Implement CNN on MNIST Dataset 6:19

In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
import tensorflow as tf
from tensorflow import keras
from tensorflow.keras import layers
from tensorflow.keras.layers import Embedding,Flatten,Dense,Dropout,Conv2D,MaxPooling2D,Input
from tensorflow.image import grayscale_to_rgb,resize
from tensorflow.keras.applications import VGG19
from tensorflow.keras.models import Model,Sequential
from tensorflow.keras.utils import to_categorical
from tensorflow.keras.datasets import mnist
```

```
WARNING:tensorflow:From D:\JUPYTER FOLDER\Lib\site-packages\keras\src\losses.py:2976: The name tf.losses.spa
rse_softmax_cross_entropy is deprecated. Please use tf.compat.v1.losses.sparse_softmax_cross_entropy instea
d.
```

In [2]:
```
(train_images,train_labels),(test_images,test_labels)=mnist.load_data()
train_images,test_images=train_images/255.0,test_images/255.0
```

In [3]:
```
model=Sequential([
    Input(shape=(28,28,1)),
    Conv2D(32,(3,3),activation='relu'),
    MaxPooling2D((2,2)),
    Conv2D(64,(3,3),activation='relu'),
    MaxPooling2D((2,2)),
    Conv2D(64,(3,3),activation='relu'),
    Flatten(),
    Dense(64,activation='relu'),
    Dense(10,activation='softmax')

])
model.compile(metrics=['accuracy'],loss='sparse_categorical_crossentropy',optimizer='adam')
```

```
WARNING:tensorflow:From D:\JUPYTER FOLDER\Lib\site-packages\keras\src\backend.py:1398: The name tf.executing
_eagerly_outside_functions is deprecated. Please use tf.compat.v1.executing_eagerly_outside_functions instea
d.

WARNING:tensorflow:From D:\JUPYTER FOLDER\Lib\site-packages\keras\src\layers\pooling\max_pooling2d.py:161: T
he name tf.nn.max_pool is deprecated. Please use tf.nn.max_pool2d instead.

WARNING:tensorflow:From D:\JUPYTER FOLDER\Lib\site-packages\keras\src\optimizers\__init__.py:309: The name t
f.train.Optimizer is deprecated. Please use tf.compat.v1.train.Optimizer instead.
```

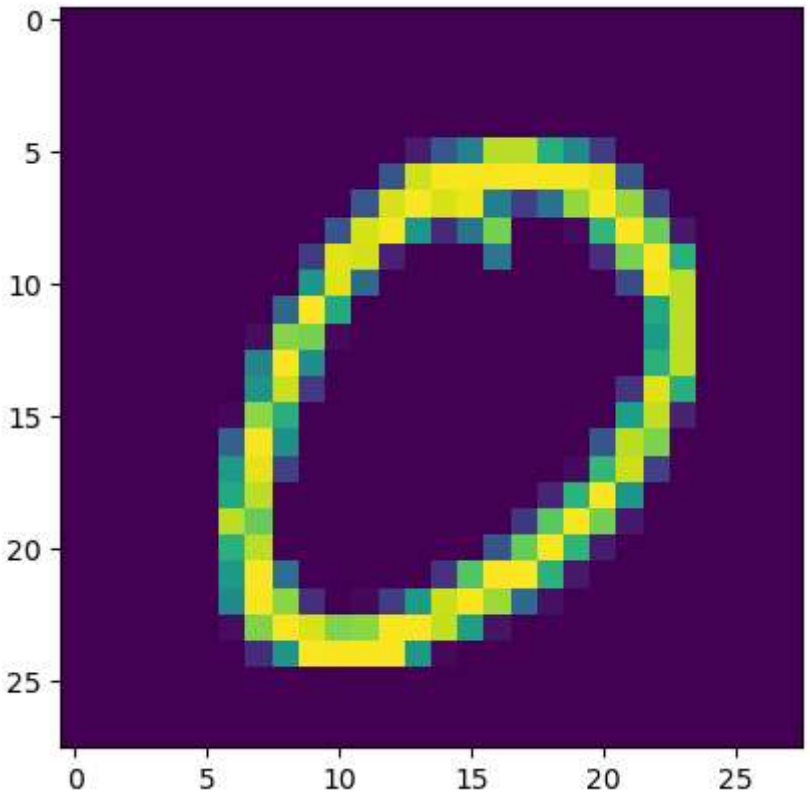
In [4]:
```
history=model.fit(train_images,train_labels,epochs=1,validation_data=(test_images,test_labels))
```

```
WARNING:tensorflow:From D:\JUPYTER FOLDER\Lib\site-packages\keras\src\utils\tf_utils.py:492: The name tf.rag
ged.RaggedTensorValue is deprecated. Please use tf.compat.v1.ragged.RaggedTensorValue instead.

WARNING:tensorflow:From D:\JUPYTER FOLDER\Lib\site-packages\keras\src\engine\base_layer_utils.py:384: The na
me tf.executing_eagerly_outside_functions is deprecated. Please use tf.compat.v1.executing_eagerly_outside_f
unctions instead.

