

Date	6 November 2022
Team ID	PNT2022TMID14463
Project Name	Real-Time Communication System Powered by AI for Specially Abled
Marks	8

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

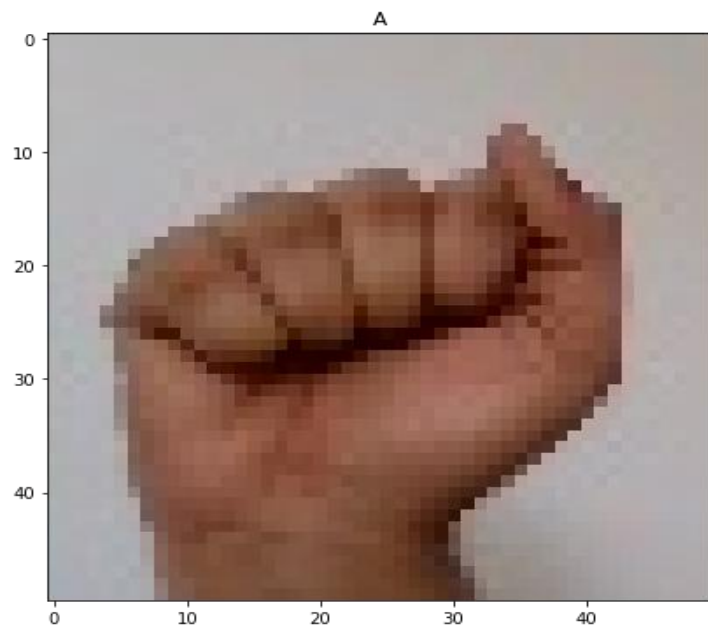
```
train_data_path = 'train_dataset/'
test_data_path = 'test_dataset/'

def display(img,sign=None):

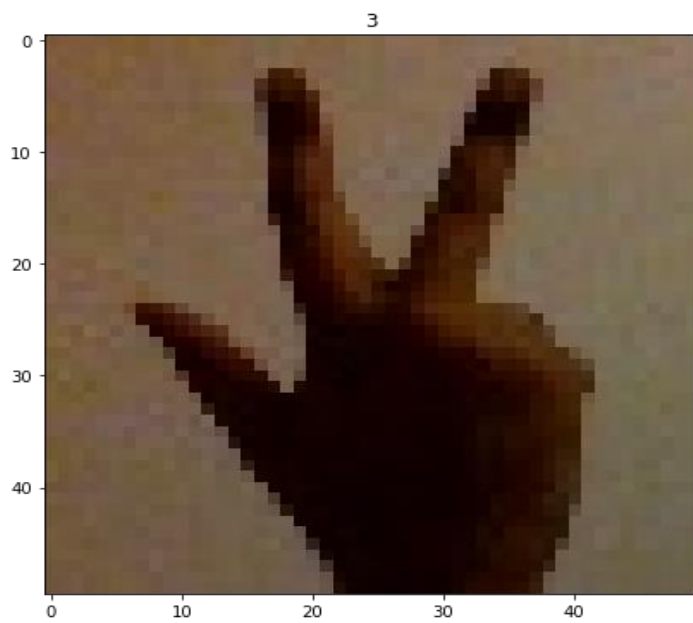
    img = cv2.cvtColor(img,cv2.COLOR_BGR2RGB)
    fig = plt.figure(figsize=(7,7))
    ax = fig.add_subplot(111)
    plt.title(sign)
    ax.imshow(img)
```

Training Data Set

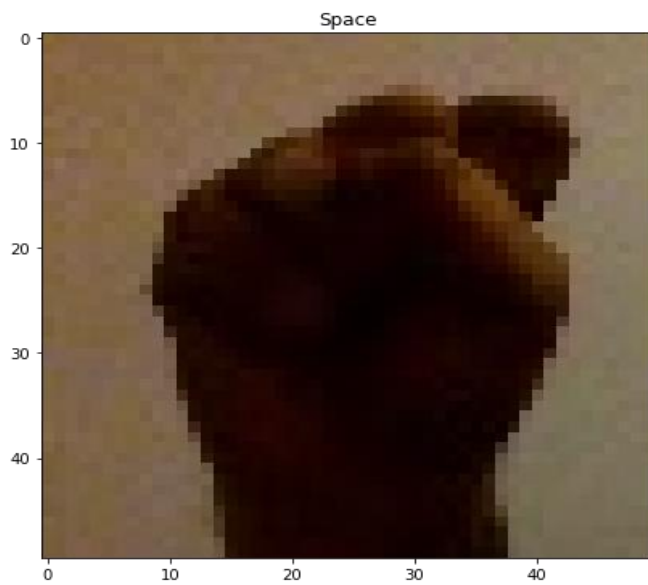
```
sign_img = cv2.imread(train_data_path+'A/A_204.jpeg')
display(sign_img,'A')
```



