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IMPORTING LIBRARIES

In [ ]:

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

Define DATA FILES

In [ ]:

```
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
```

In [ ]:

```
fn = 'Space' rename_imgs(fn)
```

In [ ]:

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

SAMPLE IMAGES FROM DATASET

In [ ]:

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

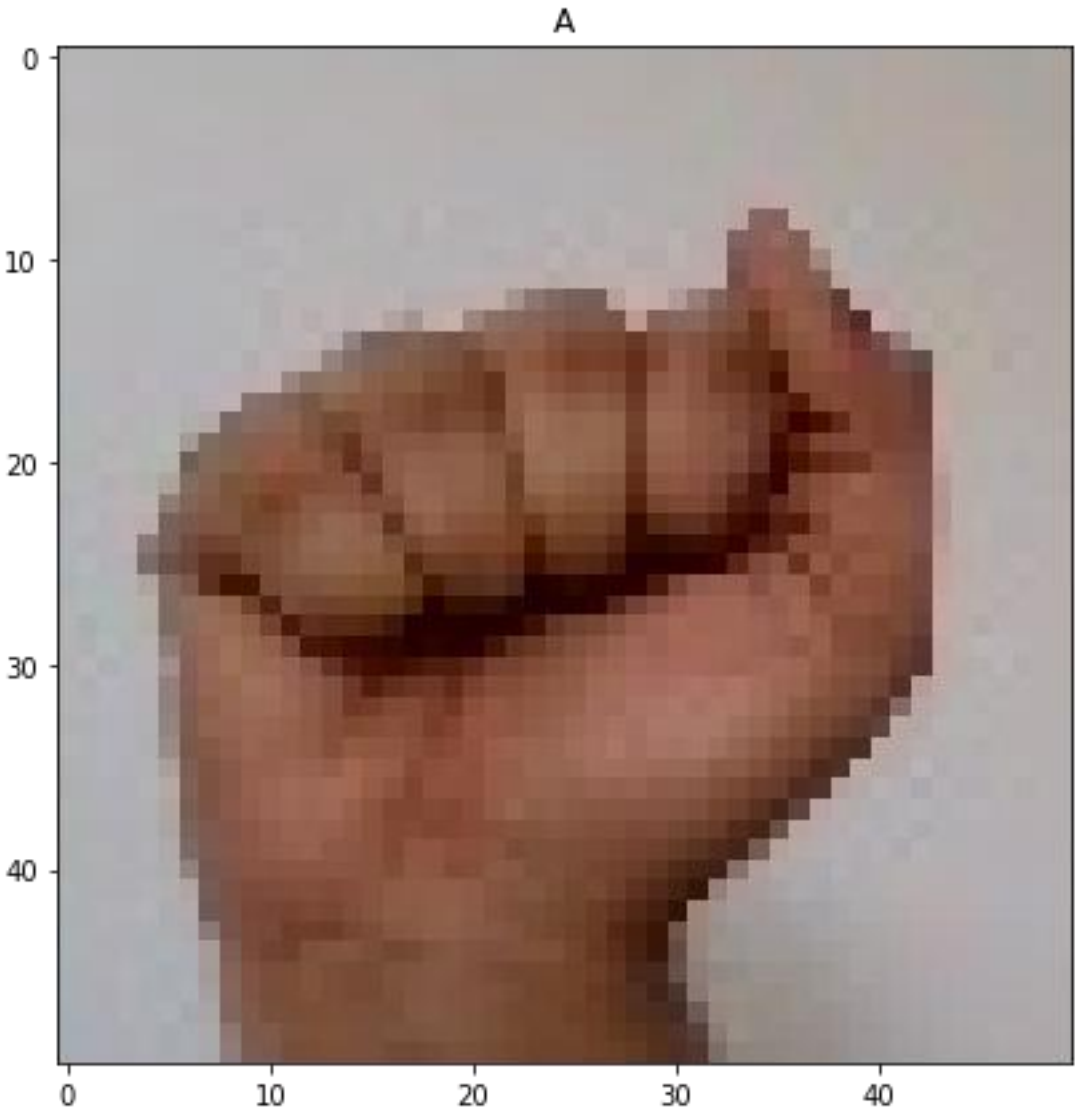
In [ ]:

```
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

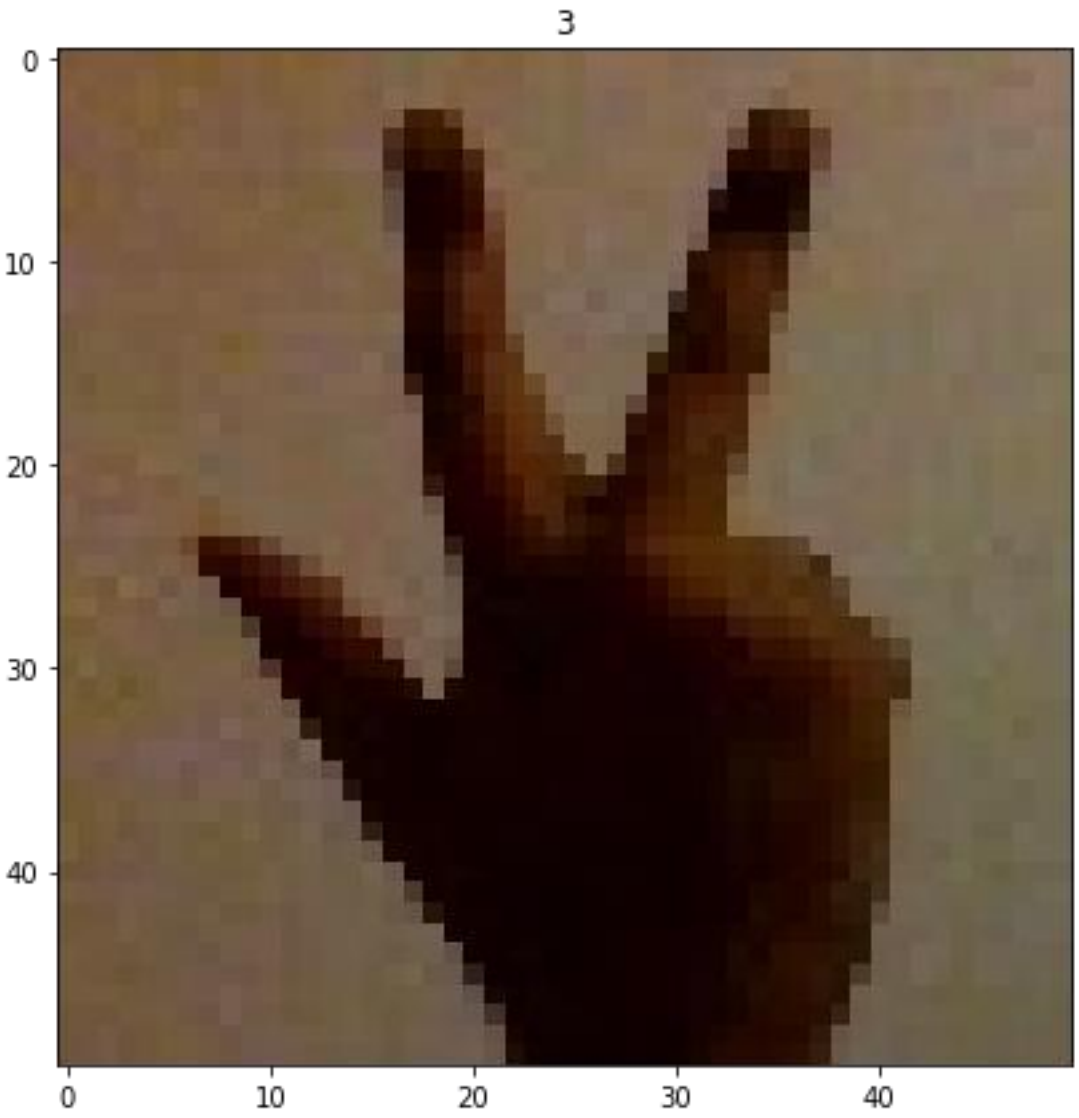
