IMPORTING NECESSARY LIBRARIES

In [ ]:

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

RENAMING 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 [ ]:

```
!unzip'/content/conversation engine for deaf and dumb (9).zip'
```

```
/bin/bash: unzip/content/conversation engine for deaf and dumb (9).zip: No such file or d
irectory
```

DISPLAYING 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 Images

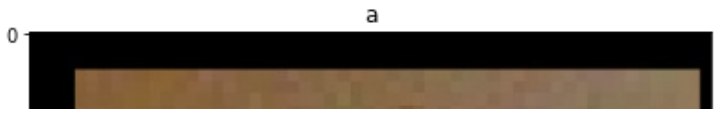
In [ ]:

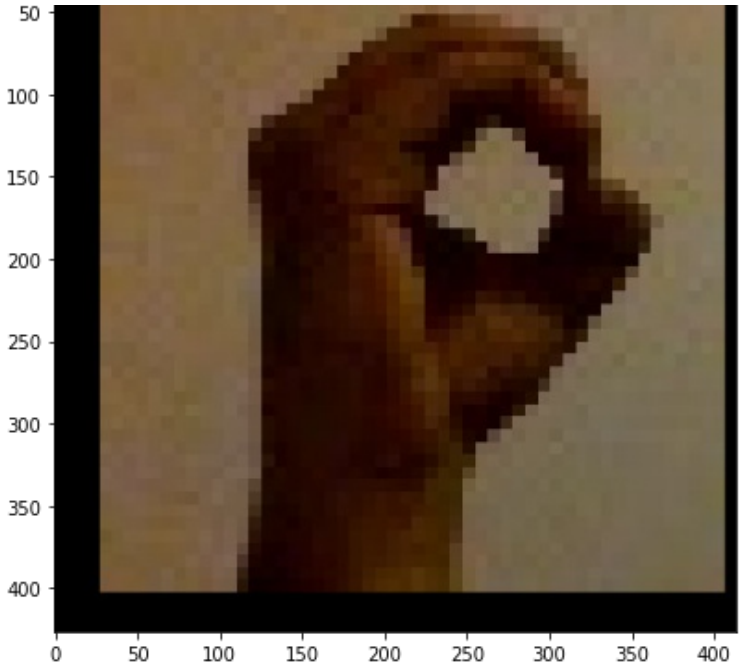
```
!unzip'/content/png2jpg.zip'
```

```
/bin/bash: unzip/content/png2jpg.zip: No such file or directory
```

In [ ]:

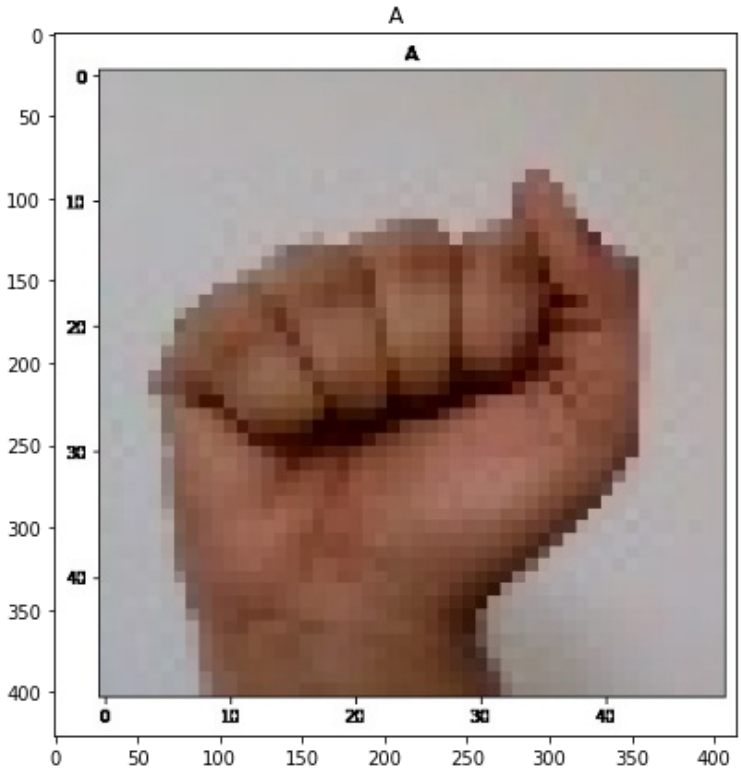
```
sign_img = cv2.imread('/content/download_1.jpeg')
display(sign_img,'a')
```





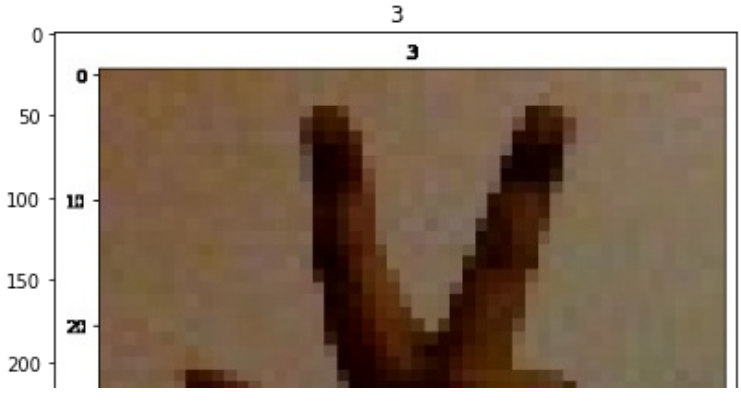
In [ ]:

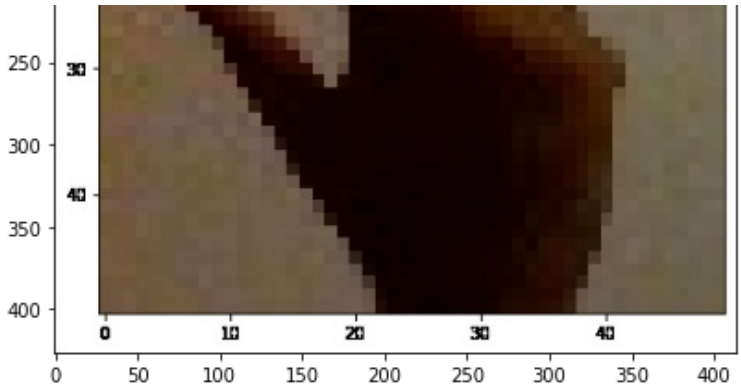
```
sign_img = cv2.imread('/content/download.jpeg')
display(sign_img,'A')
```



In [ ]:

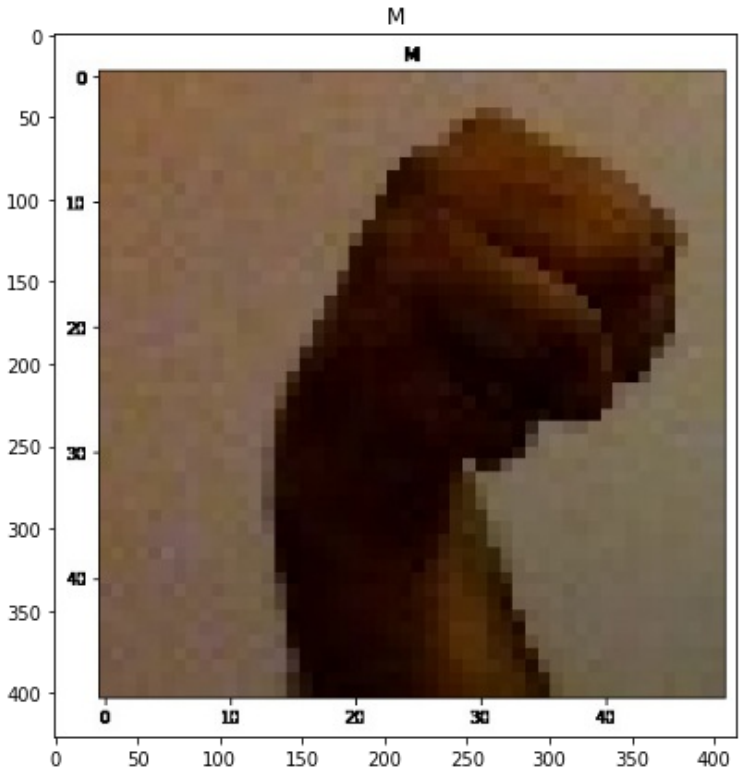
```
sign_img = cv2.imread('/content/download (1).jpeg')
display(sign_img,'3')
```





