

IBM Project Name: Real-Time Communication System Powered by AI for Specially Abled TEAM ID: PNT2022TMID46015 TEAM Lead: Akash S

Model Building

Import The Required Model Building Libraries

In []:

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

In []:

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

In []:

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

IMPORTING tensorflow

In []:

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

Initialize The Model

In []:

```
#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 []:

```
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
```

Unzipping the dataset

In []:

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

Streaming output truncated to the last 5000 lines.

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

Applying ImageDataGenerator to training set

In []:

```
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 []:

```
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 []:

```
a=len(x_train)
```

```
b=len(x_test)
```

Length of training set

In []:

```
print(a)
```

79

Length of test set

```
print(b)
12
```

Add Layers

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

Add The Convolution Layer

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

Add Pooling Layer

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

Add The Flatten Layer

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

Adding The Dense Layers

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

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

Compile The Model

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

Fit The Model

```
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 version. 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 - accuracy: 0.8746 - val_loss: 0.2797 - val_accuracy: 0.9529
Epoch 2/10
79/79 [=====] - 86s 1s/step - loss: 0.0419 - accuracy: 0.9884 - val_loss: 0.2846 - val_accuracy: 0.9751
Epoch 3/10
79/79 [=====] - 84s 1s/step - loss: 0.0195 - accuracy: 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[]:

Save The Model

In []:

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

Import The Packages And Load The Saved Model

In [38]:

```
from tensorflow.keras.models import load_model
import numpy as np
import cv2
from tensorflow.keras.preprocessing import image
```

In [45]:

```
#load the model
model=load_model('aslpng2.h5')
```

In [46]:

```
img=image.load_img('/content/Dataset/test_set/A/10.png',target_size=(400,50
0))
img
```

Out[46]:



Load The Test Image, Pre-Process It And Predict

In [79]:

```
from skimage.transform import resize
def detect(frame):
    img=resize(frame, (64,64,1))
    img=np.expand_dims(img,axis=0)
    if(np.max(img)>1):
        prediction=model.predict(img)
        print(prediction)
        prediction=model.predict_classes(img)
        print(prediction)
```

In [73]:

```
arr= image.img_to_array(img)
```

In [67]:

```
frame=cv2.imread('/content/Dataset/test_set/A/10.png')
data=detect(frame)
from google.colab.patches import cv2_imshow
cv2_imshow(frame)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

