

## Project Development Phase

Date	11 November 2022
Team ID	PNT2022TMID15704
Project Name	Real-Time Communication System Powered by AI for Specially Abled
Marks	8

### 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

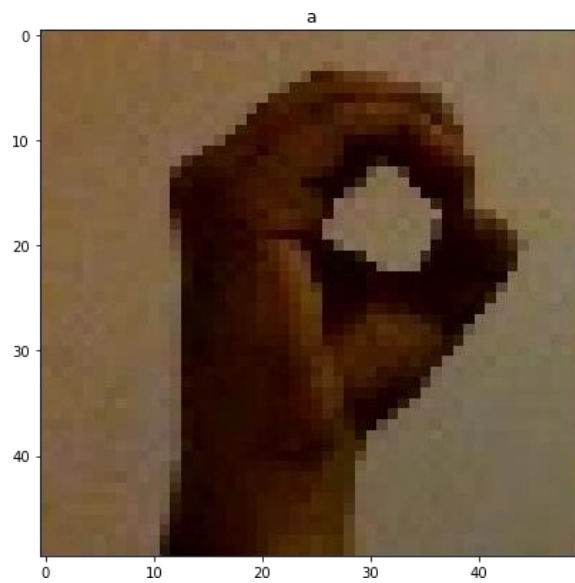
```
train_data_path = 'train_dataset/'
test_data_path = 'test_dataset/'

def display(img, sign=None):

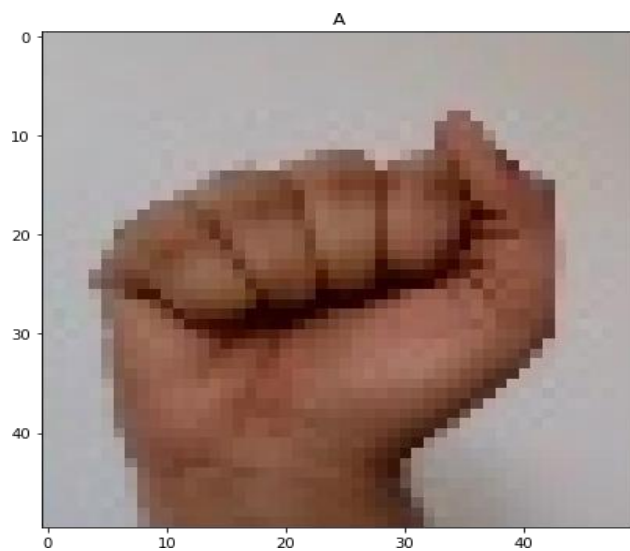
    img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
    fig = plt.figure(figsize=(7, 7))
    ax = fig.add_subplot(111)
    plt.title(sign)
    ax.imshow(img)
```

### Training Data Images

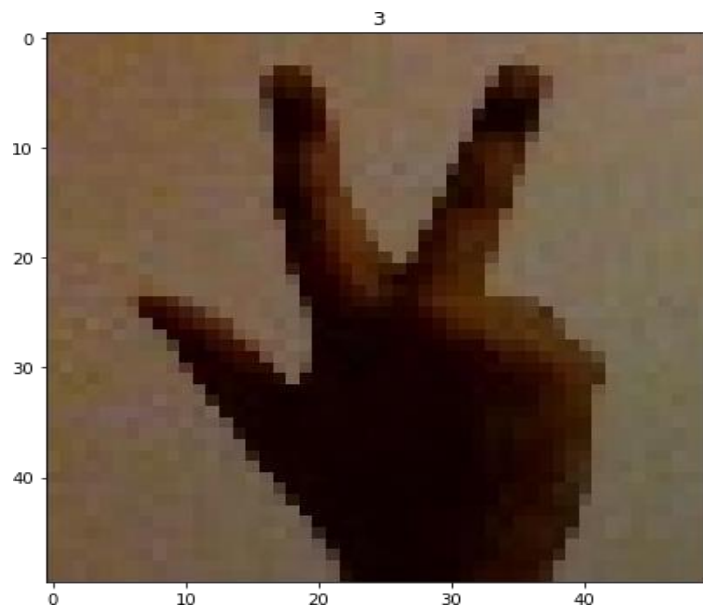
```
sign_img = cv2.imread(train_data_path+'O/O_234.jpeg')
display(sign_img, 'a')
```