In [ ]:

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



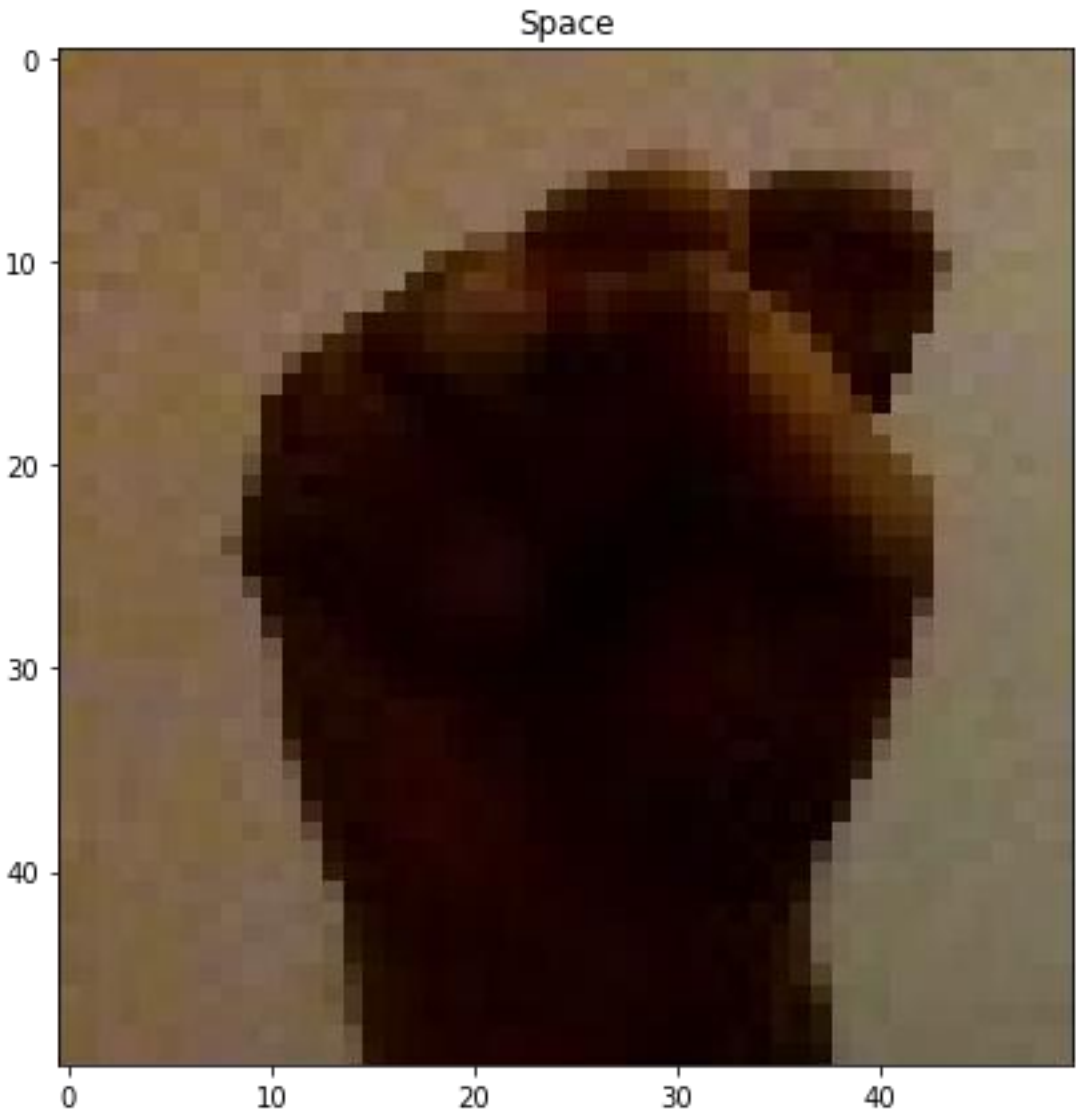
In [ ]:

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



In [ ]:

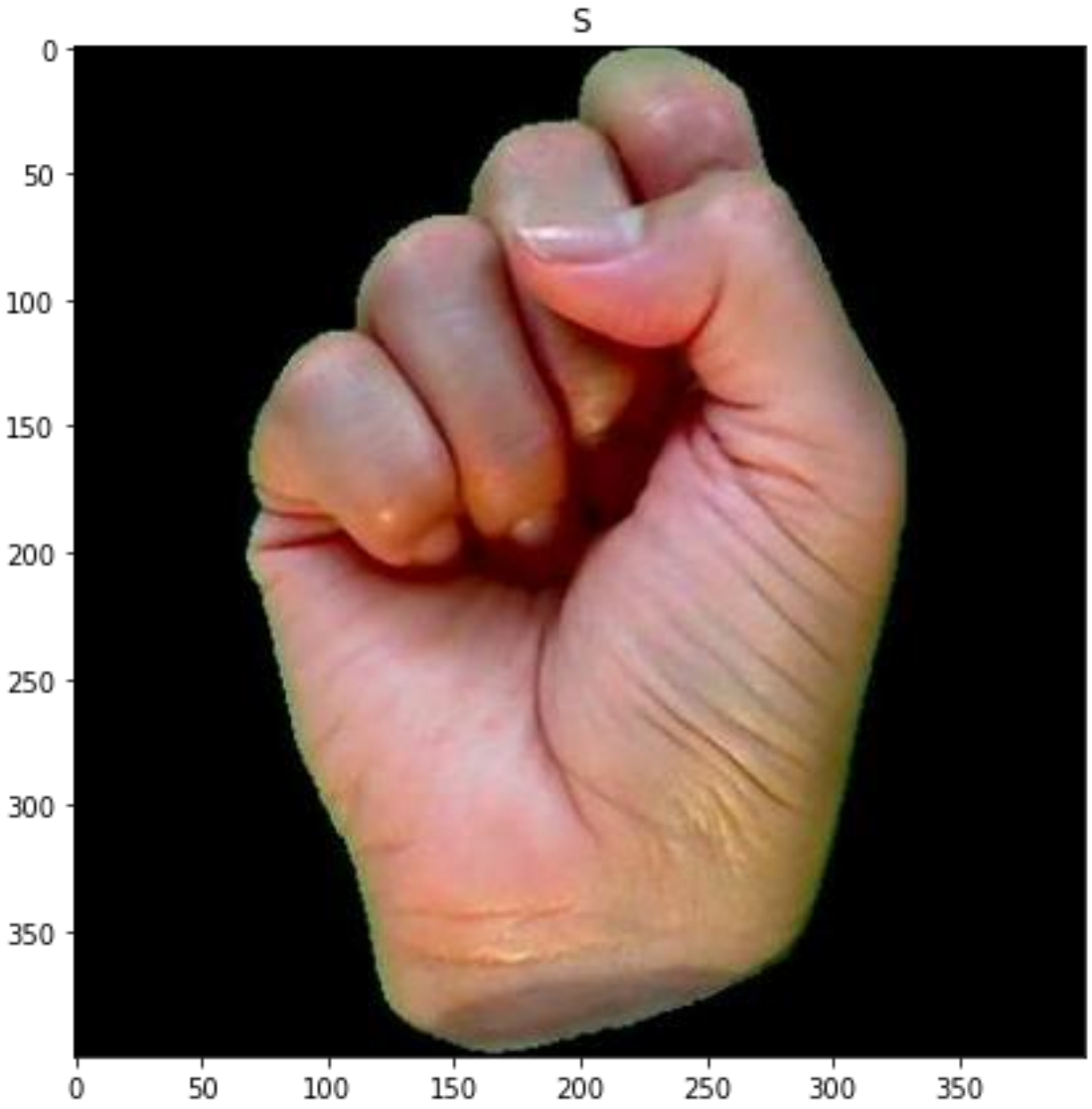
```
sign_img = cv2.imread(train_data_path+'S/S_10.jpeg')
display(sign_img,'Space')
```



Test Data Set

In [ ]:

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



