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1 60000 train samples
2 10000 test samples
3 2023-09-03 17:28:10.239827: I tensorflow/core/
  platform/cpu_feature_guard.cc:182] This TensorFlow
  binary is optimized to use available CPU instructions
  in performance-critical operations.
4 To enable the following instructions: SSE SSE2 SSE3
  SSE4.1 SSE4.2 AVX AVX2 AVX_VNNI FMA, in other
  operations, rebuild TensorFlow with the appropriate
  compiler flags.
5 Model: "sequential"
6 -----
  -----
7 Layer (type)                Output Shape
                                Param #
8 =====
  =====
9 dense (Dense)                (None, 512
  )                             401920
10
11 dropout (Dropout)           (None, 512
  )                             0
12
13 dense_1 (Dense)              (None, 512
  )                             262656
14
15 dropout_1 (Dropout)          (None, 512
  )                             0
16
17 dense_2 (Dense)              (None, 10
  )                             5130
18
19 =====
  =====
20 Total params: 669706 (2.55 MB)
21 Trainable params: 669706 (2.55 MB)

```

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22 Non-trainable params: 0 (0.00 Byte)
23 -----
24 Epoch 1/20
25 469/469 [=====] - 9s 17ms/
  step - loss: 0.2571 - accuracy: 0.9203 - val_loss: 0.
  1026 - val_accuracy: 0.9681
26 Epoch 2/20
27 469/469 [=====] - 8s 17ms/
  step - loss: 0.1045 - accuracy: 0.9681 - val_loss: 0.
  0848 - val_accuracy: 0.9753
28 Epoch 3/20
29 469/469 [=====] - 8s 18ms/
  step - loss: 0.0747 - accuracy: 0.9764 - val_loss: 0.
  0774 - val_accuracy: 0.9751
30 Epoch 4/20
31 469/469 [=====] - 9s 18ms/
  step - loss: 0.0605 - accuracy: 0.9815 - val_loss: 0.
  0655 - val_accuracy: 0.9805
32 Epoch 5/20
33 469/469 [=====] - 8s 18ms/
  step - loss: 0.0481 - accuracy: 0.9850 - val_loss: 0.
  0637 - val_accuracy: 0.9833
34 Epoch 6/20
35 469/469 [=====] - 9s 18ms/
  step - loss: 0.0422 - accuracy: 0.9863 - val_loss: 0.
  0701 - val_accuracy: 0.9805
36 Epoch 7/20
37 469/469 [=====] - 8s 18ms/
  step - loss: 0.0347 - accuracy: 0.9889 - val_loss: 0.
  0683 - val_accuracy: 0.9827
38 Epoch 8/20
39 469/469 [=====] - 9s 19ms/
  step - loss: 0.0295 - accuracy: 0.9908 - val_loss: 0.
  0643 - val_accuracy: 0.9843
40 Epoch 9/20
41 469/469 [=====] - 9s 18ms/
  step - loss: 0.0259 - accuracy: 0.9913 - val_loss: 0.
  0724 - val_accuracy: 0.9807
42 Epoch 10/20
43 469/469 [=====] - 9s 18ms/
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43 step - loss: 0.0222 - accuracy: 0.9929 - val_loss: 0.
    0779 - val_accuracy: 0.9827
44 Epoch 11/20
45 469/469 [=====] - 7s 16ms/
    step - loss: 0.0207 - accuracy: 0.9931 - val_loss: 0.
    0726 - val_accuracy: 0.9833
46 Epoch 12/20
47 469/469 [=====] - 8s 17ms/
    step - loss: 0.0190 - accuracy: 0.9938 - val_loss: 0.
    0732 - val_accuracy: 0.9841
48 Epoch 13/20
49 469/469 [=====] - 9s 20ms/
    step - loss: 0.0188 - accuracy: 0.9944 - val_loss: 0.
    0707 - val_accuracy: 0.9834
50 Epoch 14/20
51 469/469 [=====] - 9s 19ms/
    step - loss: 0.0144 - accuracy: 0.9952 - val_loss: 0.
    0719 - val_accuracy: 0.9846
52 Epoch 15/20
53 469/469 [=====] - 7s 15ms/
    step - loss: 0.0123 - accuracy: 0.9956 - val_loss: 0.
    0754 - val_accuracy: 0.9849
54 Epoch 16/20
55 469/469 [=====] - 8s 17ms/
    step - loss: 0.0141 - accuracy: 0.9954 - val_loss: 0.
    0742 - val_accuracy: 0.9841
56 Epoch 17/20
57 469/469 [=====] - 8s 16ms/
    step - loss: 0.0122 - accuracy: 0.9959 - val_loss: 0.
    0728 - val_accuracy: 0.9851
58 Epoch 18/20
59 469/469 [=====] - 7s 16ms/
    step - loss: 0.0119 - accuracy: 0.9960 - val_loss: 0.
    0763 - val_accuracy: 0.9847
60 Epoch 19/20
61 469/469 [=====] - 7s 16ms/
    step - loss: 0.0117 - accuracy: 0.9964 - val_loss: 0.
    0759 - val_accuracy: 0.9847
62 Epoch 20/20
63 469/469 [=====] - 9s 19ms/
    step - loss: 0.0092 - accuracy: 0.9969 - val_loss: 0.
```

```
63 0862 - val_accuracy: 0.9844
64 Test loss: 0.08621133118867874
65 Test accuracy: 0.9843999743461609
66
67 Process finished with exit code 0
68
```