

Project Development Phase

Date	12 November 2022
Team ID	PNT2022TMID46644
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)
```

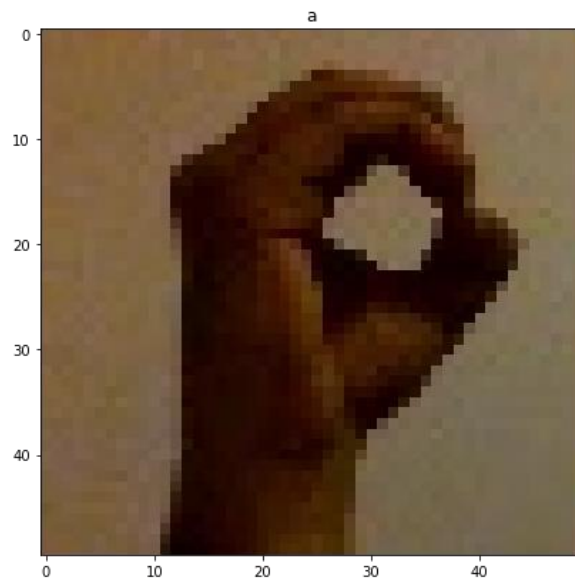
DISPLAYING SAMPLE IMAGES FROM DATASET

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

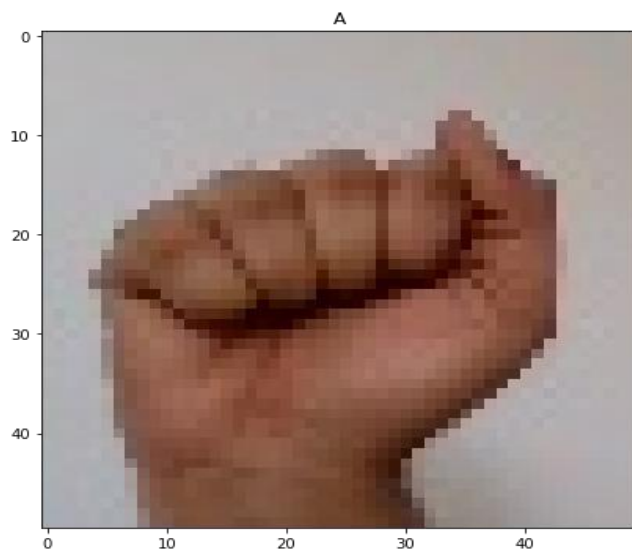
def display(img, sign=None):
    img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
    fig = plt.figure(figsize=(7, 7))
    ax = fig.add_subplot(111)
    plt.title(sign)
    ax.imshow(img)
```

Training Data Images

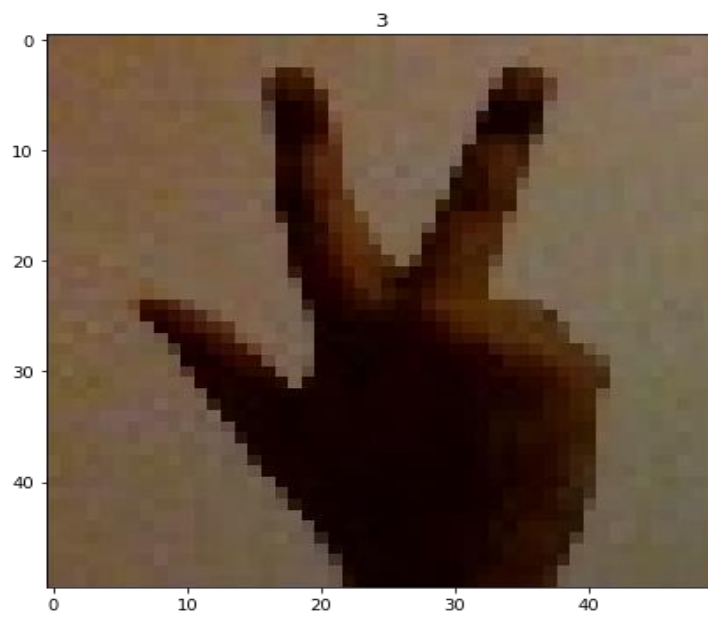
```
sign_img = cv2.imread(train_data_path+'O/O_234.jpeg')
display(sign_img, 'a')
```



