

IBM Project Name: Real-Time Communication System Powered by AI for Specially Abled

TEAM ID: PNT2022TMID46015

TEAM Lead: Akash S

IMPORTING NECESSARY LIBRARIES

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

In [1]:

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)
```

In [26]:

In [25]:

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

In [7]:

DISPLAYING SAMPLE IMAGES FROM DATASET

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

In [8]:

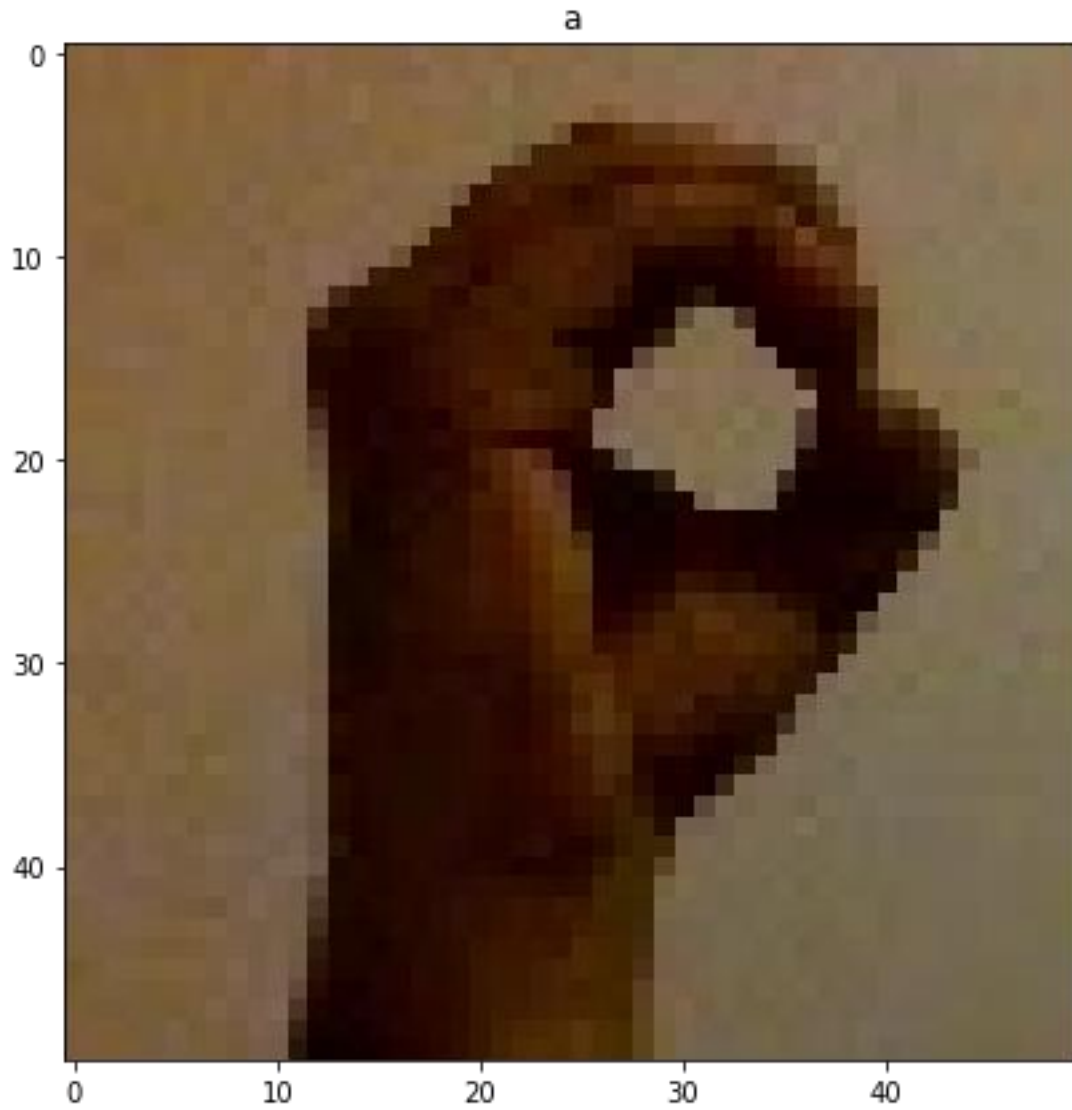
```
def display(img, sign=None):  
  
