Project Development Phase

Date	24 November 2022
Team ID	PNT2022TMID14708
Project Name	Real-Time Communication System Powered by AI for Specially Abled

IMPORTING NECESSARY LIBRARIES

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

RENAMING DATA FILES

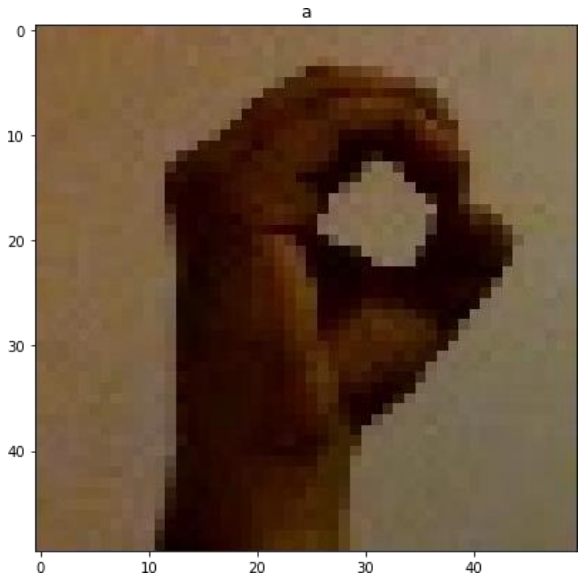
```
 def rename_imgs(file_name):
    folder_path = r'test_dataset/'+file_name

    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)
```

DISPLAYING SAMPLE IMAGES FROM DATASET

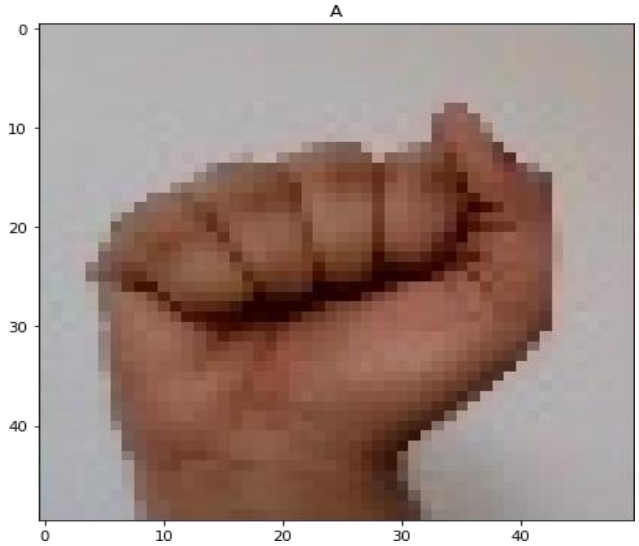
```
train_data_path = 'train_dataset/' test_data_path = 'test_dataset/'
 def display(img,sign=None):

    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 Images