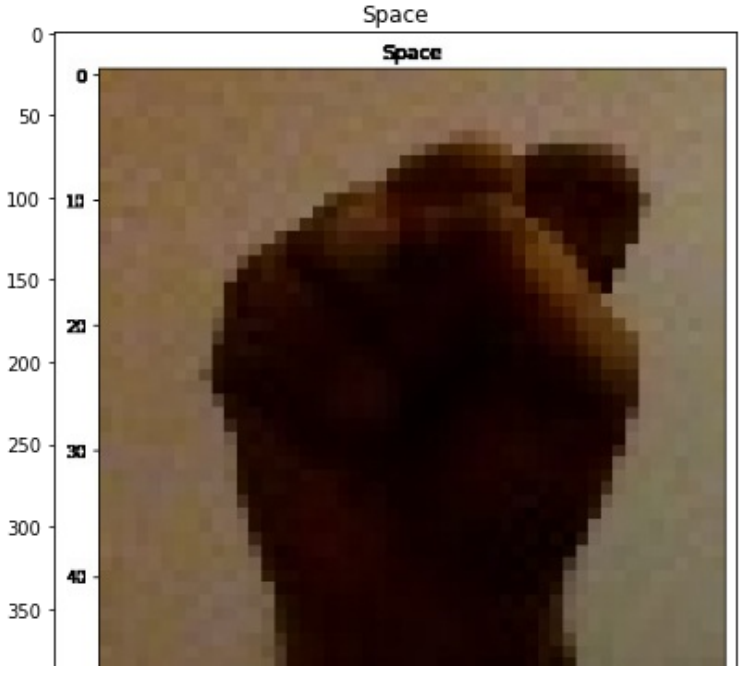
In [ ]:

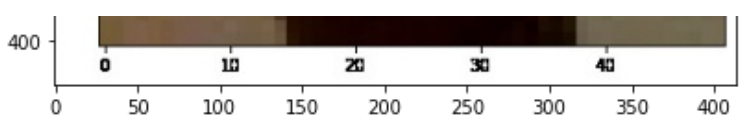
```
sign_img = cv2.imread('/content/download (2).jpeg')
display(sign_img,'M')
```



In [ ]:

```
sign_img = cv2.imread('/content/download (3).jpeg')
display(sign_img,'Space')
```

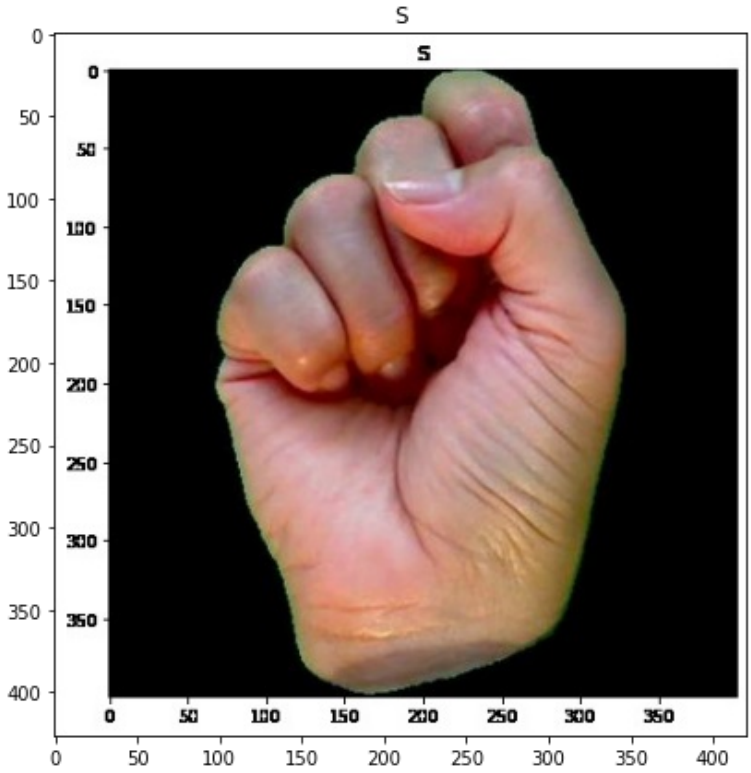




Test Data Images

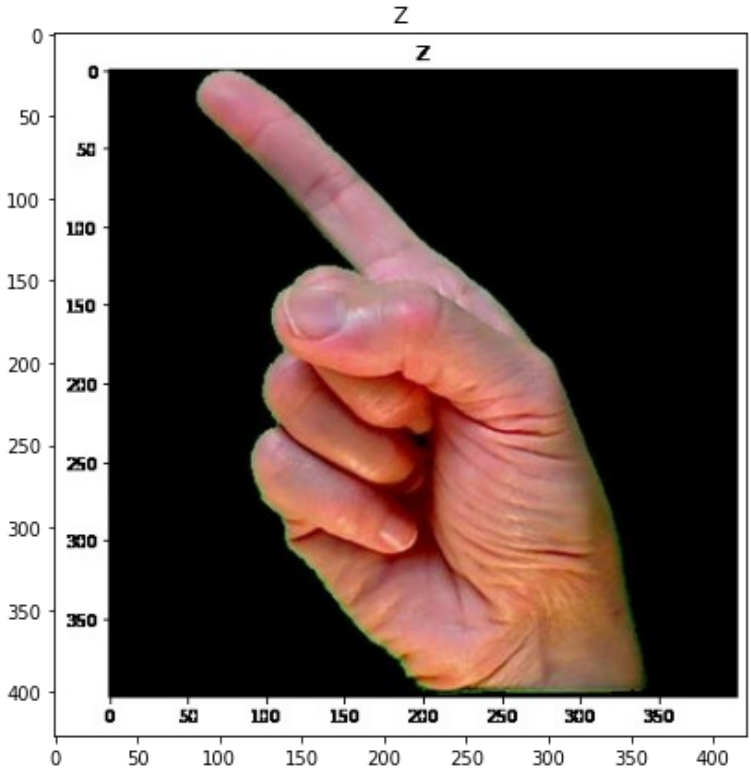
In [ ]:

```
sign_img = cv2.imread('/content/download (4).jpeg')
display(sign_img,'S')
```



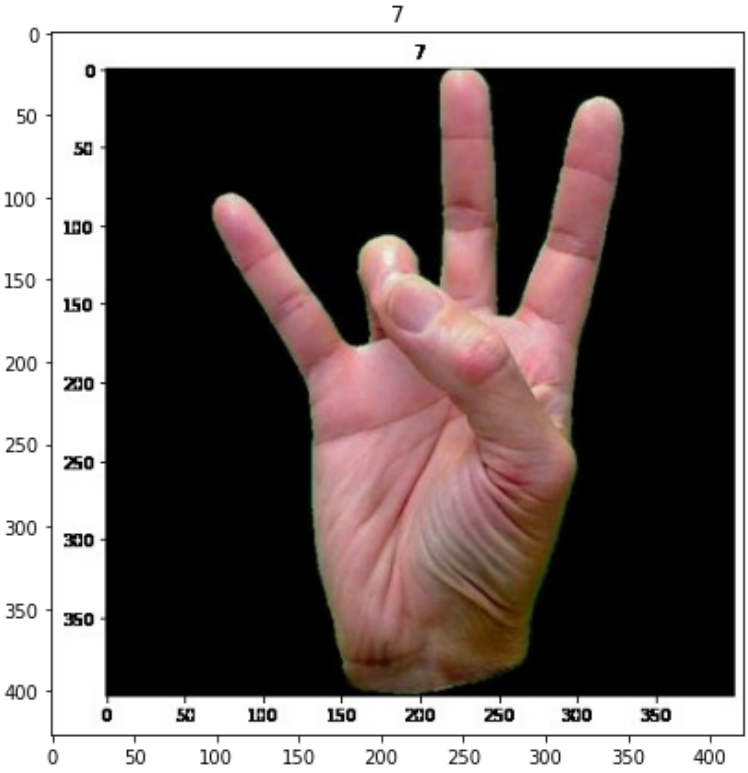
In [ ]:

```
sign_img = cv2.imread('/content/download (5).jpeg')
display(sign_img,'Z')
```



In [ ]:

```
sign_img = cv2.imread('/content/download (6).jpeg')
display(sign_img,'7')
```