    img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)  
    fig = plt.figure(figsize=(7,7))  
    ax = fig.add_subplot(111)  
    plt.title(sign)  
    ax.imshow(img)
```

In [9]:

Training Data Images

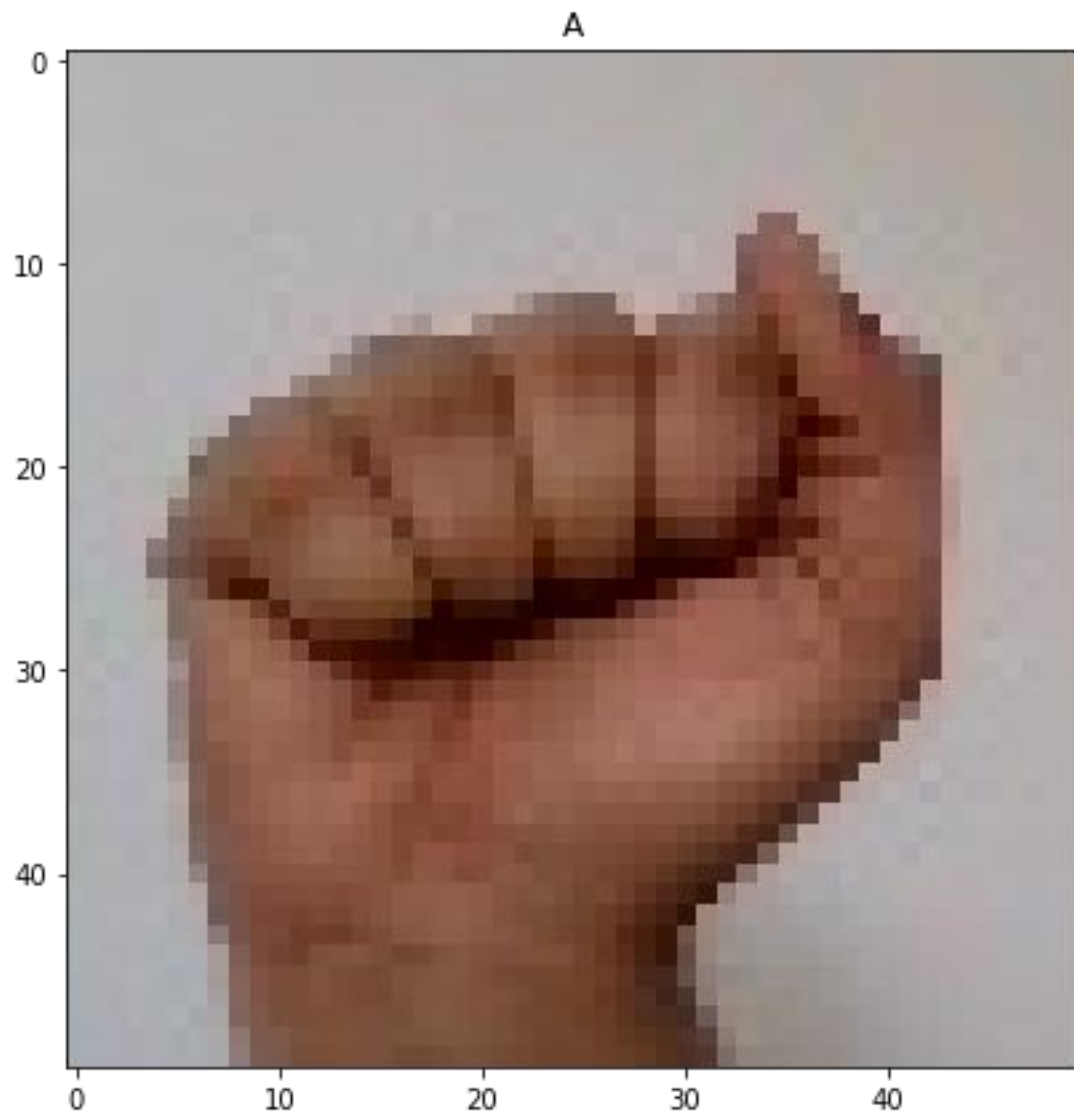
```
sign_img = cv2.imread(train_data_path+'O/O_234.jpeg')  
display(sign_img, 'a')
```

In [10]:



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

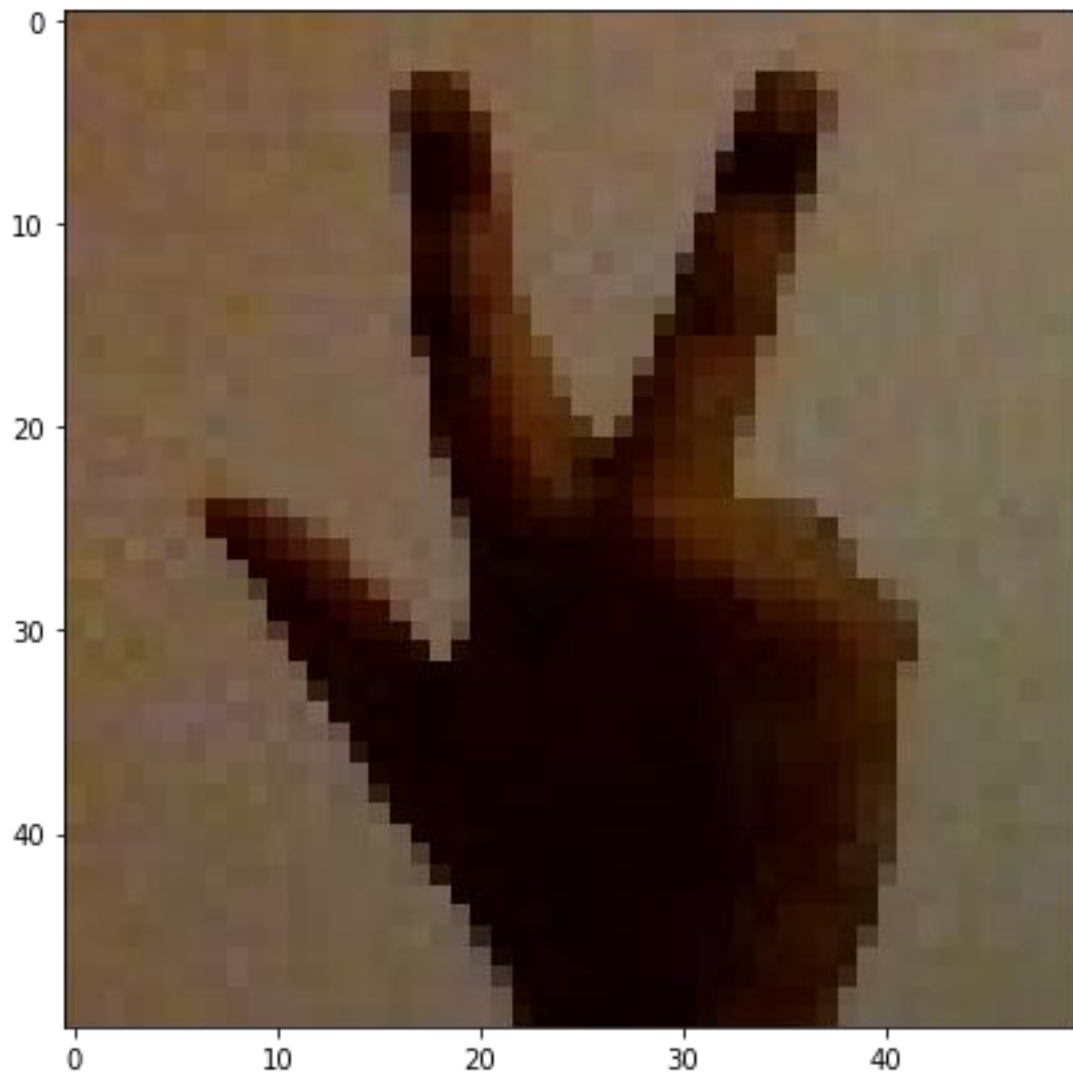
In [11]:



In [12]:

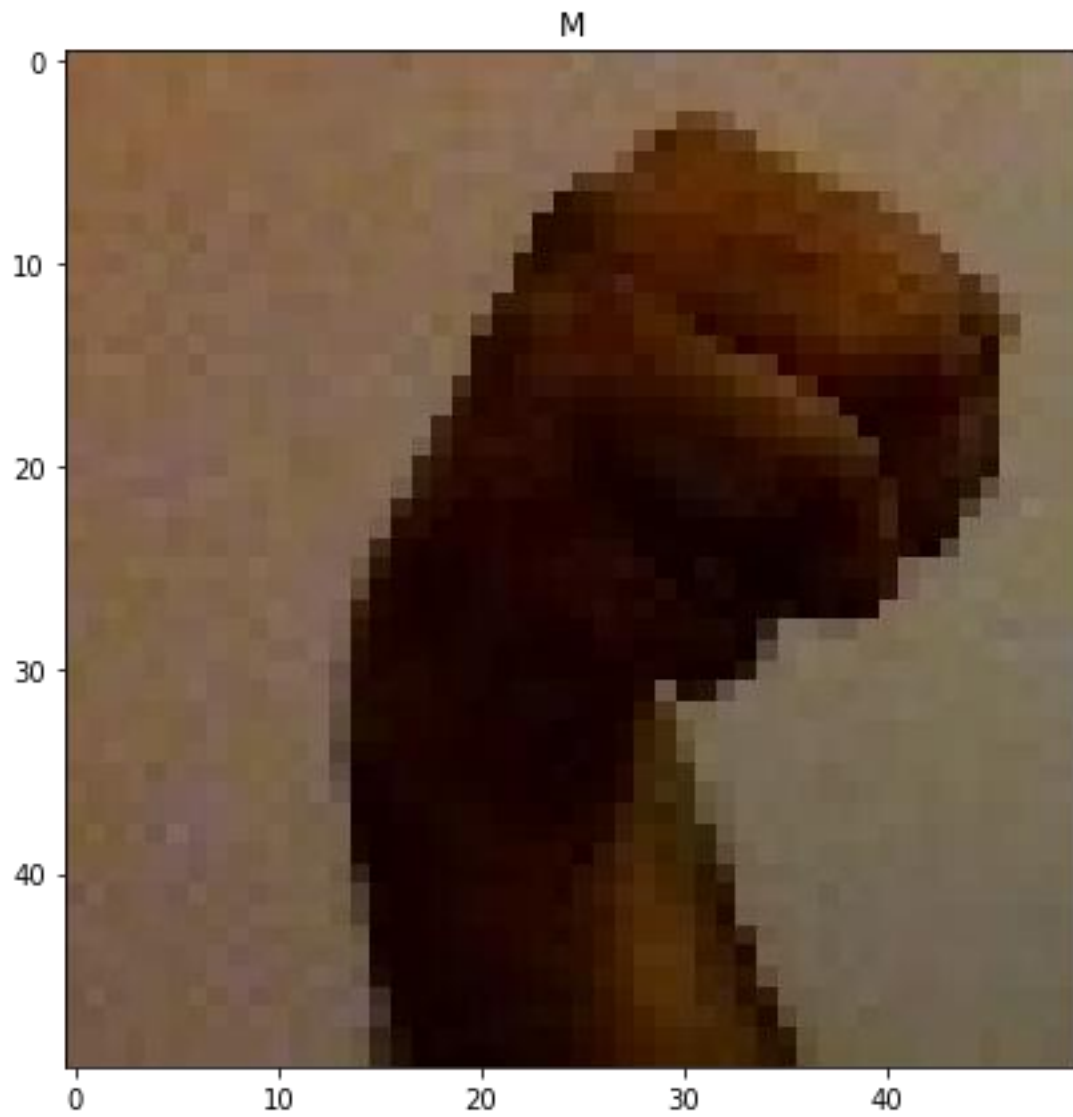
```
sign_img = cv2.imread(train_data_path+'3/3_340.jpeg')  
