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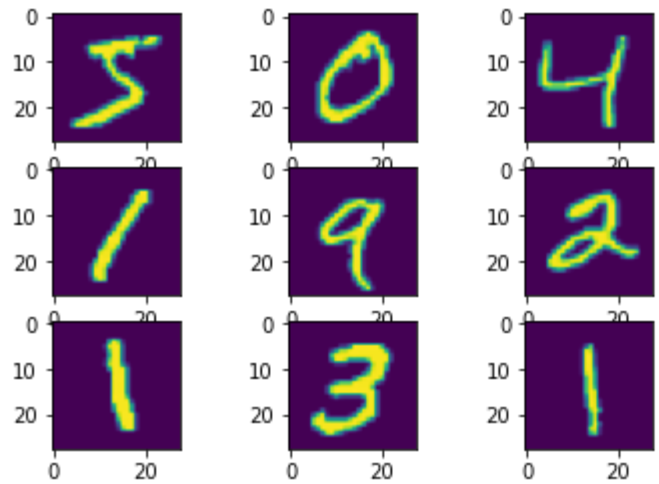
imports

```
import tensorflow as tf
from matplotlib import pyplot as plt
import numpy as np
```

```
objects = tf.keras.datasets.mnist
(training_images,training_label),(test_images, test_labels)=objects.load_data()
```

```
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-da
11493376/11490434 [==============================] - 0s 0us/step
11501568/11490434 [==============================] - 0s 0us/step
```

```
for i in range(9):
  plt.subplot(330+1+i)
  plt.imshow(training_images[i])
```



```
print(training_images.shape)
print(training_images[0])
```

```
(60000, 28, 28)
[[  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
    0   0   0   0   0   0   0   0   0   0]
 [  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
    0   0   0   0   0   0   0   0   0   0]
 [  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
    0   0   0   0   0   0   0   0   0   0]
 [  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
    0   0   0   0   0   0   0   0   0   0]
 [  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
    0   0   0   0   0   0   0   0   0   0]
 [  0   0   0   0   0   0   0   0   0   0   0   0   3  18  18  18 126 136
  175  26 166 255 247 127   0   0   0   0]
 [  0   0   0   0   0   0   0   0  30  36  94 154 170 253 253 253 253 253
```

✓ 0s completed at 3:30 PM

```
[  0   0   0   0   0   0   0  49 238 253 253 253 253 253 253 253 253 251
  93  82  82  56  39   0   0   0   0   0]
[  0   0   0   0   0   0   0  18 219 253 253 253 253 253 198 182 247 241
   0   0   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0  80 156 107 253 253 205  11   0  43 154
   0   0   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0  14   1 154 253  90   0   0   0   0
   0   0   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0 139 253 190   2   0   0   0
   0   0   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0  11 190 253  70   0   0   0
   0   0   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0   0  35 241 225 160 108   1
   0   0   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0   0   0  81 240 253 253 119
  25   0   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0   0   0   0  45 186 253 253
 150  27   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0  16  93 252
 253 187   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0 249
 253 249  64   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0   0   0   0  46 130 183 253
 253 207   2   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0   0   0  39 148 229 253 253 253
 250 182   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0  24 114 221 253 253 253 253 201
  78   0   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0  23  66 213 253 253 253 253 198  81   2
   0   0   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0  18 171 219 253 253 253 253 195  80   9   0   0
   0   0   0   0   0   0   0   0   0   0]
[  0   0   0   0  55 172 226 253 253 253 253 244 133  11   0   0   0   0
   0   0   0   0   0   0   0   0   0   0]
[  0   0   0   0 136 253 253 253 212 135 132  16   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0]
[  0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0]]
```

```
training_images = training_images / 255.0
test_images = test_images / 255.0
```

```
model = tf.keras.models.Sequential([tf.keras.layers.Flatten(input_shape=(28,28))
                                    tf.keras.layers.Dense(128,activation='relu'),
                                    tf.keras.layers.Dense(10, activation=tf.nn.sof
```

```
model.compile(optimizer = tf.keras.optimizers.Adam(),
              loss = 'sparse_categorical_crossentropy',
              metrics=['accuracy'])
```

```
model.fit(training_images, training_label, epochs=5)
```

```
Epoch 1/5
1875/1875 [==============================] - 3s 1ms/step - loss: 0.2607 - a
Epoch 2/5
1875/1875 [==============================] - 3s 2ms/step - loss: 0.1166 - a
Epoch 3/5
1875/1875 [==============================] - 3s 2ms/step - loss: 0.0800 - a
Epoch 4/5
1875/1875 [==============================] - 3s 2ms/step - loss: 0.0608 - a
Epoch 5/5
1875/1875 [==============================] - 3s 1ms/step - loss: 0.0470 - a
<keras.callbacks.History at 0x7fd834599f50>
```

```
plt.imshow(test_images[0])
```

```
<matplotlib.image.AxesImage at 0x7fd8344f7310>
```