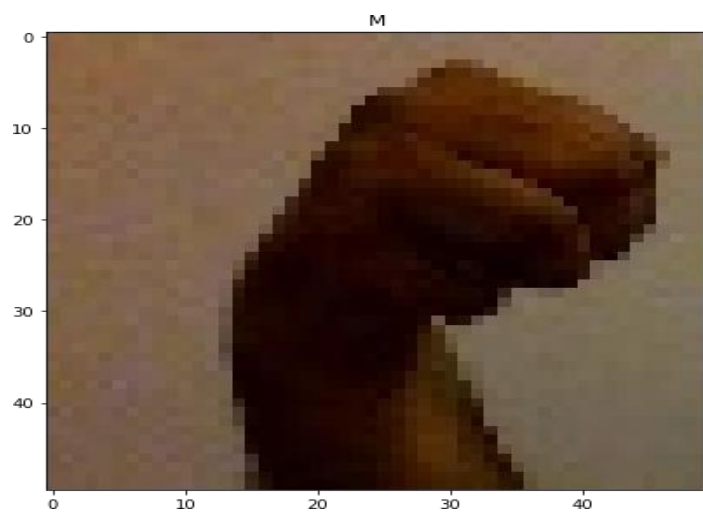
```
sign_img = cv2.imread(train_data_path+'A/A_204.jpeg') display(sign_img,'A')
```



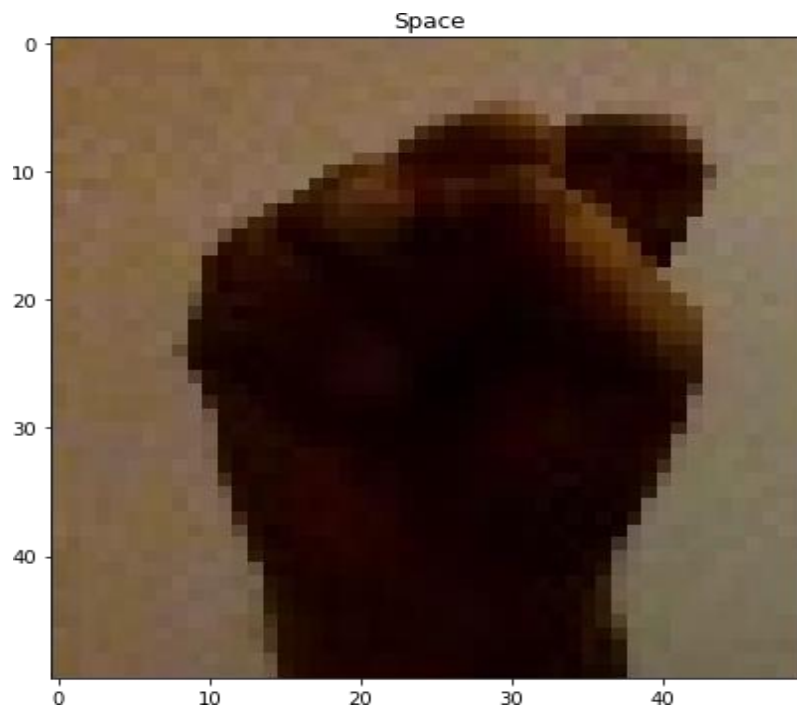
```
sign_img = cv2.imread(train_data_path+'3/3_340.jpeg') display(sign_img,'3')
```