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

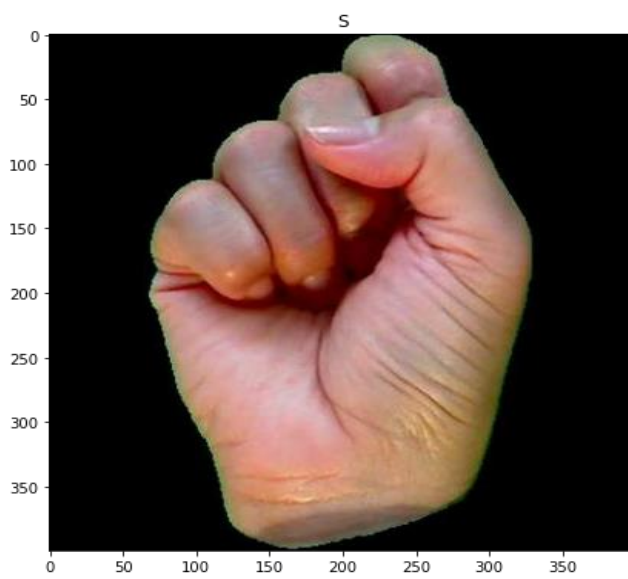


```
sign_img = cv2.imread(train_data_path+'S/S_10.jpeg')  
display(sign_img,'Space')
```



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')
```

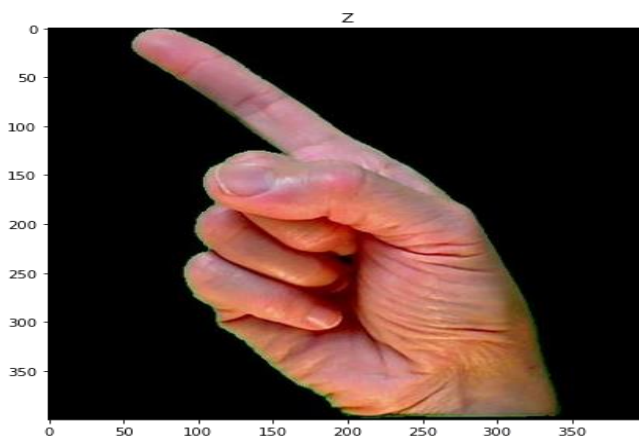
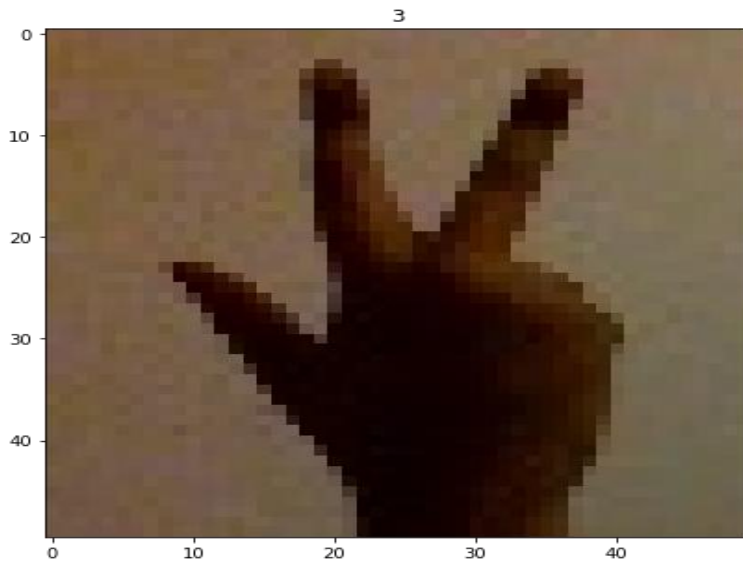


Image Data Generator

```
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)
```

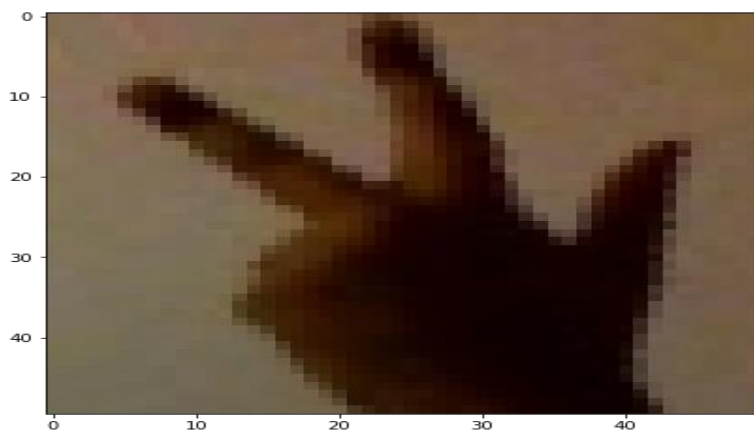
Original Image

```
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,
 'T': 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
```