```
sign_img = cv2.imread(train_data_path+'O/O_234.jpeg') display(sign_img,'a')
```

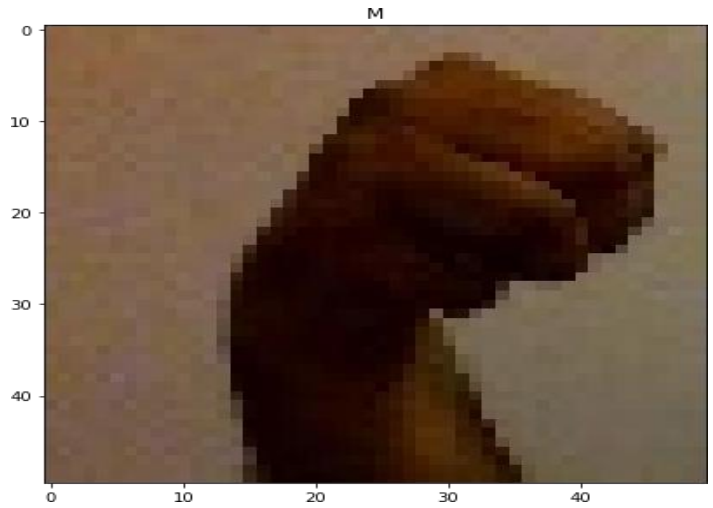


sign_img = cv2.imread(train_data_path+'A/A_204.jpeg') display(sign_img,'A')

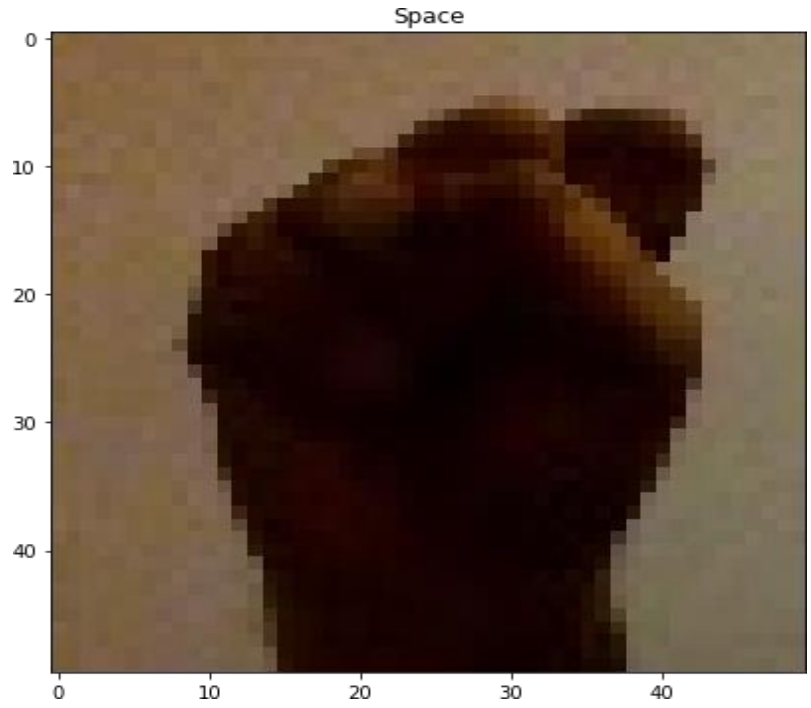


sign_img = cv2.imread(train_data_path+'3/3_340.jpeg') display(sign_img,'3')

sign_img = cv2.imread(train_data_path+'M/M_100.jpeg') display(sign_img,'M')

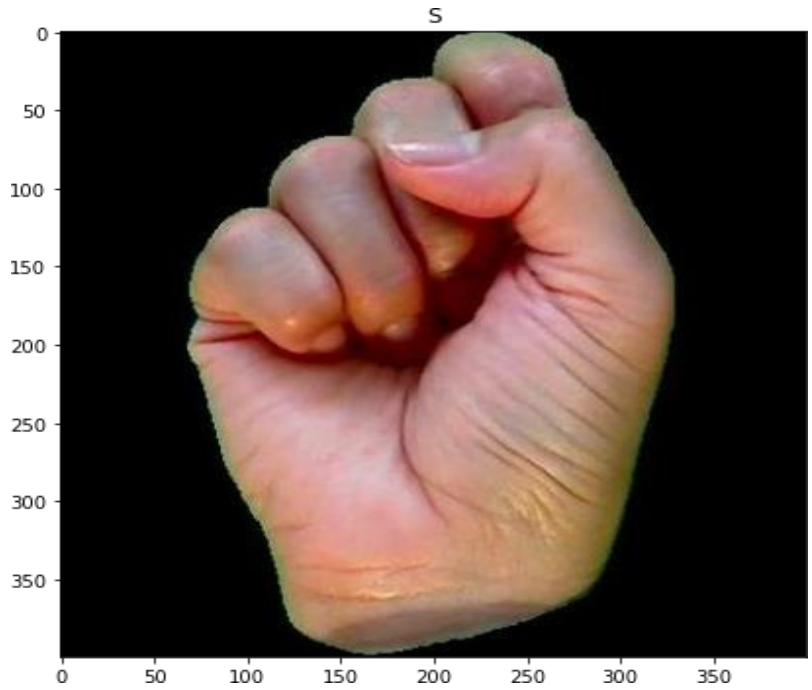


sign_img = cv2.imread(train_data_path+'S/S_10.jpeg') display(sign_img,'Space')

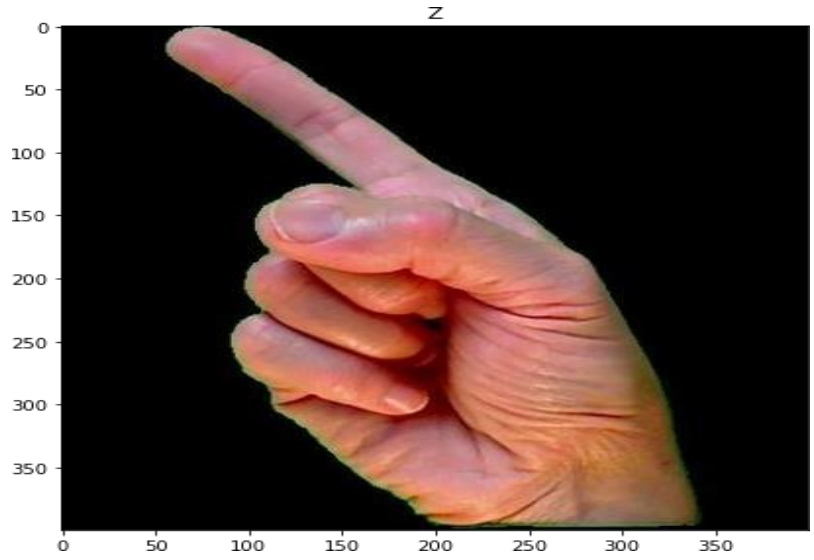


Test Data Images

