#1.This is the CNN Model For Classification Of Traffic Light Signals.

import numpy as np

import pandas as pd

import matplotlib.pyplot as plt

from keras.models import Sequential

from keras.layers import Conv2D

from keras.layers import MaxPooling2D

from keras.layers import Flatten

from keras.layers import Dense

from keras.preprocessing.image import ImageDataGenerator

from keras.preprocessing import image

classifier=Sequential()

classifier.add(Conv2D(32,(3,3),input\_shape=(64,64,3),activation='relu'))

classifier.add(MaxPooling2D(pool\_size=(2,2)))

classifier.add(Flatten())

classifier.add(Dense(output\_dim=128,activation='relu'))

classifier.add(Dense(output\_dim=4,activation='sigmoid'))

classifier.compile(optimizer='adam',loss='binary\_crossentropy',metrics=['accuracy'])

train\_datagen=ImageDataGenerator(rescale=1./255,shear\_range=0.2,zoom\_range=0.2,horizontal\_flip=True)

test\_datagen=ImageDataGenerator(rescale=1./255)

training\_set=train\_datagen.flow\_from\_directory('C:/Users/pc/Downloads/datasets/training',target\_size=(64,64),batch\_size=32,class\_mode='categorical')

test\_set=test\_datagen.flow\_from\_directory('C:/Users/pc/Downloads/datasets/test',target\_size=(64,64),batch\_size=32,class\_mode='categorical')

classifier.fit\_generator(training\_set,steps\_per\_epoch=260,epochs=10,validation\_data=test\_set,validation\_steps=260)

#2. Green, Yellow, Red, STOP signs prediction function from Above Build CNN model.

def predict(test\_image):

test\_image=image.img\_to\_array(test\_image)

test\_image=np.expand\_dims(test\_image,axis=0)

result=classifier.predict(test\_image)

training\_set.class\_indices

if result[0][0]==1: # command for Green light

command="GO"

elif result[0][1]==1: # command for Yellow light

command="WAIT"

elif result[0][2]==1: # command for Red Light

command="STOP"

else: # command for STOP sign

command="STOP"

return command