Date	12 November 2022
Team ID	PNT2022TMID46648
Project Name	Real-Time Communication System Powered by AI for Specially Abled
Marks	8 marks

IMPORTING LIBRARIES

import os import cv2 import numpy as np import matplotlib.pyplot as plt
from keras.preprocessing.image import ImageDataGenerator

Define DATA FILES

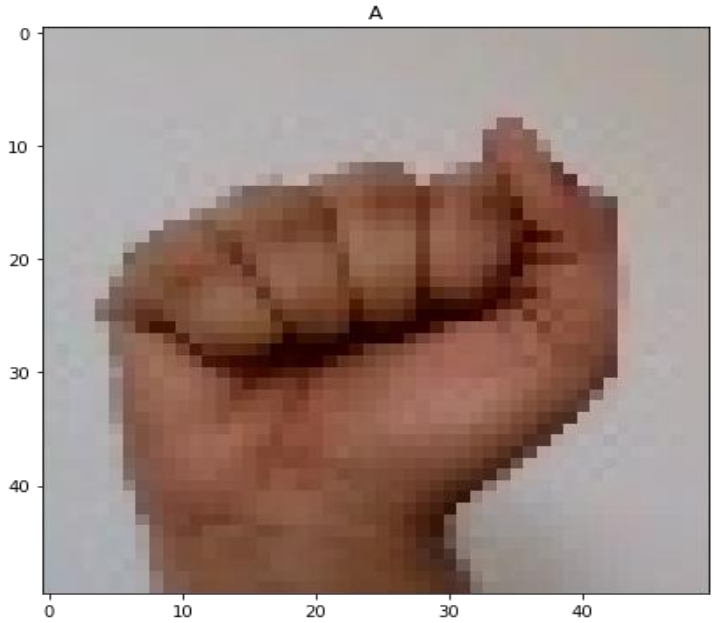
```
def rename_imgs(file_name):
    folder_path = r'test_dataset/'+file_name

    num = 0     for file in
os.listdir(folder_path):
        # if num%10 == 0:
        #     print(f'Renamed {num} files...')
        # os.rename(folder_path+'\\'+file, folder_path+'\\'+file_name+'_'+str(num)+'.jpeg')
num += 1

fn = 'Space' rename_imgs(fn)

file_names = '0123456789'+'ABCDEFGHIJKLMNOPQRSTUVWXYZ' for fn in file_names:
rename_imgs(fn)
```

SAMPLE IMAGES FROM DATASET

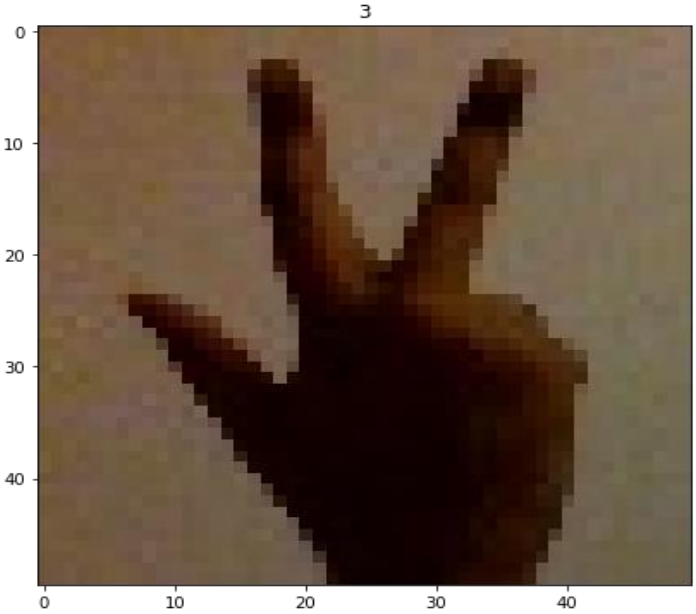
```
train_data_path = 'train_dataset/' test_data_path = 'test_dataset/'

def display(img,sign=None):

    img = cv2.cvtColor(img,cv2.COLOR_BGR2RGB)
fig = plt.figure(figsize=(7,7))
    ax = fig.add_subplot(111)
plt.title(sign)
    ax.imshow(img) Training
```

