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))
```

SPLITING 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')
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