```
from google.colab import drive
drive.mount('/content/gdrive')
```

```
Mounted at /content/gdrive
```

```
import tensorflow as tf
import numpy as np
import matplotlib.pyplot as plt
print(tf.__version__)
```

```
2.18.0
```

```
fashion_mnist = tf.keras.datasets.fashion_mnist
(train_images,train_labels),(test_images,test_labels) = fashion_mnist.load_data()

class_names = ['T-shirt/top','Trouser','Pullover','Dress','Coat','Sandal','Shirt','Sneaker','Bag','Ankle boot']
```

```
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/train-labels-idx1-ubyte.gz
29515/29515 ━━━━━━━━━━━━━━━━━━━━ 0s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/train-images-idx3-ubyte.gz
26421880/26421880 ━━━━━━━━━━━━━━━━━━━━ 0s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/t10k-labels-idx1-ubyte.gz
5148/5148 ━━━━━━━━━━━━━━━━━━━━ 0s 0us/step
Downloading data from https://storage.googleapis.com/tensorflow/tf-keras-datasets/t10k-images-idx3-ubyte.gz
4422102/4422102 ━━━━━━━━━━━━━━━━━━━━ 0s 0us/step
```

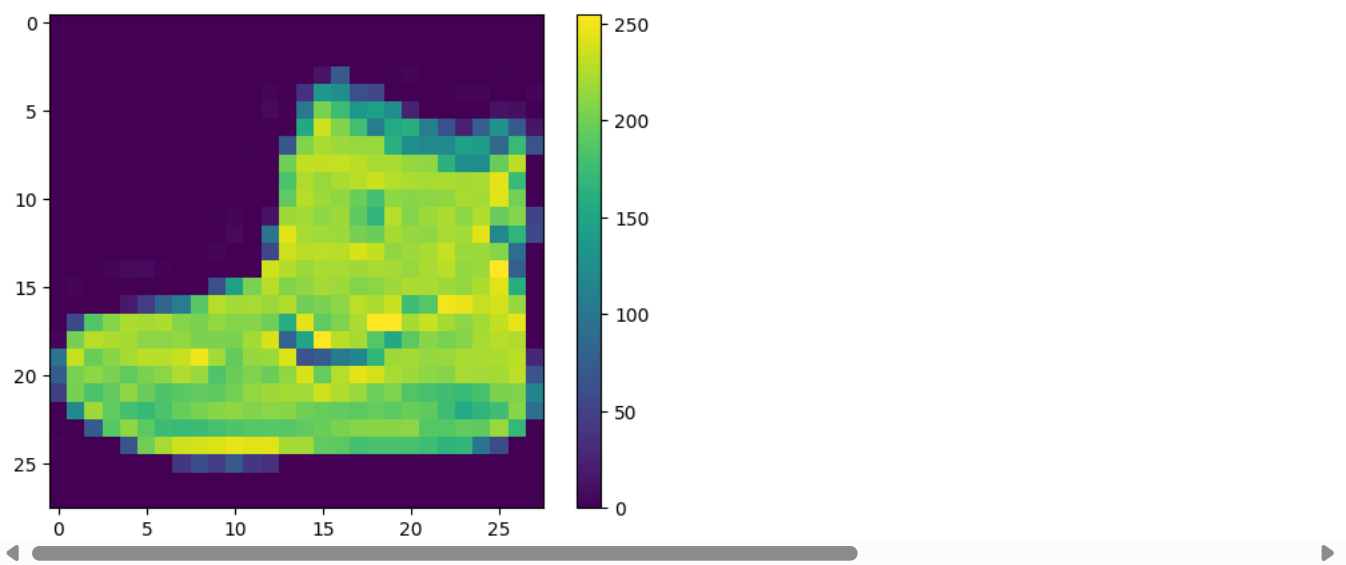
```
train_images.shape
```

```
(60000, 28, 28)
```

```
test_images.shape
```

```
(10000, 28, 28)
```

```
plt.figure()
plt.imshow(train_images[0])
plt.colorbar()
plt.grid(False)
plt.show()
```




```
train_images=train_images/255.0
test_images=test_images/255.0
```

```
plt.figure(figsize=(10,10))
for i in range(20):
  plt.subplot(5,5,i+1)
  plt.xticks([])
  plt.yticks([])
  plt.grid(False)
  plt.imshow(train_images[i], cmap=plt.cm.binary)
  plt.xlabel(class_names[train_labels[i]])
plt.show()
```


```
train_images = train_images.reshape(train_images.shape[0],28,28,1).astype('float32')
test_images = test_images.reshape(test_images.shape[0],28,28,1).astype('float32')


model=tf.keras.Sequential([
    tf.keras.layers.Conv2D(64,(3,3),activation='relu',input_shape=(28,28,1)),
    tf.keras.layers.MaxPooling2D(2,2),
    tf.keras.layers.Conv2D(64,(3,3),activation='relu'),
    tf.keras.layers.MaxPooling2D(2,2),
    tf.keras.layers.Flatten(),
    #tf.keras.layers.Dense(128,activation= tf.keras.layers.LeakyReLU(alpha=0.3)),
    tf.keras.layers.Dense(128,activation='relu'),
    tf.keras.layers.Dropout(0.5),
    tf.keras.layers.Dense(64,activation='relu'),
    tf.keras.layers.Dropout(0.5),
    tf.keras.layers.Dense(10,activation='softmax'),
])
```

```
/usr/local/lib/python3.11/dist-packages/keras/src/layers/convolutional/base_conv.py:107: UserWarning: Do not pass an `input_shape`/`
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
```

```
model.compile(optimizer='rmsprop',
              loss=tf.keras.losses.SparseCategoricalCrossentropy(from_logits=True),
              metrics=['accuracy'])


model.summary()
```