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

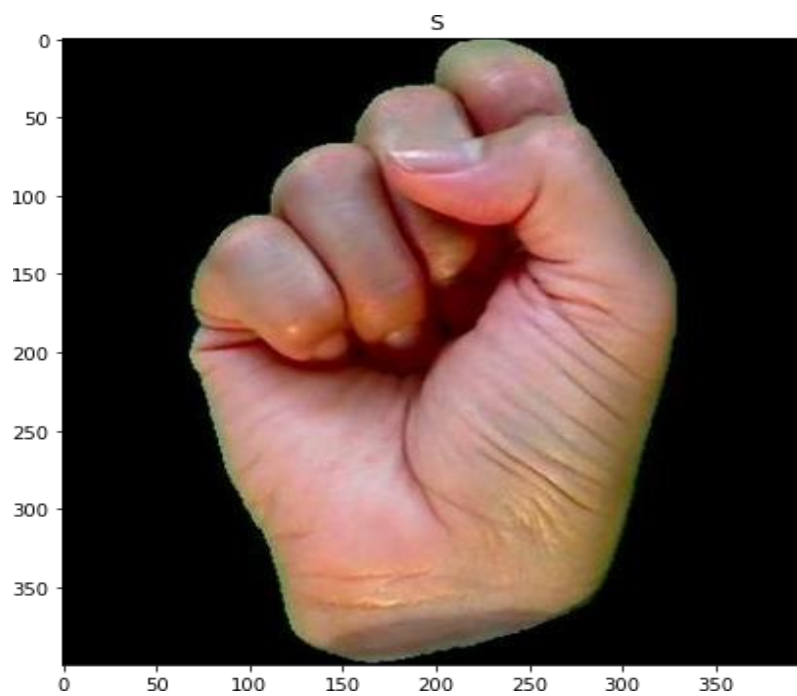


```
sign_img = cv2.imread(train_data_path+'S/S_10.jpeg') display(sign_img,'Space')
```

