**Code 6 (CNN)**

from google.colab import drive

drive.mount("/content/drive")

import numpy as np

import pandas as pd

import tensorflow as tp

import matplotlib.pyplot as plt

from tensorflow.keras.datasets import mnist

from tensorflow.keras.models import Sequential

from tensorflow.keras.layers import Conv2D

from tensorflow.keras.layers import MaxPool2D

from tensorflow.keras.layers import Flatten

from tensorflow.keras.layers import Dropout

from tensorflow.keras.layers import Dense

(X\_train,y\_test) , (X\_test,y\_test) = mnist.load\_data()

print(X\_train.shape)

print(X\_test.shape)

X\_train

plt.imshow(X\_train[1])

plt.imshow(X\_train[5])

for i in range(20):

  plt.subplot(5, 5, i+1)

plt.imshow(X\_train[i], cmap=plt.get\_cmap('gray'))

plt.show()

print(X\_train.shape)

print(X\_test.shape)

X\_train[0]

X\_train = X\_train.reshape((X\_train.shape[0], X\_train.shape[1], X\_train.shape[2], 1))

X\_test = X\_test.reshape((X\_test.shape[0], X\_test.shape[1], X\_test.shape[2],1))

print(X\_train.shape)

print(X\_test.shape)

X\_train[0]

X\_train = X\_train/255

X\_test = X\_test/255

X\_train[0]

model = Sequential()

model.add(Conv2D(32, (3,3), activation='relu', input\_shape=(28,28,1)))

model.add(MaxPool2D(2,2))

model.add(Flatten())

model.add(Dense(100,activation='relu'))

model.add(Dense(10,activation='softmax'))

model.compile(loss='sparse\_categorical\_crossentropy',optimizer='adam',metrics=['accuracy'])

(X\_train, y\_train), (X\_test, y\_test) = mnist.load\_data()

model.fit(X\_train,y\_train,epochs=5)

model.fit(X\_test,y\_test,epochs=5)