuracy: 0.8606
184 Epoch 84/150
185 214/214 [=====] - 0s
    562us/step - loss: 0.3973 - accuracy: 0.8601
186 Epoch 85/150
187 214/214 [=====] - 0s
    531us/step - loss: 0.3980 - accuracy: 0.8620
188 Epoch 86/150
189 214/214 [=====] - 0s
    573us/step - loss: 0.3840 - accuracy: 0.8550
190 Epoch 87/150
191 214/214 [=====] - 0s
    533us/step - loss: 0.3926 - accuracy: 0.8620
192 Epoch 88/150
193 214/214 [=====] - 0s
    576us/step - loss: 0.3901 - accuracy: 0.8592
194 Epoch 89/150
195 214/214 [=====] - 0s
    532us/step - loss: 0.3975 - accuracy: 0.8531
196 Epoch 90/150
197 214/214 [=====] - 0s
    561us/step - loss: 0.3832 - accuracy: 0.8625
198 Epoch 91/150
```

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199 214/214 [=====] - 0s
    543us/step - loss: 0.3929 - accuracy: 0.8569
200 Epoch 92/150
201 214/214 [=====] - 0s
    562us/step - loss: 0.3866 - accuracy: 0.8578
202 Epoch 93/150
203 214/214 [=====] - 0s
    528us/step - loss: 0.3920 - accuracy: 0.8485
204 Epoch 94/150
205 214/214 [=====] - 0s
    560us/step - loss: 0.3805 - accuracy: 0.8653
206 Epoch 95/150
207 214/214 [=====] - 0s
    543us/step - loss: 0.3821 - accuracy: 0.8709
208 Epoch 96/150
209 214/214 [=====] - 0s
    561us/step - loss: 0.3857 - accuracy: 0.8597
210 Epoch 97/150
211 214/214 [=====] - 0s
    527us/step - loss: 0.3795 - accuracy: 0.8630
212 Epoch 98/150
213 214/214 [=====] - 0s
    562us/step - loss: 0.3813 - accuracy: 0.8611
214 Epoch 99/150
215 214/214 [=====] - 0s
    540us/step - loss: 0.3766 - accuracy: 0.8644
216 Epoch 100/150
217 214/214 [=====] - 0s
    561us/step - loss: 0.3820 - accuracy: 0.8545
218 Epoch 101/150
219 214/214 [=====] - 0s
    530us/step - loss: 0.3752 - accuracy: 0.8653
220 Epoch 102/150
221 214/214 [=====] - 0s
    562us/step - loss: 0.3864 - accuracy: 0.8583
222 Epoch 103/150
223 214/214 [=====] - 0s
    539us/step - loss: 0.3709 - accuracy: 0.8625
224 Epoch 104/150
225 214/214 [=====] - 0s
    570us/step - loss: 0.3645 - accuracy: 0.8620
226 Epoch 105/150
227 214/214 [=====] - 0s
    528us/step - loss: 0.3735 - accuracy: 0.8616
```

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228 Epoch 106/150
229 214/214 [=====] - 0s
      568us/step - loss: 0.3776 - accuracy: 0.8601
230 Epoch 107/150
231 214/214 [=====] - 0s
      533us/step - loss: 0.3669 - accuracy: 0.8648
232 Epoch 108/150
233 214/214 [=====] - 0s
      571us/step - loss: 0.3821 - accuracy: 0.8592
234 Epoch 109/150
235 214/214 [=====] - 0s
      530us/step - loss: 0.3663 - accuracy: 0.8690
236 Epoch 110/150
237 214/214 [=====] - 0s
      559us/step - loss: 0.3627 - accuracy: 0.8709
238 Epoch 111/150
239 214/214 [=====] - 0s
      529us/step - loss: 0.3649 - accuracy: 0.8630
240 Epoch 112/150
241 214/214 [=====] - 0s
      578us/step - loss: 0.3730 - accuracy: 0.8639
242 Epoch 113/150
243 214/214 [=====] - 0s
      529us/step - loss: 0.3645 - accuracy: 0.8620
244 Epoch 114/150
245 214/214 [=====] - 0s
      561us/step - loss: 0.3637 - accuracy: 0.8658
246 Epoch 115/150
247 214/214 [=====] - 0s
      531us/step - loss: 0.3567 - accuracy: 0.8714
248 Epoch 116/150
249 214/214 [=====] - 0s
      570us/step - loss: 0.3590 - accuracy: 0.8690
250 Epoch 117/150
251 214/214 [=====] - 0s
      532us/step - loss: 0.3598 - accuracy: 0.8648
252 Epoch 118/150
253 214/214 [=====] - 0s
      593us/step - loss: 0.3685 - accuracy: 0.8686
254 Epoch 119/150
255 214/214 [=====] - 0s
      535us/step - loss: 0.3470 - accuracy: 0.8700
256 Epoch 120/150
257 214/214 [=====] - 0s
```

```
