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
```