In [ ]:

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

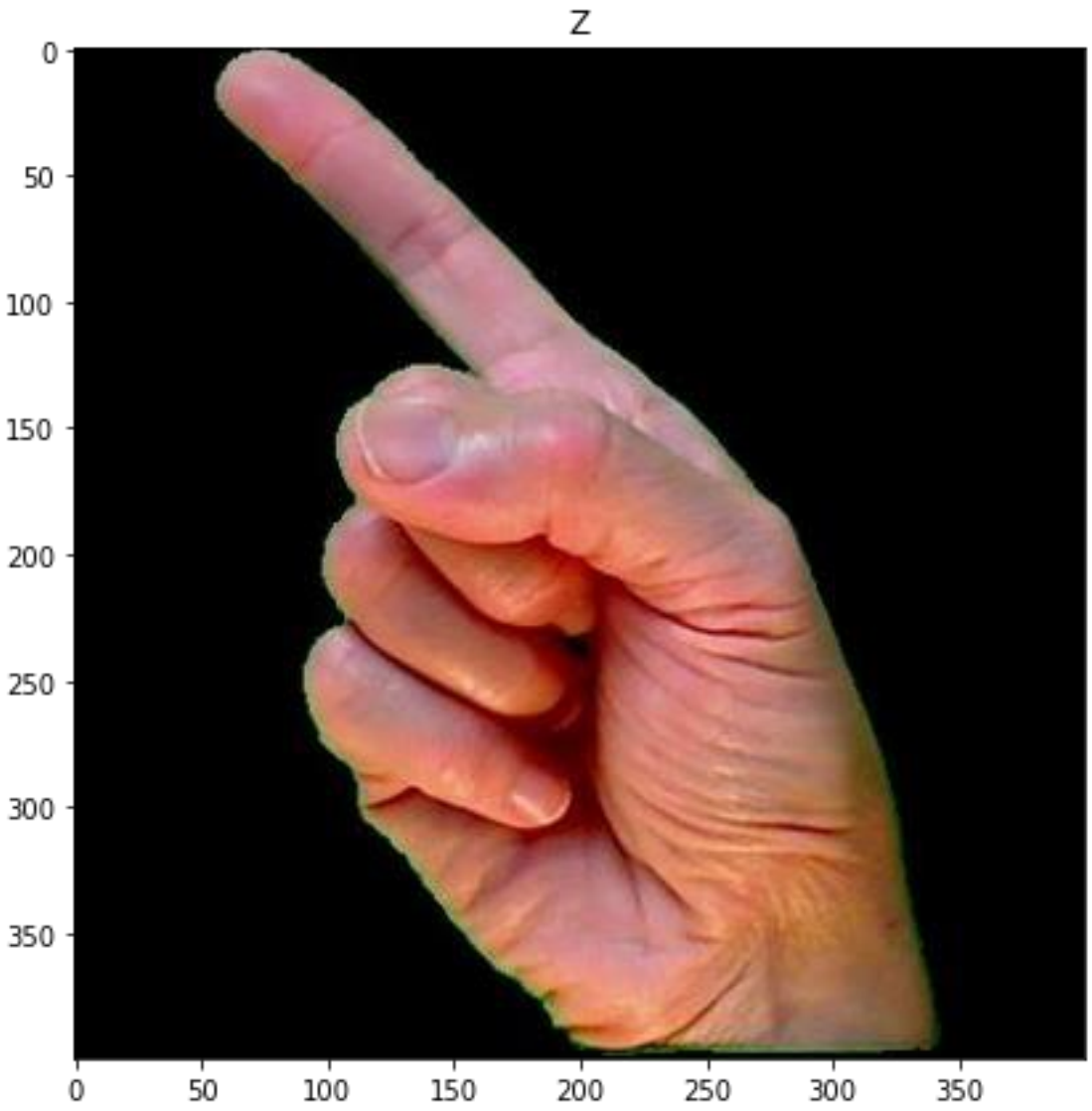


Image Data Generator

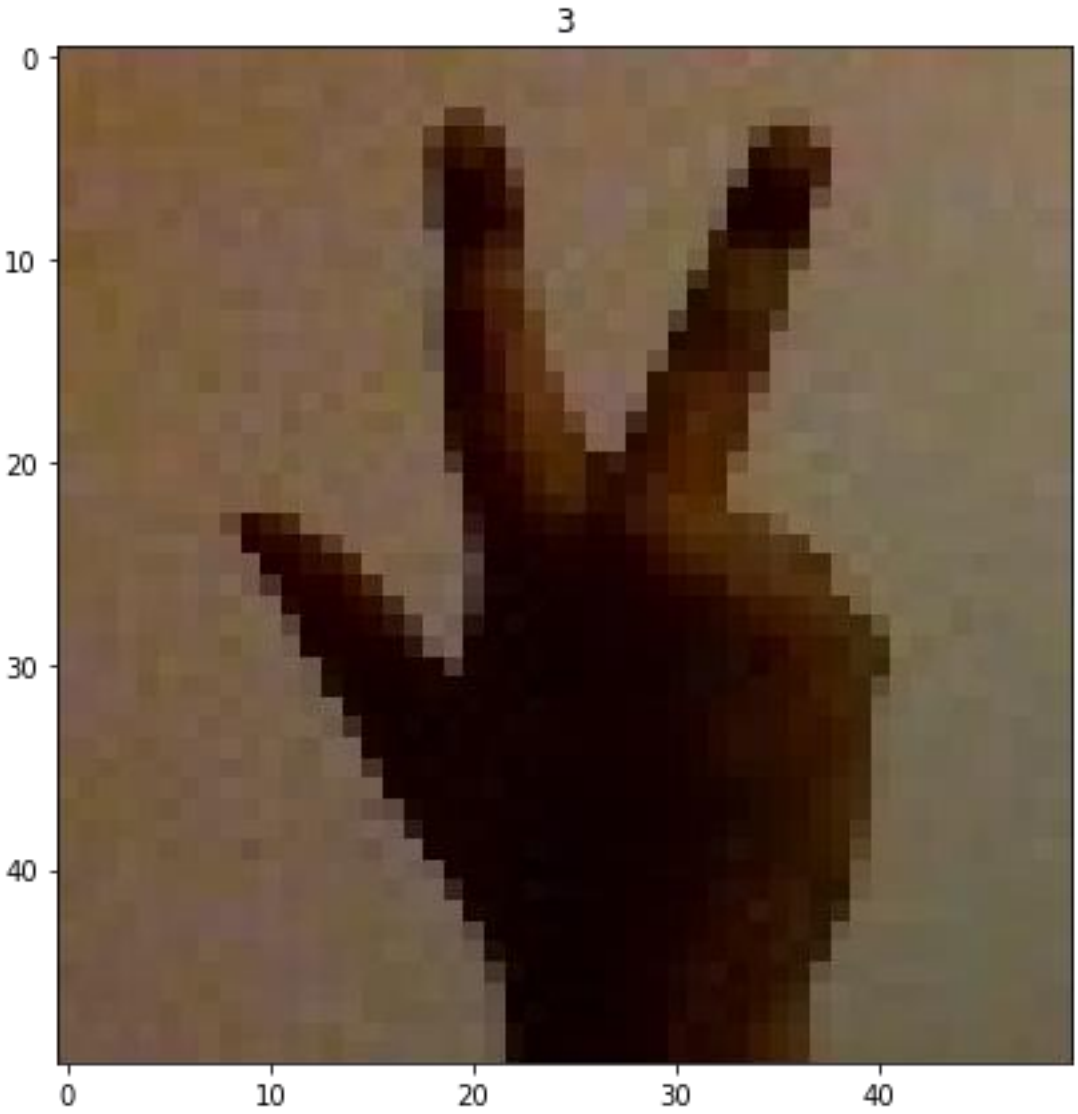
In [ ]:

```
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

In [ ]:

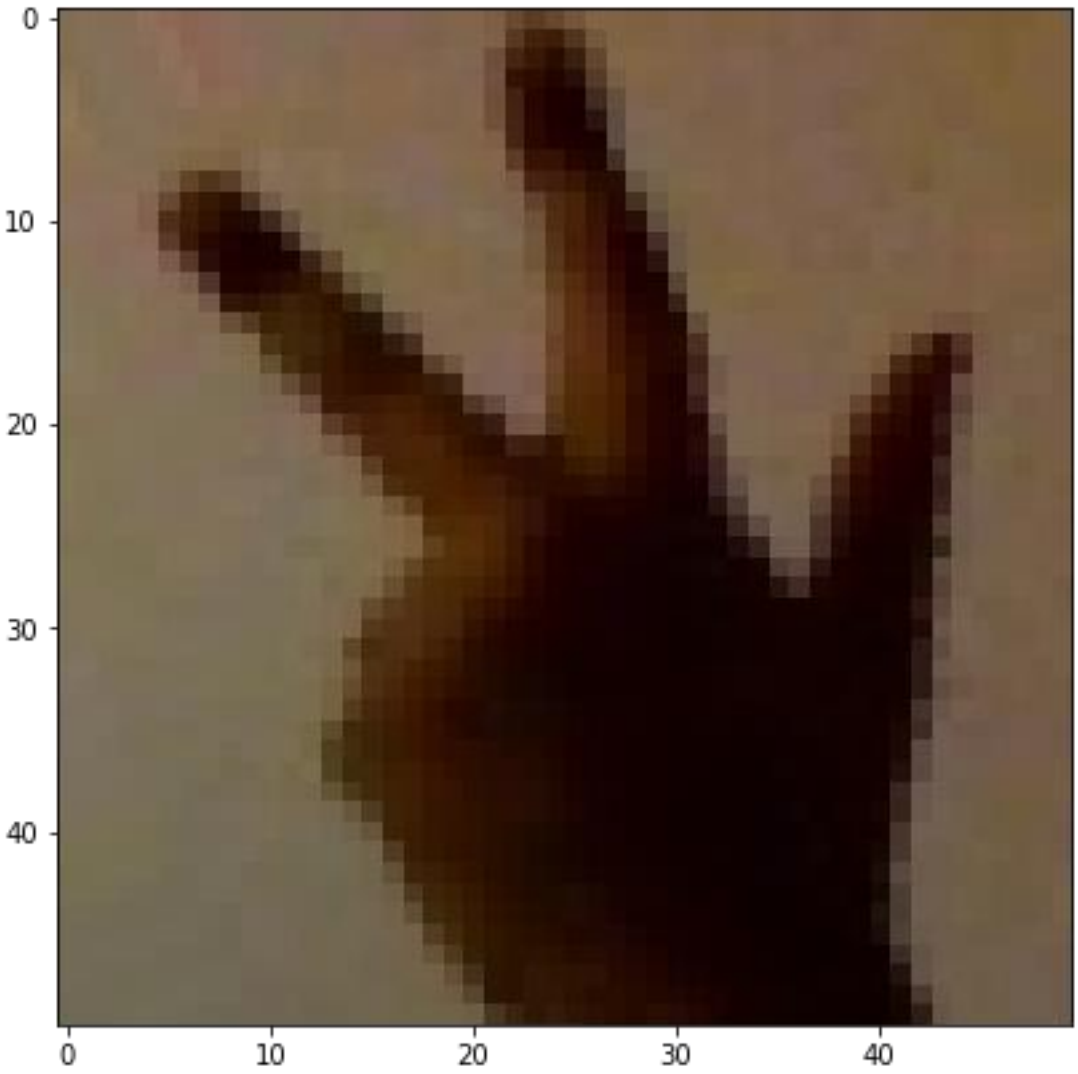
```
sign_img = cv2.imread(train_data_path+'3/3_100.jpeg')
display(sign_img,'3')
```



Augmented Images

In [ ]:

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



Split into Test & Validation dataset

Train Data Generator

In [ ]:

```
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

In [ ]:

```
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 [ ]:

```
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 [ ]:

```
train_data_gen.class_indices
```

Out[ ]:

```
{'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}
```

In [ ]:

```
test_data_gen.classes
```

Out[ ]:

```
array([ 0,  0,  0, ..., 36, 36, 36])
```

In [ ]:

```
len(train_data_gen.classes)
```

Out[ ]:

```
41625
```