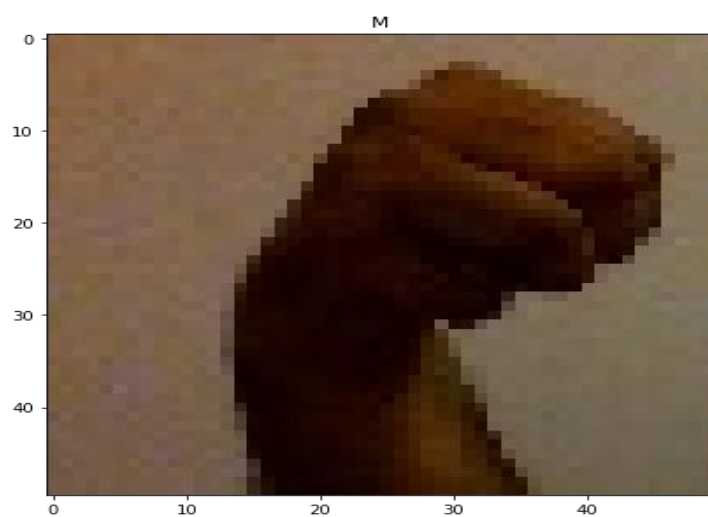
```
sign_img = cv2.imread(train_data_path+'A/A_204.jpeg') display(sign_img,'A')
```



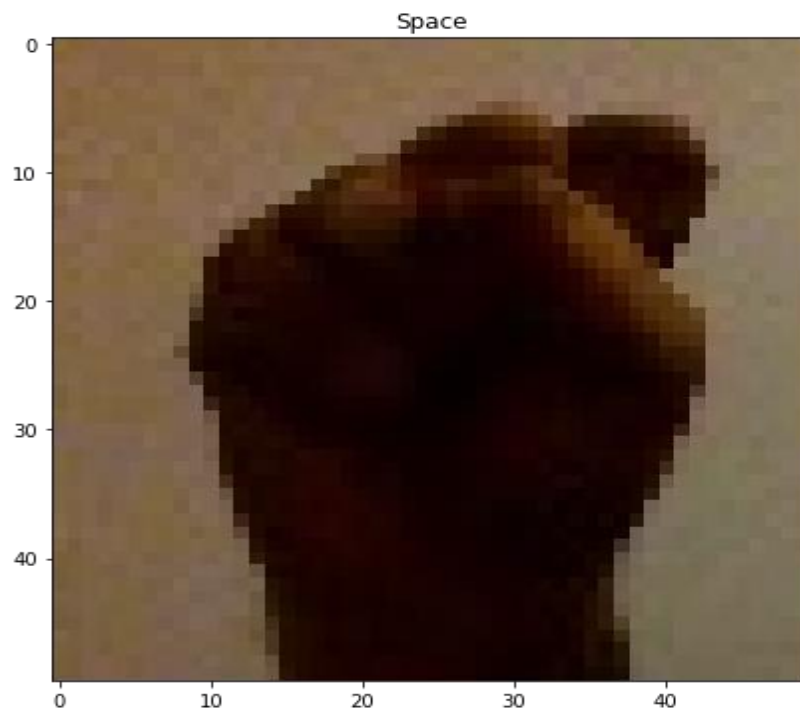
```
sign_img = cv2.imread(train_data_path+'3/3_340.jpeg') display(sign_img,'3')
```



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

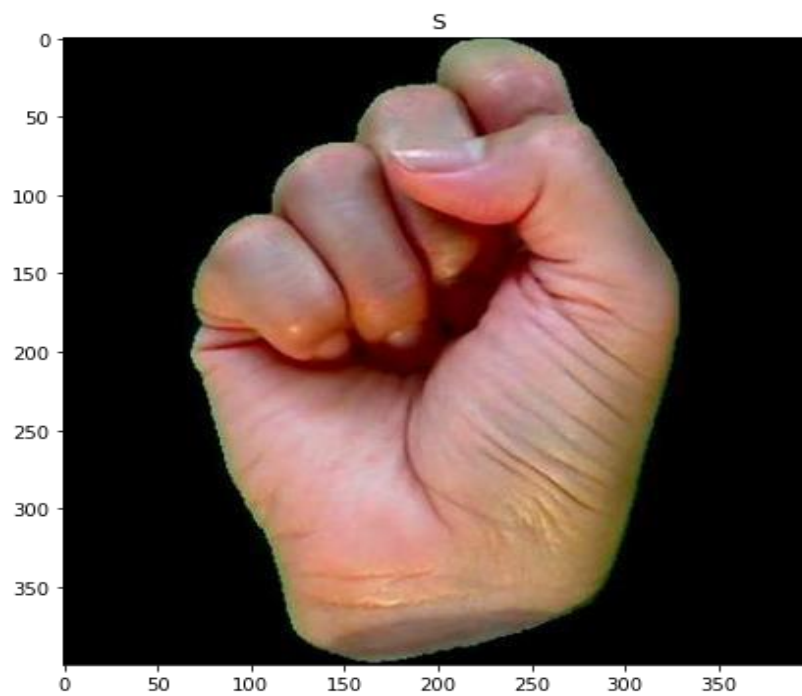


```
sign_img = cv2.imread(train_data_path+'S/S_10.jpeg') display(sign_img,'Space')
```

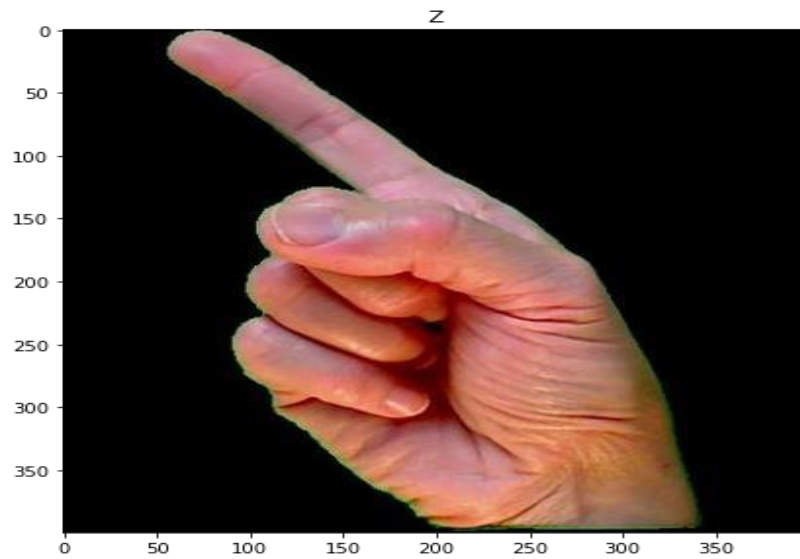


Test Data Images

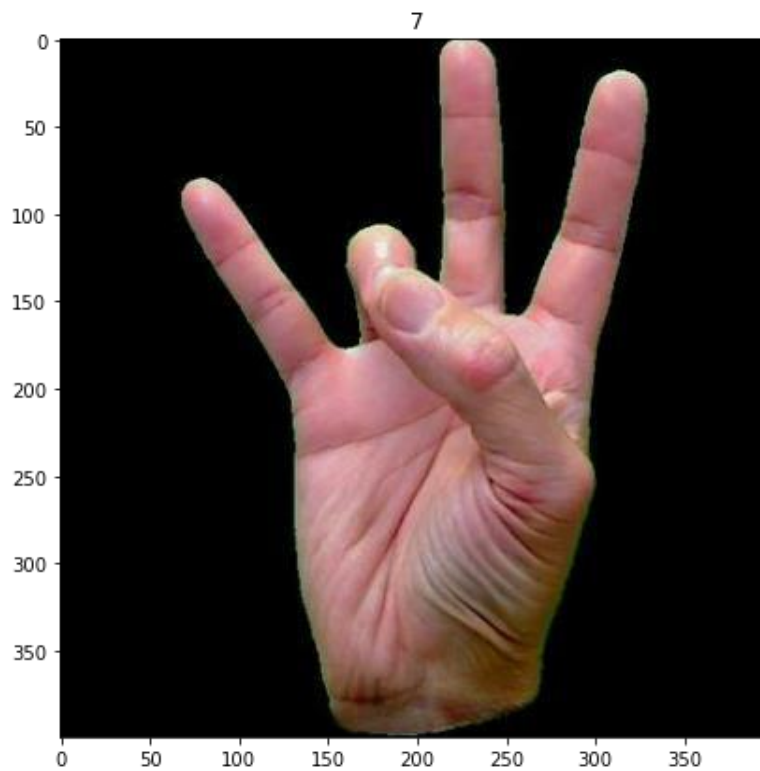
```
sign_img = cv2.imread(test_data_path+'S/S_15.jpeg') display(sign_img,'S')
```



```
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')
```

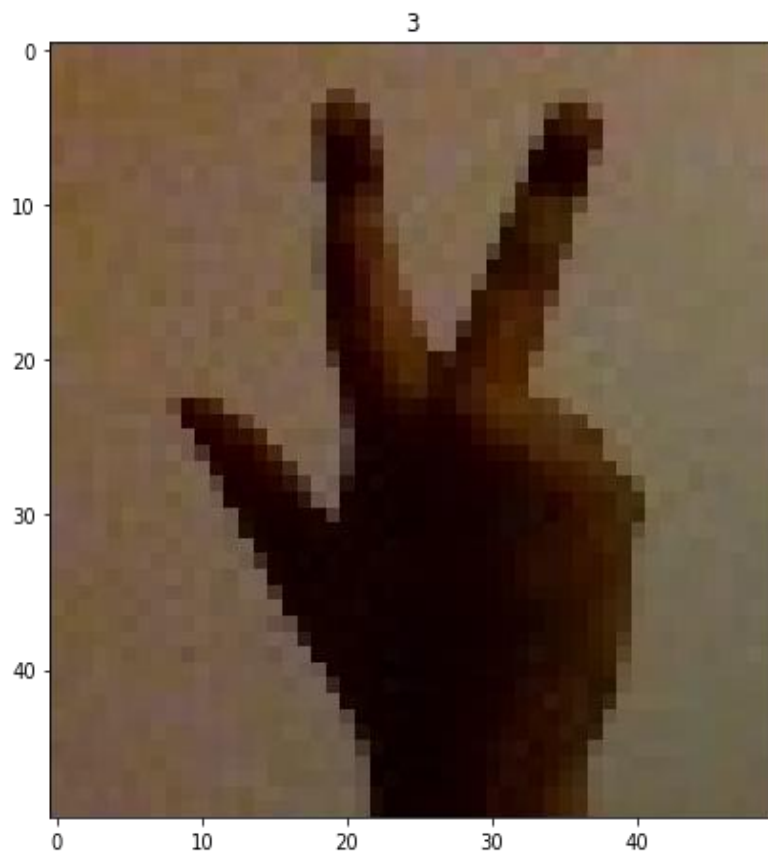


AUGMENTATION AND PREPROCESSING THE DATASET

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

Original Image

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

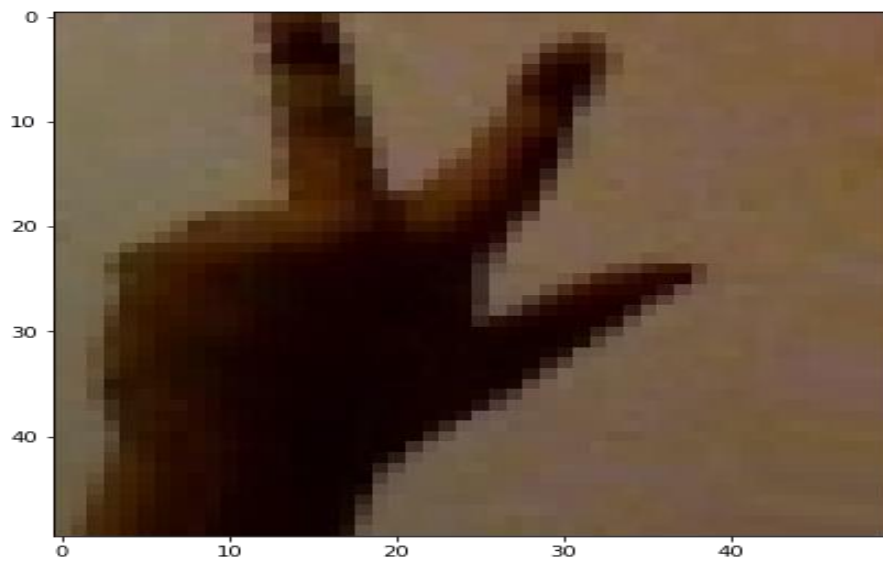


Augmented Images

```
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
```