display(sign_img, '3')
```

3



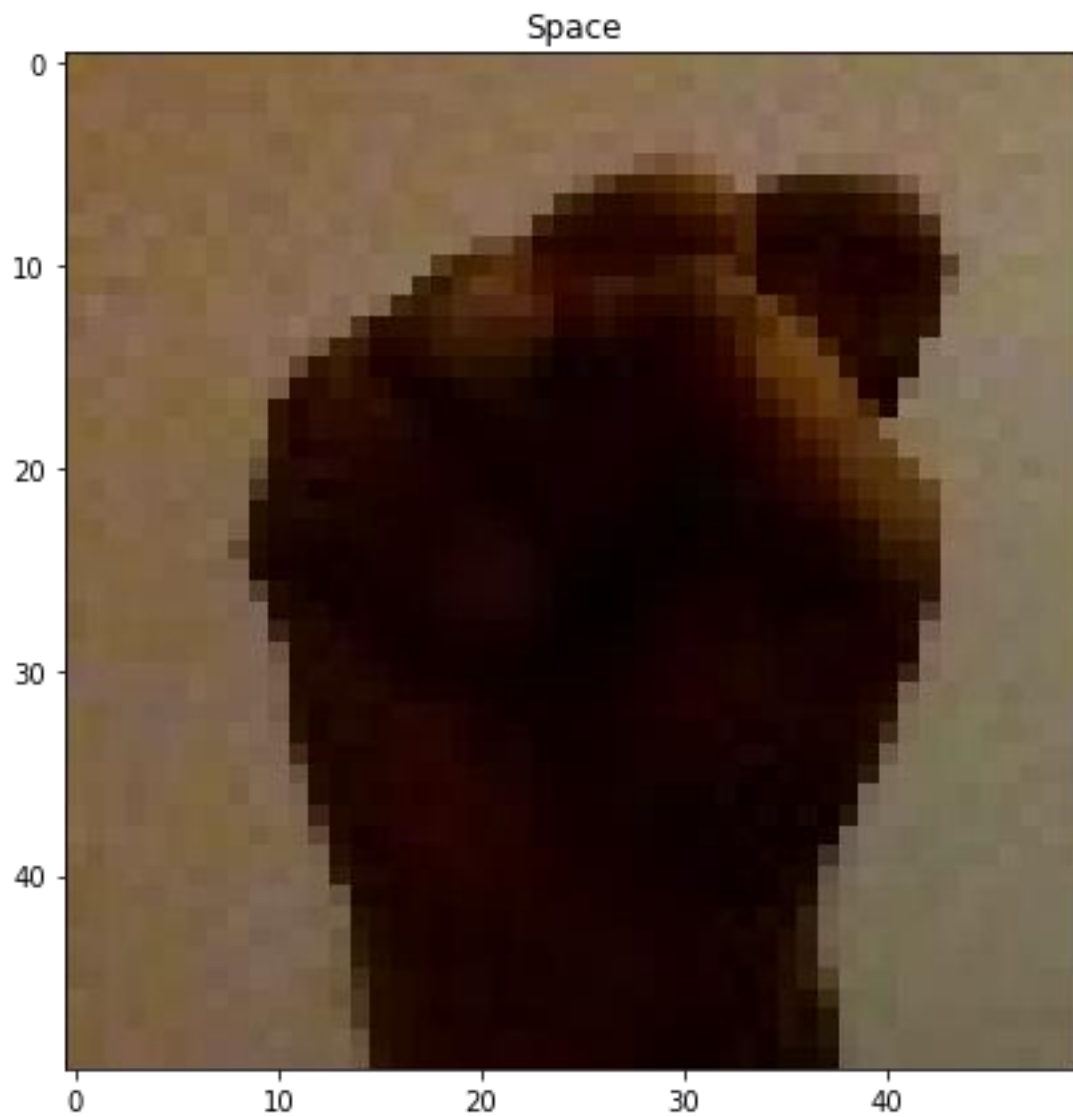
In [13]:

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



In [14]:

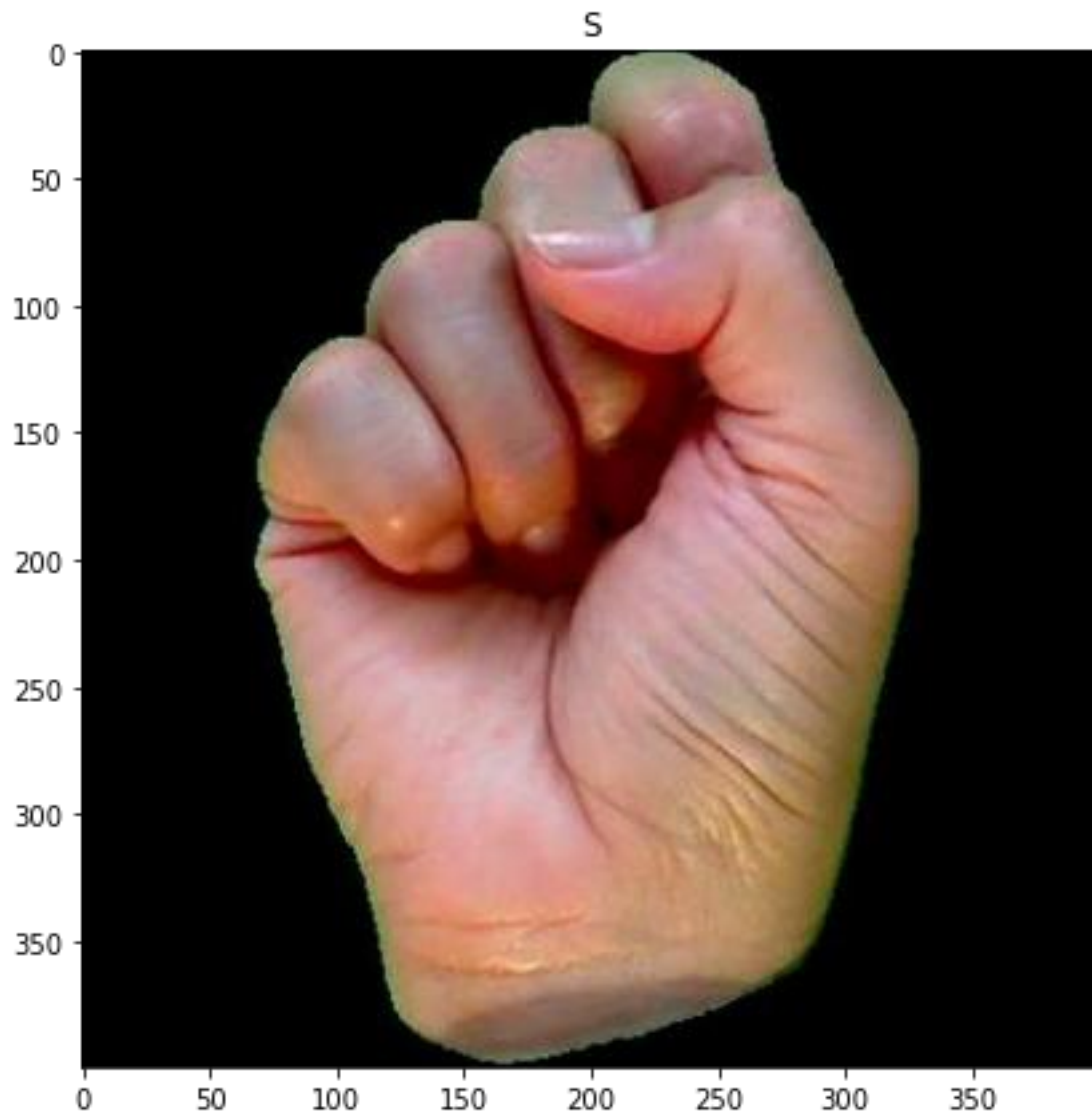
```
sign_img = cv2.imread(train_data_path+'S/S_10.jpeg')  
display(sign_img, 'Space')