1875/1875 [==============================] - 19s 10ms/step - loss: 0.1461 - accuracy: 0.9539 - val_loss: 0.0
442 - val_accuracy: 0.9862
```

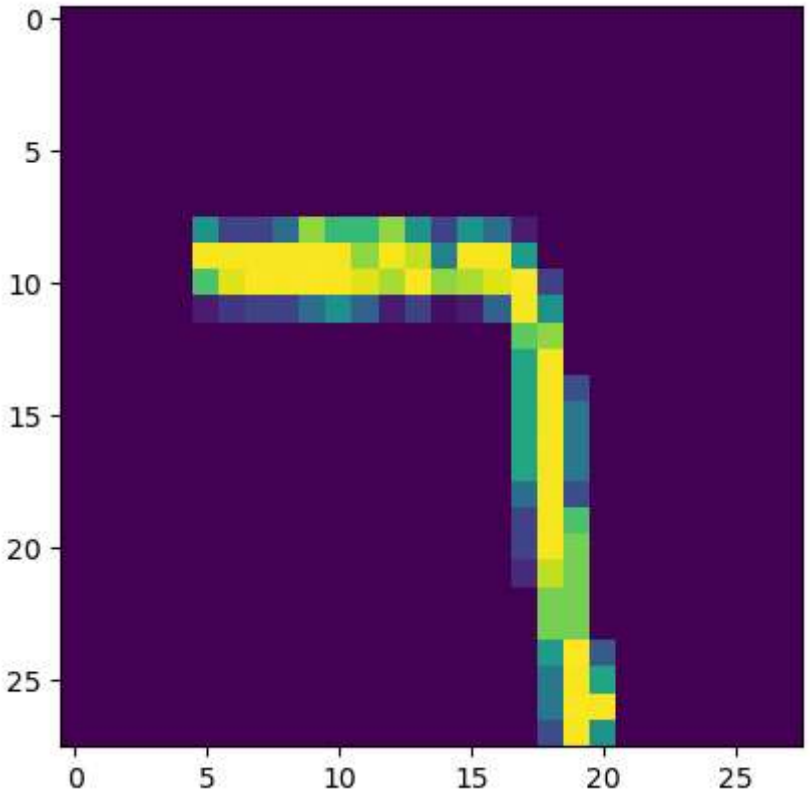
In [ ]:
```

```

In [5]:
```
for _ in range(3):
    index=np.random.randint(0,len(test_images))
    input_image = test_images[index]
    input_image = np.expand_dims(input_image, axis=0)
    pred = model.predict(input_image)
    predicted = np.argmax(pred)
    print(predicted)
    plt.imshow(test_images[index])
    plt.show()
```

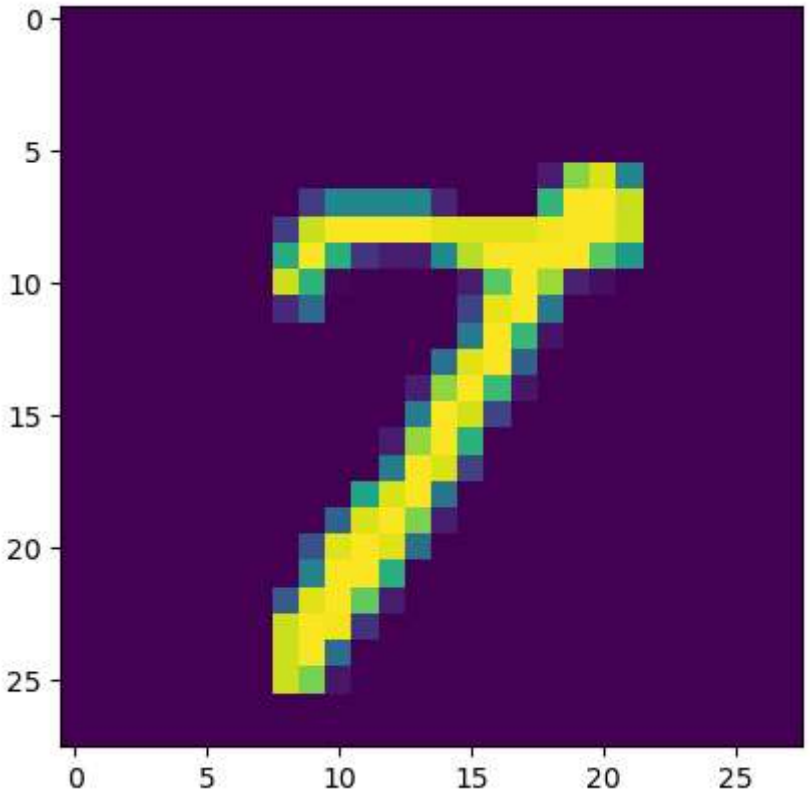
```
1/1 [==============================] - 0s 168ms/step
0
```



```
1/1 [==============================] - 0s 28ms/step
7
```




```
1/1 [==============================] - 0s 29ms/step
7
```



In [ ]: