

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

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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') 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') 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,  
                                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))
```

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

SPLITTING INTO TRAIN AND VALIDATION DATASET Train Data

Generator

[illegible]

```
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
```