Model: "sequential"

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 26, 26, 64)	640
max_pooling2d (MaxPooling2D)	(None, 13, 13, 64)	0
conv2d_1 (Conv2D)	(None, 11, 11, 64)	36,928
max_pooling2d_1 (MaxPooling2D)	(None, 5, 5, 64)	0
flatten (Flatten)	(None, 1600)	0
dense (Dense)	(None, 128)	204,928
dropout (Dropout)	(None, 128)	0
dense_1 (Dense)	(None, 64)	8,256
dropout_1 (Dropout)	(None, 64)	0
dense_2 (Dense)	(None, 10)	650

Total params: 251,402 (982.04 KB)

```
model.fit(train_images, train_labels,epochs=5)
```

```
Epoch 1/5
/usr/local/lib/python3.11/dist-packages/keras/src/backend/tensorflow/nn.py:708: UserWarning: "`sparse_categorical_crossentropy` rece
  output, from_logits = _get_logits(
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 94s 49ms/step - accuracy: 0.6524 - loss: 0.9626
Epoch 2/5
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 135s 46ms/step - accuracy: 0.8489 - loss: 0.4477
Epoch 3/5
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 84s 45ms/step - accuracy: 0.8677 - loss: 0.4105
Epoch 4/5
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 84s 45ms/step - accuracy: 0.8718 - loss: 0.3936
Epoch 5/5
1875/1875 ━━━━━━━━━━━━━━━━━━━━ 87s 46ms/step - accuracy: 0.8705 - loss: 0.4154
<keras.src.callbacks.history.History at 0x792a6bd602d0>
```

```
test_loss ,test_acc = model.evaluate(test_images ,test_labels,verbose=1)
print('\nTest accuracy:',test_acc)
```

```
  4/313 ━━━━━━━━━━━━━━━━━━━━ 5s 17ms/step - accuracy: 0.8561 - loss: 0.7078   /usr/local/lib/python3.11/dist-packages/keras/src/bacl
  output, from_logits = _get_logits(
313/313 ━━━━━━━━━━━━━━━━━━━━ 5s 17ms/step - accuracy: 0.8869 - loss: 0.3825

Test accuracy: 0.8827000260353088
```

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