Data Set

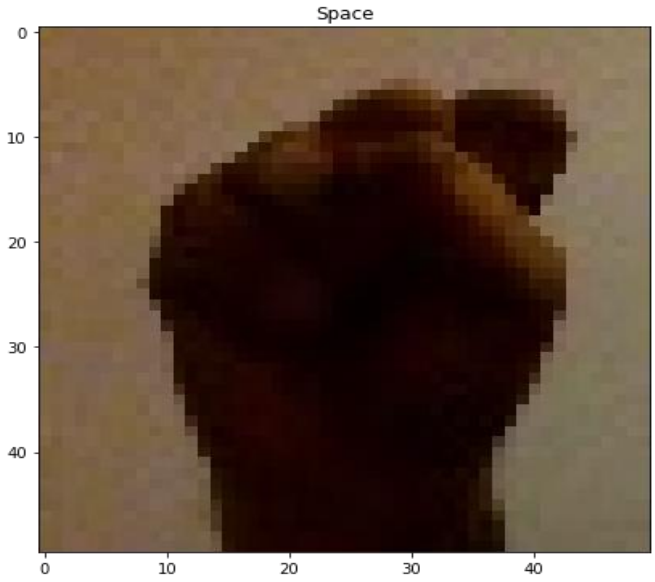
```
sign_img = cv2.imread(train_data_path+'A/A_204.jpeg') display(sign_img,'A')
```



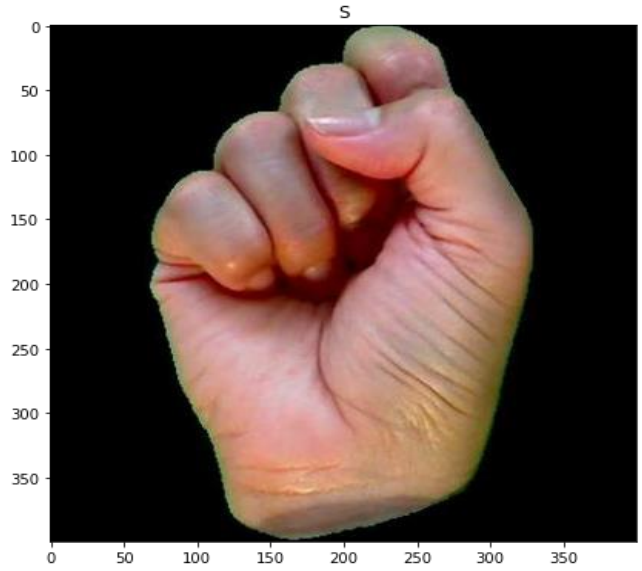
sign_img = cv2.imread(train_data_path+'3/3_340.jpeg') display(sign_img,'3')



sign_img = cv2.imread(train_data_path+'S/S_10.jpeg') display(sign_img,'Space')



Test Data Set sign_img = cv2.imread(test_data_path+'S/S_15.jpeg')
display(sign_img,'S')



sign_img = cv2.imread(test_data_path+'Z/Z_1.jpeg') display(sign_img,'Z')

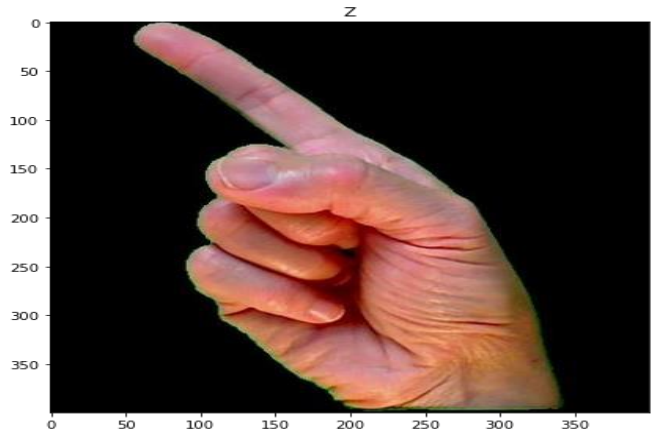
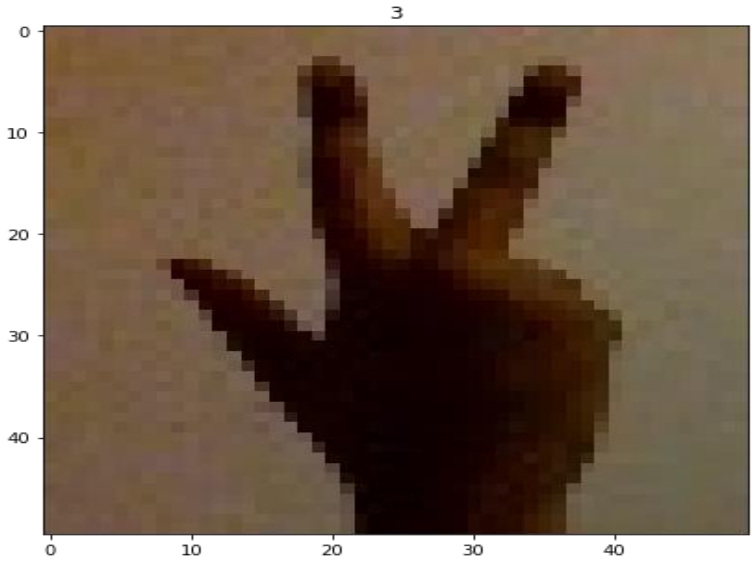


