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

TEAM ID: PNT2022TMID19449

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IMPORTING NECESSARY LIBRARIES

In [1]:

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

RENAMING DATA FILES

In [26]:

```
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 [25]:

```
fn = 'Space'
rename_imgs(fn)
```

In [7]:

```
file_names = '0123456789'+'ABCDEFGHIJKLMNOPQRSTUVWXYZ'
for fn in file_names:
        rename_imgs(fn)
```

DISPLAYING SAMPLE IMAGES FROM DATASET

In [8]:

```
train_data_path = 'train_dataset/'
test_data_path = 'test_dataset/'
```

In [9]:

```
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 [10]:

```
sign_img = cv2.imread(train_data_path+'O/O_234.jpeg')
display(sign_img,'a')
```

In [11]:

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

In [12]:

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

In [13]:

```
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')
display(sign_img,'Space')
```

Test Data Images

In [15]:

```
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

In [18]:

```
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 [19]:

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

display(sign_img,'3')
```

Augmented Images

In [20]:

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

In [21]:

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

SPLITING INTO TRAIN AND VALIDATION DATASET

Train Data Generator

In [22]:

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

In [23]:

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

In [30]:

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.

In [31]:

train_data_gen.class_indices

Out[31]:

{'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}

In [34]:

```
test_data_gen.classes
```

Out[34]:

```
array([ 0, 0, 0, ..., 36, 36, 36])
```

In [35]:

```
len(train_data_gen.classes)
```

Out[35]:

41625

In [36]:

```
len(test_data_gen.classes)
```

Out[36]:

2586