

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

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Model Building

Import The Required Model Building Libraries

```
#import imagedatagenerator  
from keras.preprocessing.image import ImageDataGenerator
```

In [1]:

```
#training datagen  
train_datagen=ImageDataGenerator(rescale=1./255, shear_range=0.2, zoom_range=  
0.2, horizontal_flip=True)
```

In [2]:

```
#testing datagen  
test_datagen=ImageDataGenerator(rescale=1./255)
```

In [3]:

IMPORTING tensorflow

```
import tensorflow as tf  
import os
```

In [4]:

Initialize The Model

```
#create model  
from keras.models import Sequential  
from keras.layers import Dense  
from keras.layers import Convolution2D  
from keras.layers import MaxPooling2D  
from keras.layers import Dropout  
from keras.layers import Flatten  
from tensorflow.keras.preprocessing.image import ImageDataGenerator
```

In [13]:

```
import numpy as np  
import matplotlib.pyplot as plt #to view graph in colab itself  
import IPython.display as display  
from PIL import Image  
import pathlib
```

In [6]:

Unzipping the dataset

In [7]:

```
!unzip '/content/conversation engine for deaf and dumb (1).zip'
```

**Streaming output truncated to the last 5000 lines.**

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```
inflating: Dataset/training_set/I/96.png
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inflating: Dataset/training_set/I/999.png
```

#### Applying ImageDataGenerator to training set

In [8]:

```
x_train=train_datagen.flow_from_directory('/content/Dataset/training_set',target_size=(64,64),batch_size=200,
```

```
class_mode='categorical',color_mode="grayscale")
```

Found 15750 images belonging to 9 classes.

#### Applying ImageDataGenerator to test set

In [9]:

```
x_test=test_datagen.flow_from_directory('/content/Dataset/test_set',target_size=(64,64),batch_size=200,
```

```
class_mode='categorical',color_mode="grayscale")
Found 2250 images belonging to 9 classes.
```

In [10]:

```
a=len(x_train)
b=len(x_test)
```

**Length of training set**

In [11]:

```
print(a)
79
```

**Length of test set**

In [12]:

```
print(b)
12
```

**Add Layers**

In [15]:

```
#create model
model=Sequential()
```

**Add The Convolution Layer**

In [16]:

```
model.add(Convolution2D(32,(3,3),input_shape=(64,64,1),activation='relu'))
```

**Add Pooling Layer**

In [17]:

```
model.add(MaxPooling2D(pool_size=(2,2)))
```

**Add The Flatten Layer**

In [18]:

```
model.add(Flatten())
```

**Adding The Dense Layers**

In [19]:

```
#1st hidden layer
model.add(Dense(units=512,activation='relu'))
#2nd hidden layer
model.add(Dense(units=261,activation='relu'))
```

In [20]:

```
#output layer
model.add(Dense(units=9,activation='softmax'))
```

**Compile The Model**

In [22]:

```
model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accuracy'])
```

**Fit The Model**

In [23]:

```
model.fit_generator(x_train,steps_per_epoch=len(x_train),epochs=10,validation_data=x_test,validation_steps=len(x_test))
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: UserWarning
: `Model.fit_generator` is deprecated and will be removed in a future versi
on. Please use `Model.fit`, which supports generators.
```

```
"""Entry point for launching an IPython kernel.
```

```
Epoch 1/10
```

```
79/79 [=====] - 90s 1s/step - loss: 0.3965 - accur
acy: 0.8746 - val_loss: 0.2797 - val_accuracy: 0.9529
```

```
Epoch 2/10
```

```
79/79 [=====] - 86s 1s/step - loss: 0.0419 - accur
acy: 0.9884 - val_loss: 0.2846 - val_accuracy: 0.9751
```

```
Epoch 3/10
```

```
79/79 [=====] - 84s 1s/step - loss: 0.0195 - accur
acy: 0.9947 - val_loss: 0.3436 - val_accuracy: 0.9751
```

```
Epoch 4/10
```

```
79/79 [=====] - 87s 1s/step - loss: 0.0083 - accur
acy: 0.9982 - val_loss: 0.3722 - val_accuracy: 0.9751
```

```
Epoch 5/10
```

```
79/79 [=====] - 83s 1s/step - loss: 0.0066 - accur
acy: 0.9983 - val_loss: 0.4095 - val_accuracy: 0.9756
```

```
Epoch 6/10
```

```
79/79 [=====] - 88s 1s/step - loss: 0.0072 - accur
acy: 0.9979 - val_loss: 0.3874 - val_accuracy: 0.9756
```

```
Epoch 7/10
```

```
79/79 [=====] - 86s 1s/step - loss: 0.0059 - accur
acy: 0.9985 - val_loss: 0.3891 - val_accuracy: 0.9747
```

```
Epoch 8/10
```

```
79/79 [=====] - 86s 1s/step - loss: 0.0027 - accur
acy: 0.9992 - val_loss: 0.4429 - val_accuracy: 0.9756
```

```
Epoch 9/10
```

```
79/79 [=====] - 84s 1s/step - loss: 0.0073 - accur
acy: 0.9981 - val_loss: 0.4907 - val_accuracy: 0.9756
```

```
Epoch 10/10
```

```
79/79 [=====] - 85s 1s/step - loss: 0.0048 - accur
acy: 0.9987 - val_loss: 0.4866 - val_accuracy: 0.9702
```

Out[23]:

Save The Model

In [27]:

```
model.save('aslpng2.h5')
```