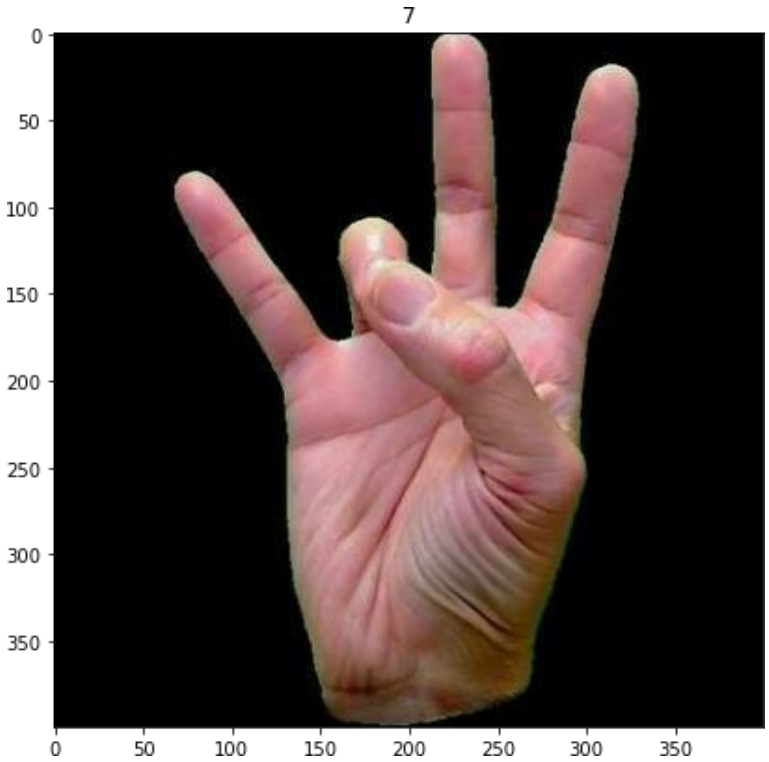
sign_img = cv2.imread(test_data_path+'S/S_15.jpeg') display(sign_img,'S')



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



sign_img = cv2.imread(test_data_path+'7/7_8.jpeg') display(sign_img,'7')



AUGMENTATION AND PREPROCESSING THE DATASET

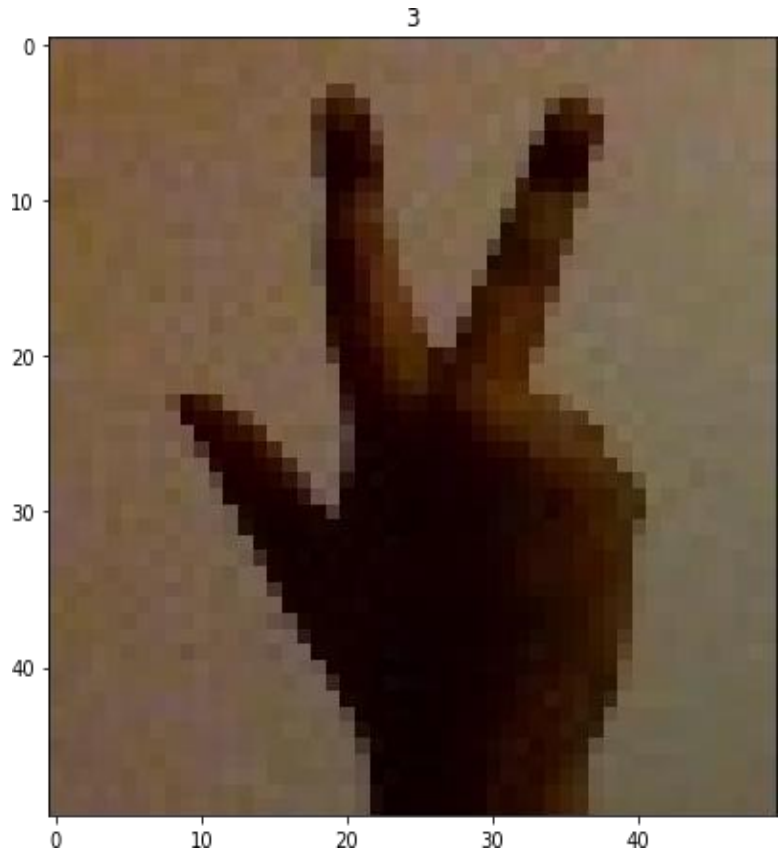
Creating ImageDataGenerator

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))

display(image_gen.random_transform(sign_img))

SPLITING INTO TRAIN AND 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

len(test_data_gen.classes)

2586