```



Test Data Images

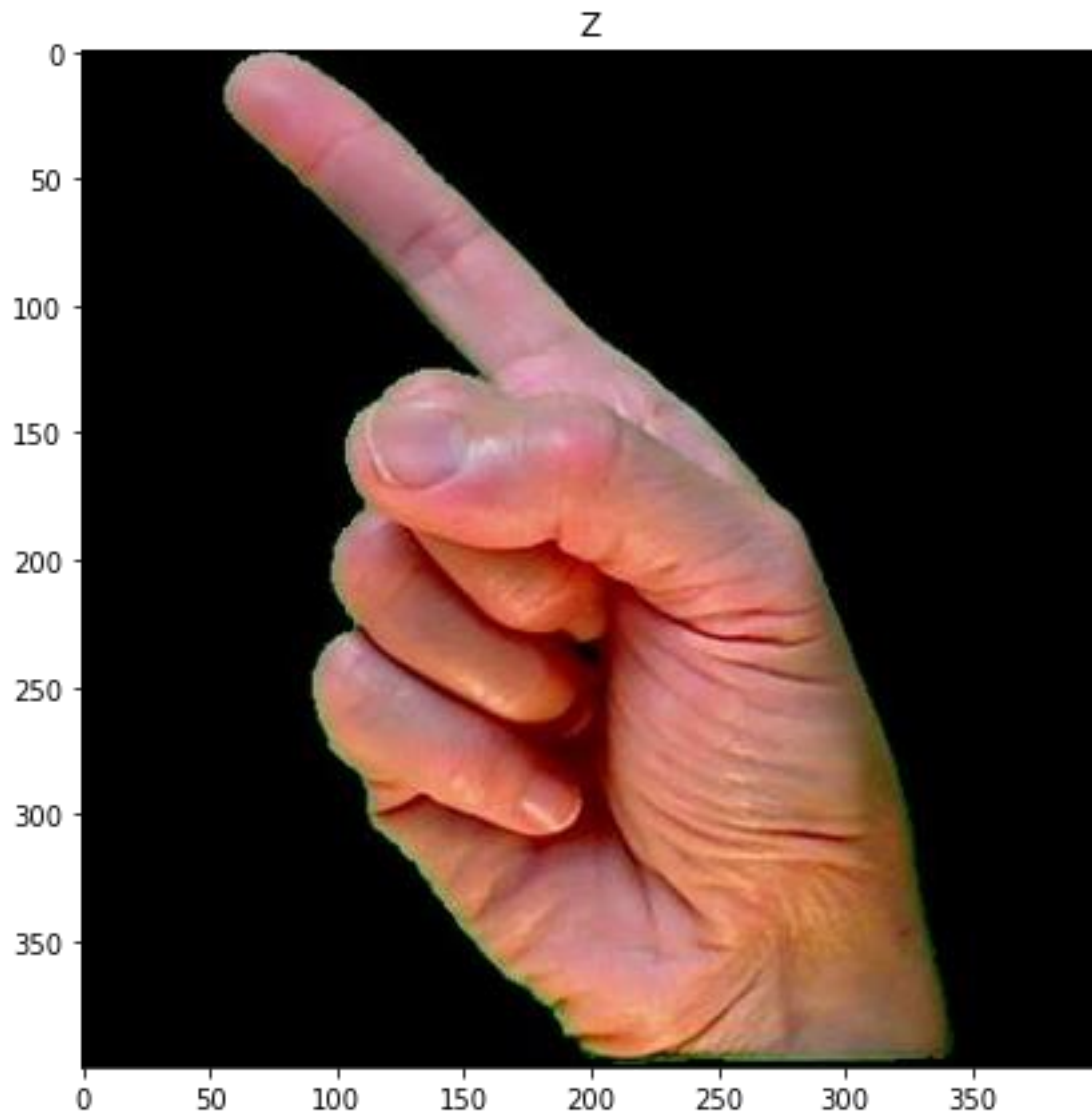
```
sign_img = cv2.imread(test_data_path+'S/S_15.jpeg')  
display(sign_img, 'S')
```

In [15]:



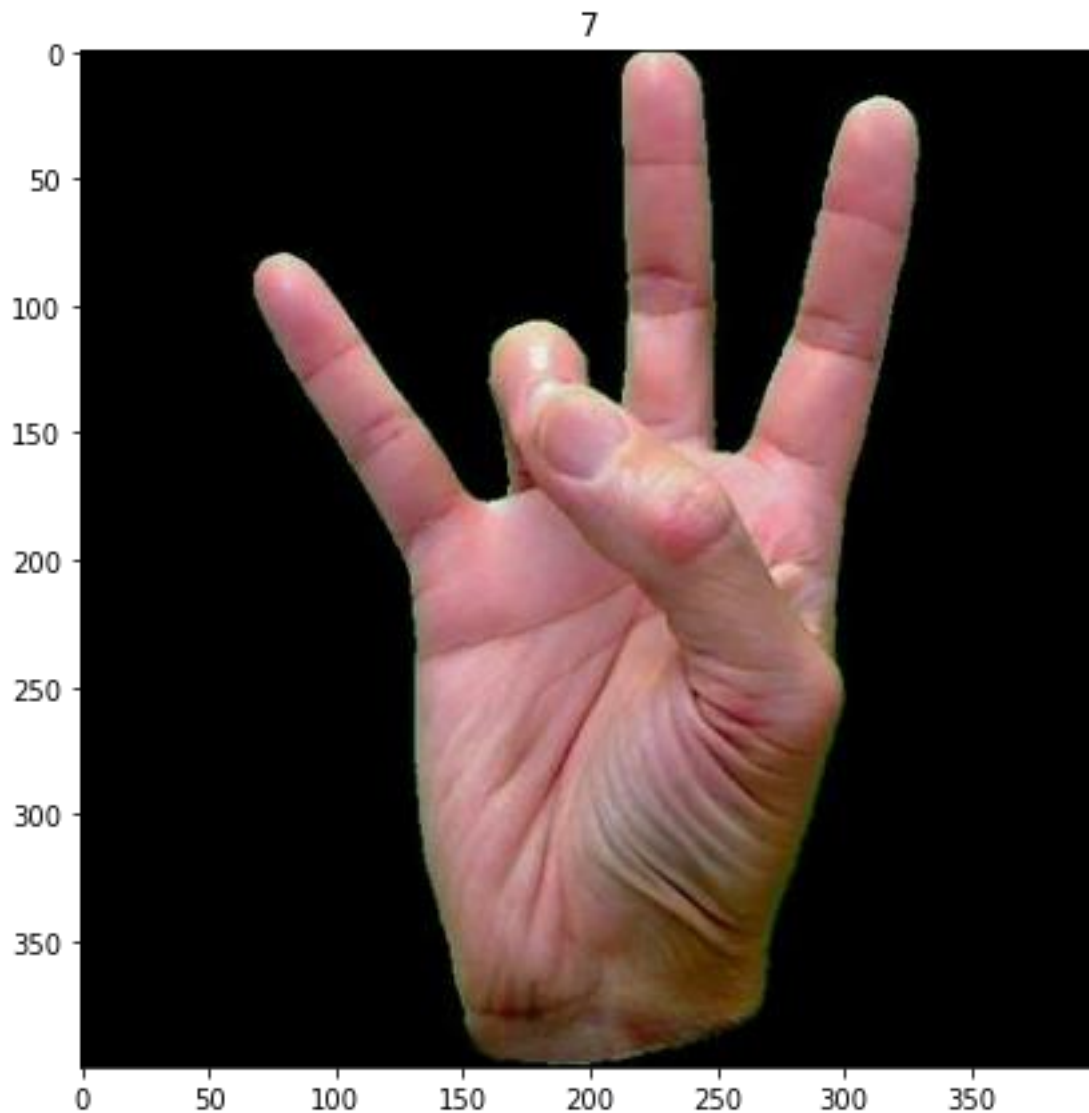
```
sign_img = cv2.imread(test_data_path+'Z/Z_1.jpeg')  
display(sign_img, 'Z')