257 580us/step - loss: 0.3663 - accuracy: 0.8672
258 Epoch 121/150
259 214/214 [=====] - 0s
    528us/step - loss: 0.3605 - accuracy: 0.8587
260 Epoch 122/150
261 214/214 [=====] - 0s
    558us/step - loss: 0.3603 - accuracy: 0.8672
262 Epoch 123/150
263 214/214 [=====] - 0s
    528us/step - loss: 0.3626 - accuracy: 0.8625
264 Epoch 124/150
265 214/214 [=====] - 0s
    571us/step - loss: 0.3518 - accuracy: 0.8686
266 Epoch 125/150
267 214/214 [=====] - 0s
    533us/step - loss: 0.3502 - accuracy: 0.8681
268 Epoch 126/150
269 214/214 [=====] - 0s
    563us/step - loss: 0.3537 - accuracy: 0.8681
270 Epoch 127/150
271 214/214 [=====] - 0s
    528us/step - loss: 0.3643 - accuracy: 0.8714
272 Epoch 128/150
273 214/214 [=====] - 0s
    564us/step - loss: 0.3483 - accuracy: 0.8751
274 Epoch 129/150
275 214/214 [=====] - 0s
    541us/step - loss: 0.3488 - accuracy: 0.8742
276 Epoch 130/150
277 214/214 [=====] - 0s
    560us/step - loss: 0.3595 - accuracy: 0.8662
278 Epoch 131/150
279 214/214 [=====] - 0s
    530us/step - loss: 0.3690 - accuracy: 0.8578
280 Epoch 132/150
281 214/214 [=====] - 0s
    561us/step - loss: 0.3628 - accuracy: 0.8634
282 Epoch 133/150
283 214/214 [=====] - 0s
    544us/step - loss: 0.3651 - accuracy: 0.8644
284 Epoch 134/150
285 214/214 [=====] - 0s
    562us/step - loss: 0.3436 - accuracy: 0.8728
286 Epoch 135/150
```

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287 214/214 [=====] - 0s
    529us/step - loss: 0.3424 - accuracy: 0.8732
288 Epoch 136/150
289 214/214 [=====] - 0s
    566us/step - loss: 0.3428 - accuracy: 0.8765
290 Epoch 137/150
291 214/214 [=====] - 0s
    541us/step - loss: 0.3477 - accuracy: 0.8690
292 Epoch 138/150
293 214/214 [=====] - 0s
    596us/step - loss: 0.3390 - accuracy: 0.8718
294 Epoch 139/150
295 214/214 [=====] - 0s
    546us/step - loss: 0.3451 - accuracy: 0.8779
296 Epoch 140/150
297 214/214 [=====] - 0s
    566us/step - loss: 0.3444 - accuracy: 0.8789
298 Epoch 141/150
299 214/214 [=====] - 0s
    541us/step - loss: 0.3508 - accuracy: 0.8686
300 Epoch 142/150
301 214/214 [=====] - 0s
    562us/step - loss: 0.3420 - accuracy: 0.8765
302 Epoch 143/150
303 214/214 [=====] - 0s
    552us/step - loss: 0.3448 - accuracy: 0.8751
304 Epoch 144/150
305 214/214 [=====] - 0s
    574us/step - loss: 0.3606 - accuracy: 0.8662
306 Epoch 145/150
307 214/214 [=====] - 0s
    562us/step - loss: 0.3408 - accuracy: 0.8812
308 Epoch 146/150
309 214/214 [=====] - 0s
    570us/step - loss: 0.3398 - accuracy: 0.8704
310 Epoch 147/150
311 214/214 [=====] - 0s
    531us/step - loss: 0.3495 - accuracy: 0.8686
312 Epoch 148/150
313 214/214 [=====] - 0s
    586us/step - loss: 0.3400 - accuracy: 0.8709
314 Epoch 149/150
315 214/214 [=====] - 0s
    552us/step - loss: 0.3394 - accuracy: 0.8803
```

```
316 Epoch 150/150
317 214/214 [=====] - 0s
      578us/step - loss: 0.3492 - accuracy: 0.8751
318 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
            .
319 Instructions for updating:
320 This property should not be used in TensorFlow 2.0
            , as updates are applied automatically.
321 2020-09-03 18:15:35.862558: W tensorflow/python/
            util/util.cc:348] Sets are not currently
            considered sequences, but this may change in the
            future, so consider avoiding using them.
322 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.
323 Instructions for updating:
324 This property should not be used in TensorFlow 2.0
            , as updates are applied automatically.
325
326 Process finished with exit code 0
327
```