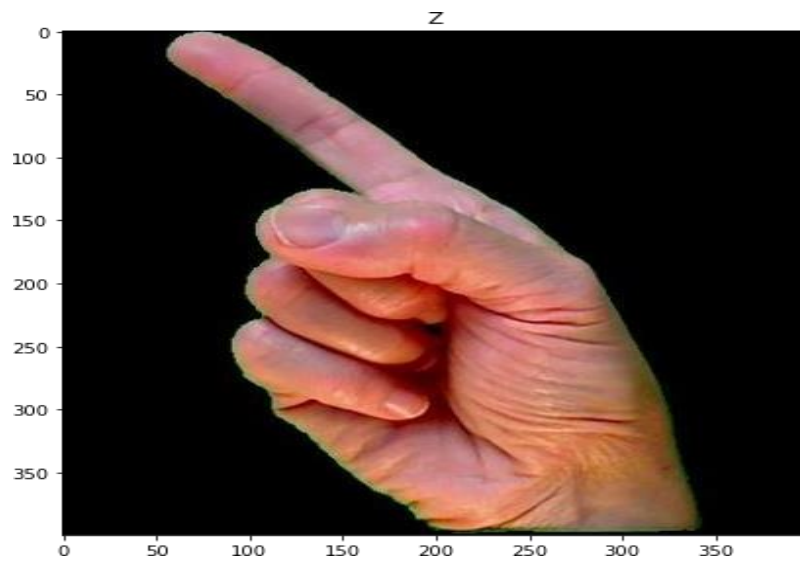


Test Data Images

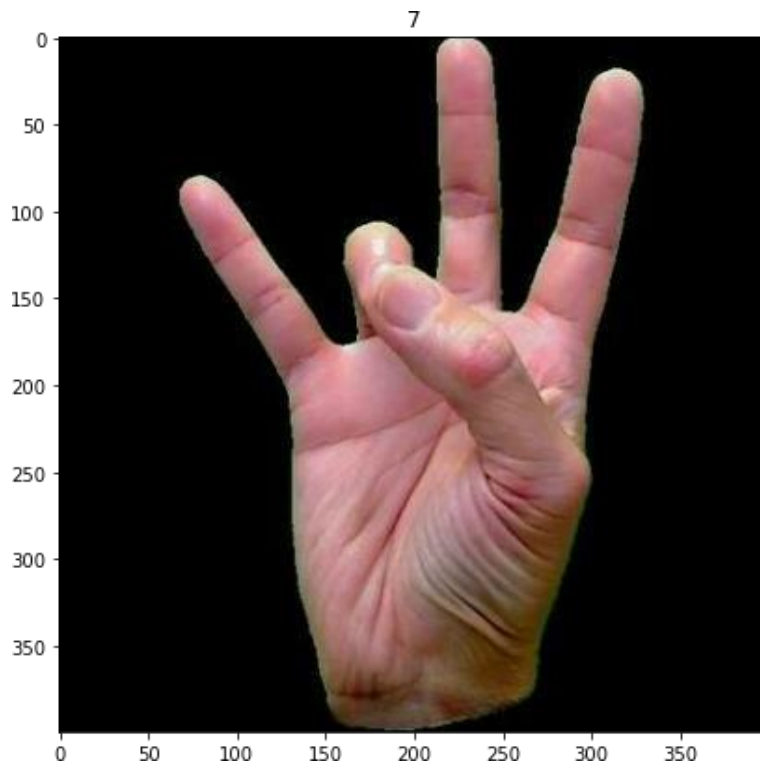
```
sign_img = cv2.imread(test_data_path+'S/S_15.jpeg') display(sign_img,'S')
```



```
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

```
width_shift_range=0.1,
height_shift_range=0.1,
shear_range=0.2,
zoom_range=0.2,
horizontal_flip=True,
```

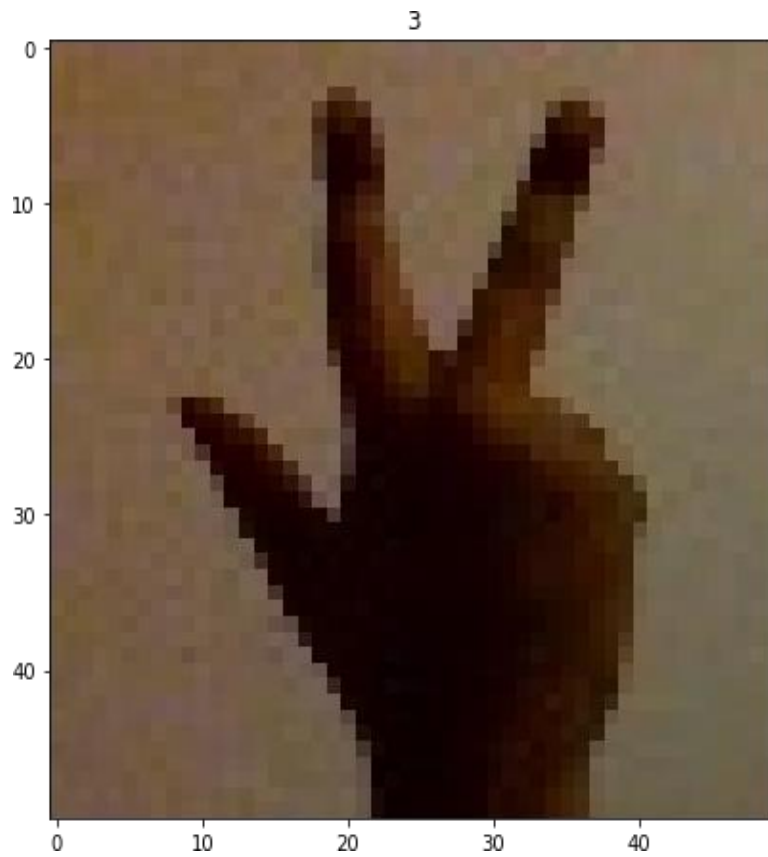
```
image_gen = ImageDataGenerator(rotation_range=30,
```

```
rescale=1/255,
```

```
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))`



## **SPLITTING 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
```