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Team ID	PNT2022TMID14708
Project Name	Real-Time Communication System Powered by AI for Specially Abled

IMPORTING LIBRARIES

import os import cv2 import numpy as np import matplotlib.pyplot as plt from keras.preprocessing.image import ImageDataGenerator **Define 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)
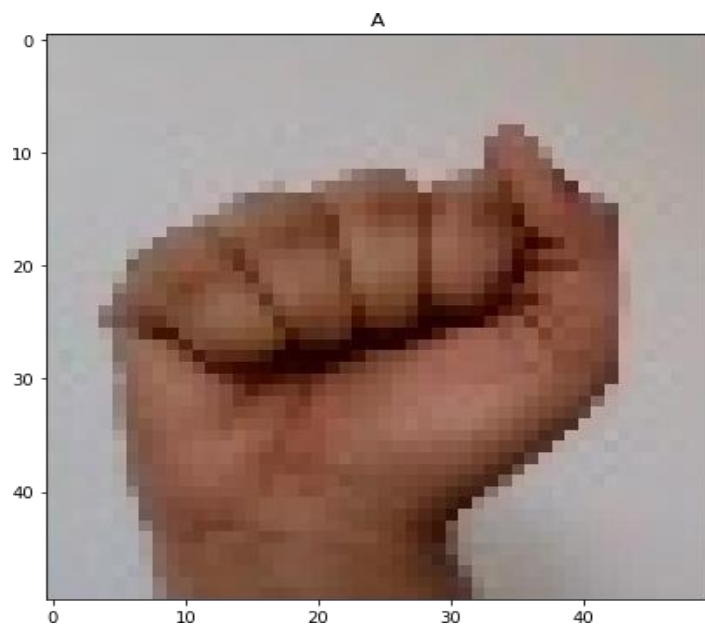
SAMPLE IMAGES FROM DATASET