AUGMENTATION AND PREPROCESSING THE DATASET

Creating ImageDataGenerator

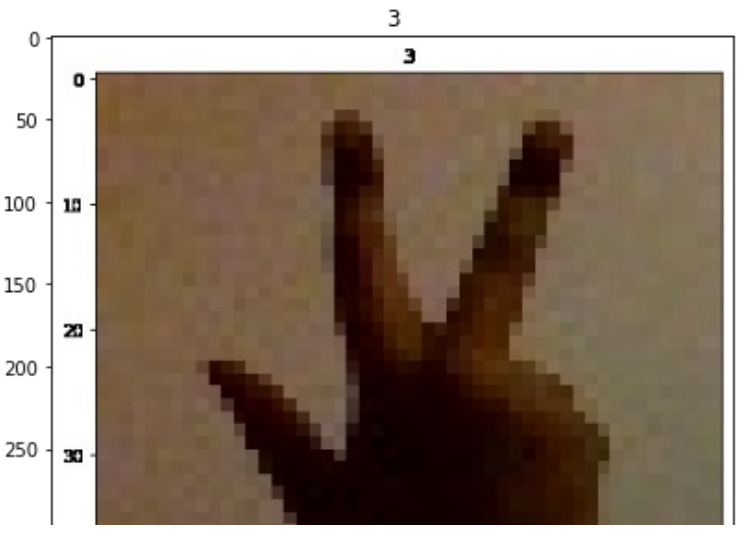
In [ ]:

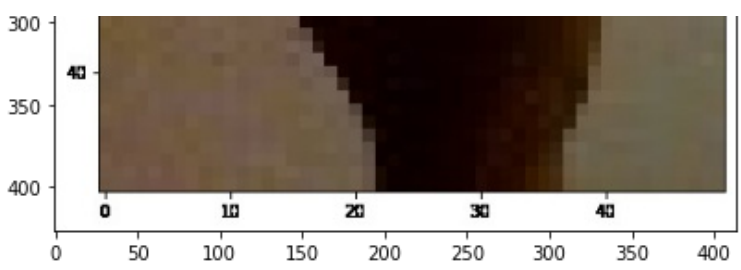
```
image_gen = ImageDataGenerator(rotation_range=30,
                               width_shift_range=0.1,
                               height_shift_range=0.1,
                               shear_range=0.2,
                               zoom_range=0.2,
                               rescale=1/255,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

Original Image

In [ ]:

```
sign_img = cv2.imread('/content/download (7).jpeg')
display(sign_img,'3')
```

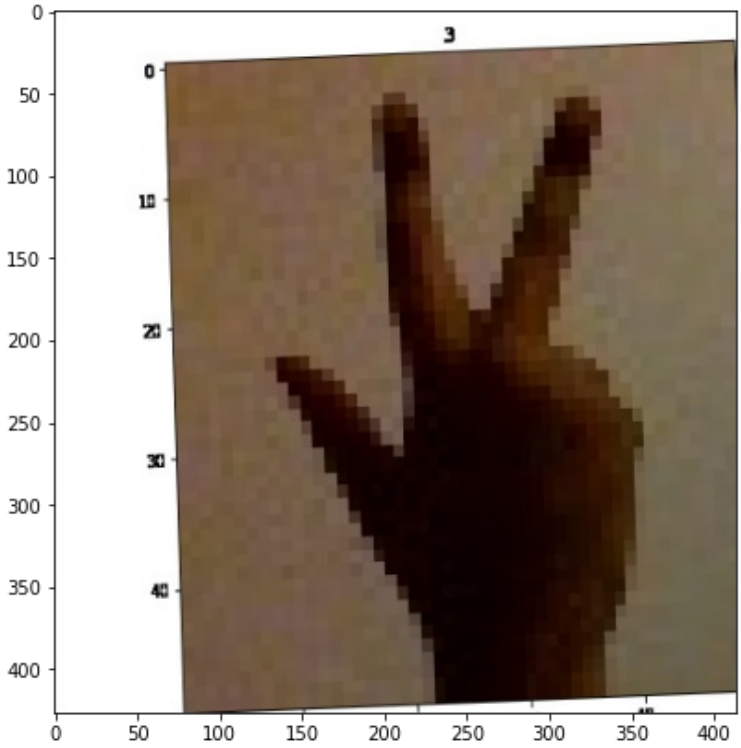




Augmented Images

In [ ]:

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



In [ ]:

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