Image Data Generator

image_gen = ImageDataGenerator(rotation_range=30,
width_shift_range=0.1,
height_shift_range=0.1,
shear_range=0.2,
zoom_range=0.2, rescale=1/255,
horizontal_flip=True,
fill_mode='nearest',
validation_split=0.25)

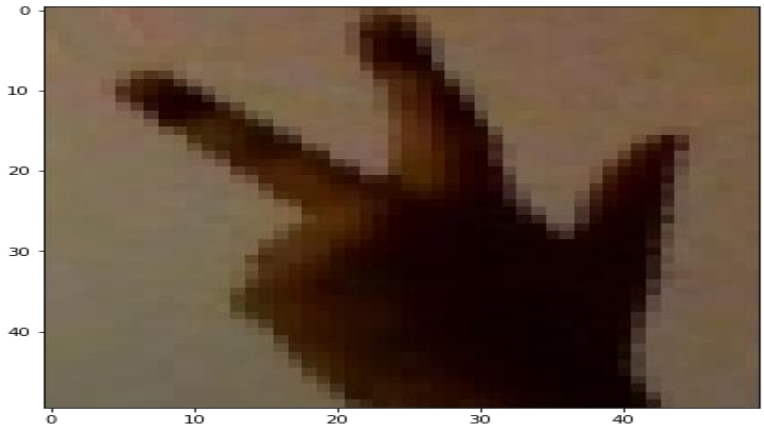
Original Image

sign_img = cv2.imread(train_data_path+'3/3_100.jpeg') display(sign_img,'3')



Augmented Images

display(image_gen.random_transform(sign_img))



Split into Test & Validation dataset Train Data Generator

train_data_gen = image_gen.flow_from_directory(train_data_path,
target_size=(250,250),
batch_size=16, shuffle=True,

class_mode='binary',
subset='training')

Found 41625 images belonging to 37 classes.
Validation Data Generator

validation_data_gen = image_gen.flow_from_directory(train_data_path,
target_size=(250,250),
batch_size=16, shuffle=True,
class_mode='binary',
subset='validation')

Found 13875 images belonging to 37 classes.
Test Data Generator

test_data_gen = image_gen.flow_from_directory(test_data_path,
target_size=(250,250),
batch_size=8, shuffle=True,
class_mode='categorical',
)

Found 2586 images belonging to 37 classes.

train_data_gen.class_indices

{'0': 0,
'1': 1,
'2': 2,
'3': 3,
'4': 4,
'5': 5,
'6': 6, '7':
7,
'8': 8,
'9': 9,
'A': 10,
'B': 11,
'C': 12,
'D': 13,
'E': 14,
'F': 15,
'G': 16,
'H': 17,
'I': 18,
'J': 19,
'K': 20,
'L': 21,
'M': 22,
'N': 23,
'O': 24,
'P': 25,
'Q': 26,
'R': 27,
'S': 28,
'Space': 29,
'T': 30,
'U': 31,
'V': 32,
'W': 33,

```
 'X': 34,
 'Y': 35,
 'Z': 36}
```

```
test_data_gen.classes
```

```
array([ 0,  0,  0, ..., 36, 36, 36])
```

```
len(train_data_gen.classes)
```

```
41625
```