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)
```
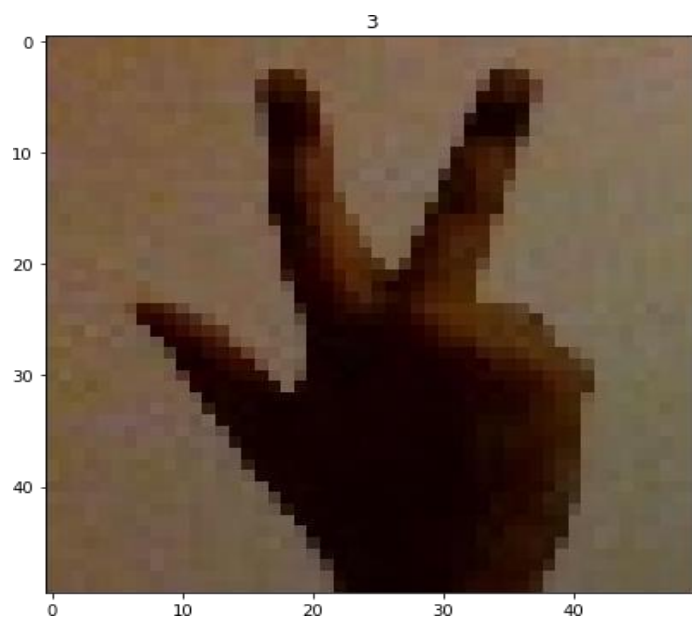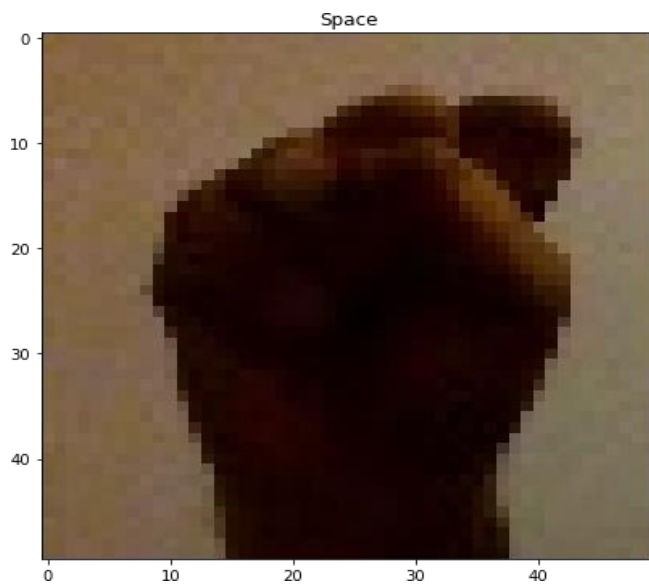**Training**

Data Set

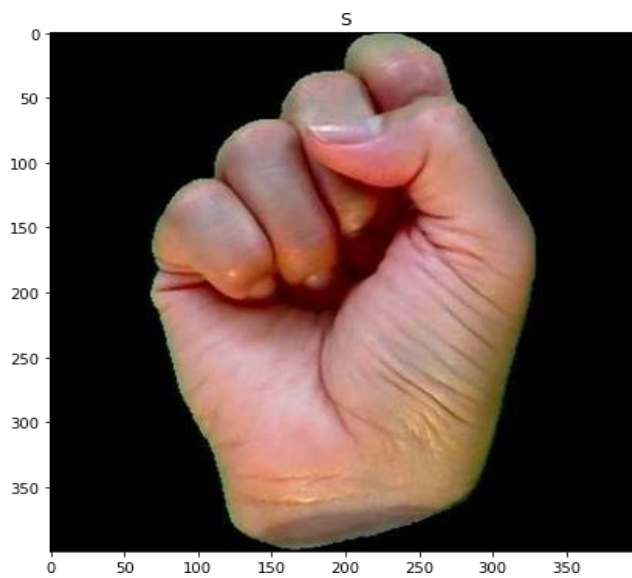sign_img = cv2.imread(train_data_path+'A/A_204.jpeg') display(sign_img,'A')

A

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

3

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

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

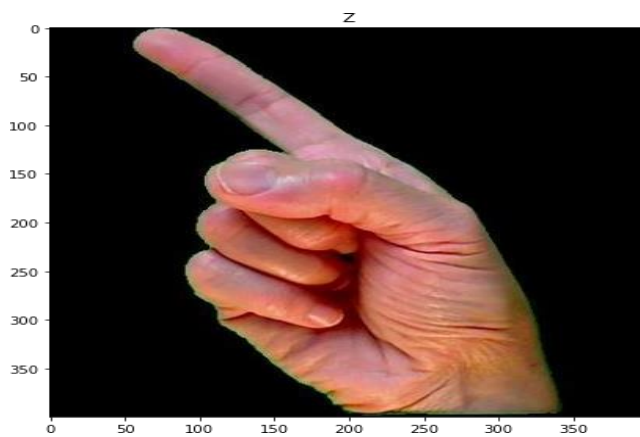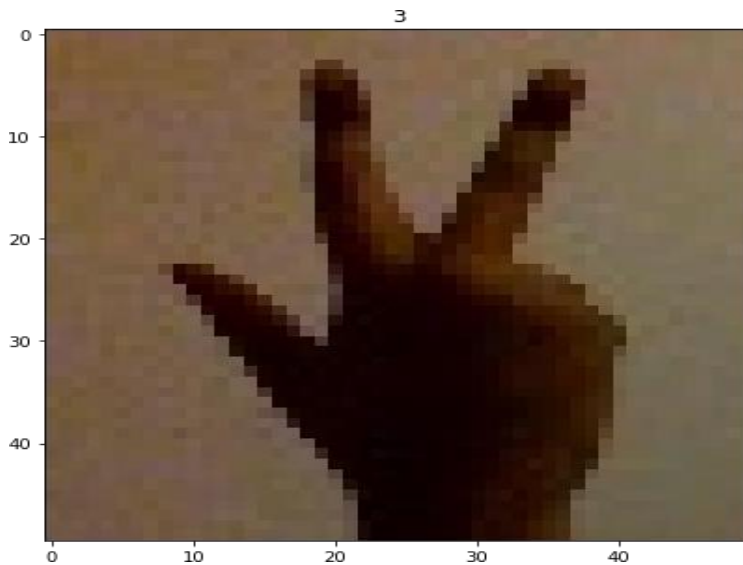sign_img = cv2.imread(test_data_path+'Z/Z_1.jpeg') display(sign_img,'Z')

Image Data Generator 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,

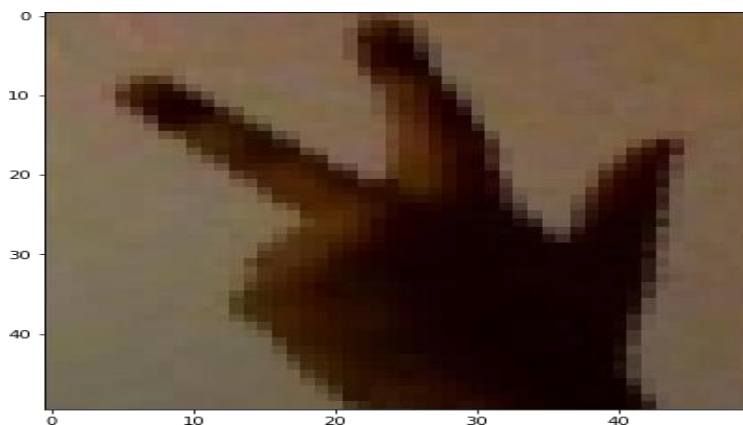fill_mode='nearest',

validation_split=0.25)

Original Image

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

Augmented Images

display(image_gen.random_transform(sign_img))

Split into Test & 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