```

In [16]:



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

In [17]:



AUGMENTATION AND PREPROCESSING THE DATASET

Creating ImageDataGenerator

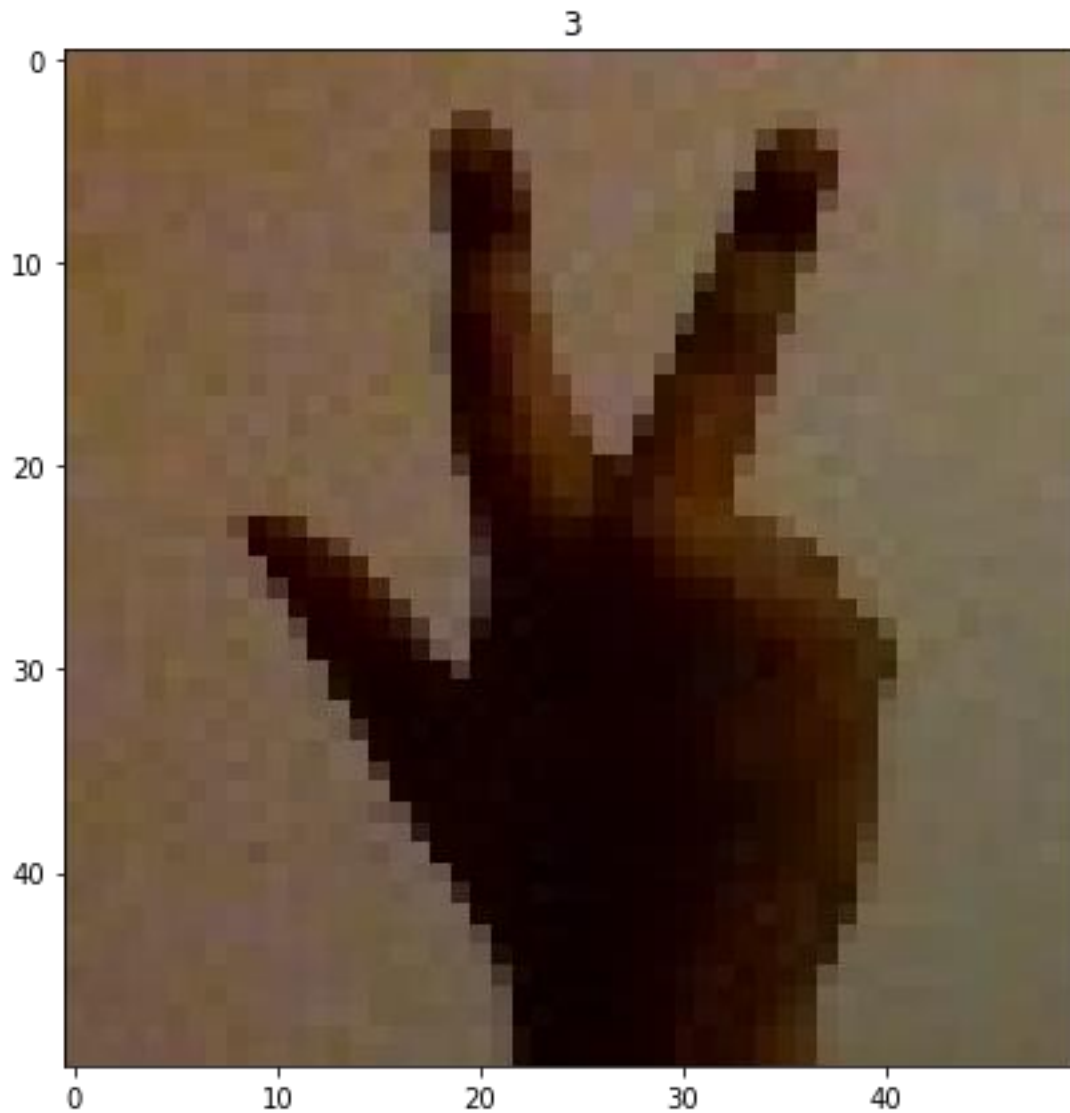
```
image_gen = ImageDataGenerator(rotation_range=30,  
                                width_shift_range=0.1,  
                                height_shift_range=0.1,  
                                shear_range=0.2,  
                                zoom_range=0.2,  
                            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

In [18]:

Original Image

In [19]:

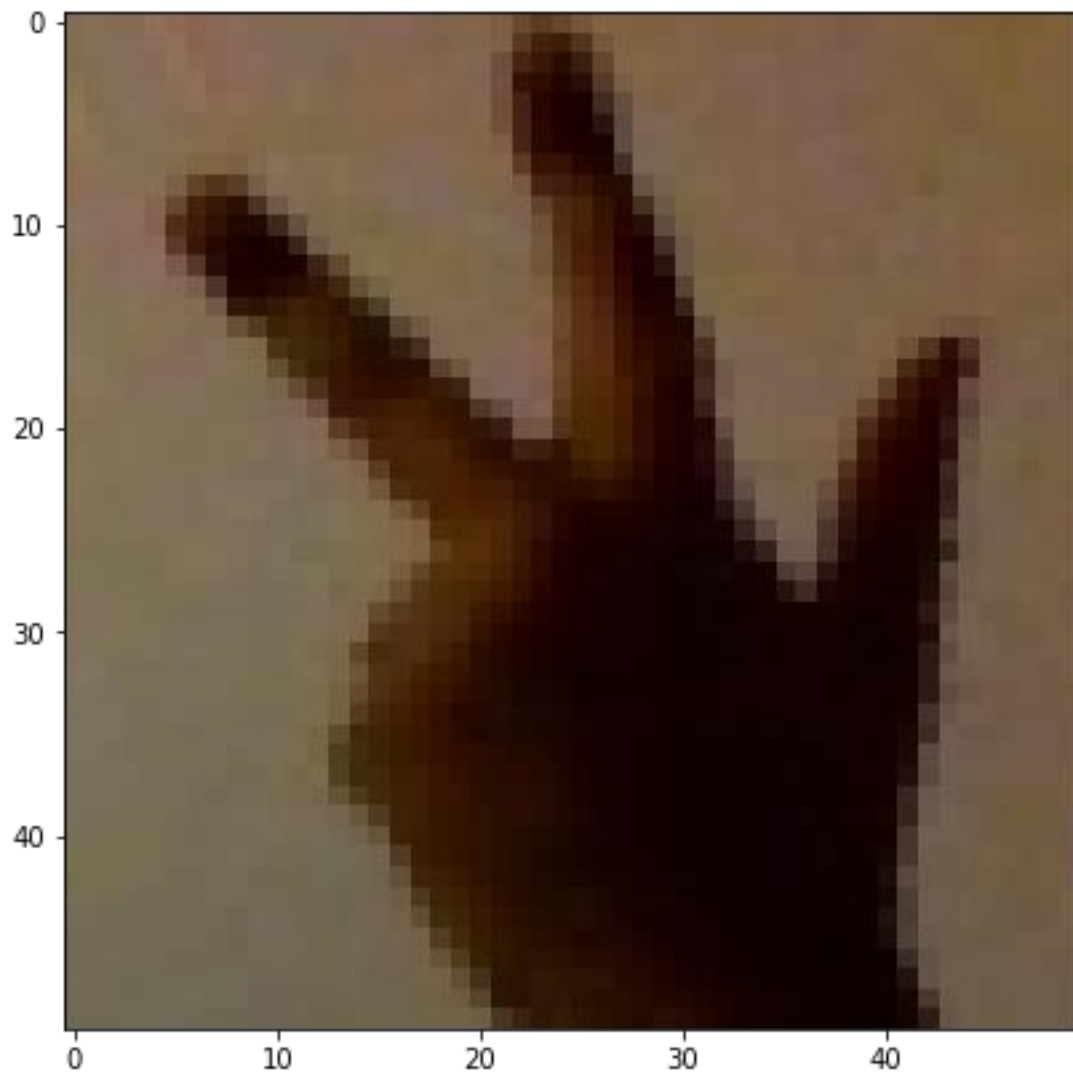
```
sign_img = cv2.imread(train_data_path+'3/3_100.jpeg')  
display(sign_img, '3')
```



Augmented Images

In [20]:

```
display(image_gen.random_transform(sign_img))
```



```
display(image_gen.random_transform(sign_img))
```

In [21]:



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')
```

In [22]:

Found 41625 images belonging to 37 classes.

Validation Data Generator

In [23]:

```
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

In [30]:

```
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.

In [31]:

```
train_data_gen.class_indices
```

Out[31]:

```
{'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
```

In [34]:

Out[34]:

In [35]:

Out[35]:

In [36]:

Out[36]:

In []: