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Project: Real-Time Communication system powered by AI for specially abled

### Import The Required Model Building Libraries

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

#training datagen
train_datagen=ImageDataGenerator(rescale=1./255, shear_range=0.2, zoom_range=0.2, horizontal_

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

### IMPORTING tensorflow

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

### IMPORTING LIBRARIES TO INITIALIZE NEURAL NETWORK LAYER

```
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
```

```
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

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

inflating: Dataset/training_set/I/947.png
inflating: Dataset/training_set/I/948.png
inflating: Dataset/training_set/I/949.png
inflating: Dataset/training_set/I/95.png
```

```
inflating: Dataset/training_set/I/950.png
inflating: Dataset/training_set/I/951.png
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inflating: Dataset/training_set/I/970.png
inflating: Dataset/training_set/I/971.png
inflating: Dataset/training_set/I/972.png
extracting: Dataset/training_set/I/973.png
inflating: Dataset/training_set/I/974.png
inflating: Dataset/training_set/I/975.png
inflating: Dataset/training_set/I/976.png
inflating: Dataset/training_set/I/977.png
inflating: Dataset/training_set/I/978.png
inflating: Dataset/training_set/I/979.png
inflating: Dataset/training_set/I/98.png
inflating: Dataset/training_set/I/980.png
inflating: Dataset/training_set/I/981.png
inflating: Dataset/training_set/I/982.png
extracting: Dataset/training_set/I/983.png
inflating: Dataset/training_set/I/984.png
inflating: Dataset/training_set/I/985.png
inflating: Dataset/training_set/I/986.png
inflating: Dataset/training_set/I/987.png
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inflating: Dataset/training_set/I/989.png
inflating: Dataset/training_set/I/99.png
inflating: Dataset/training_set/I/990.png
inflating: Dataset/training_set/I/991.png
inflating: Dataset/training_set/I/992.png
extracting: Dataset/training_set/I/993.png
inflating: Dataset/training_set/I/994.png
inflating: Dataset/training_set/I/995.png
extracting: Dataset/training_set/I/996.png
inflating: Dataset/training_set/I/997.png
inflating: Dataset/training_set/I/998.png
inflating: Dataset/training_set/I/999.png
```

## Applying ImageDataGenerator to training set

```
x_train=train_datagen.flow_from_directory('/content/Dataset/training_set',target_size=(64,64),
class_mode='categorical',color_mode="grayscale")
```

Found 15750 images belonging to 9 classes.

### Applying ImageDataGenerator to test set

```
x_test=test_datagen.flow_from_directory('/content/Dataset/test_set',target_size=(64,64),batch_size=32,
class_mode='categorical',color_mode="grayscale")
```

Found 2250 images belonging to 9 classes.

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

### Length of training set

```
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,
```

```

/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: UserWarning: `Model.
    """Entry point for launching an IPython kernel.
Epoch 1/10
79/79 [=====] - 87s 1s/step - loss: 0.4944 - accuracy: 0.84
Epoch 2/10
79/79 [=====] - 87s 1s/step - loss: 0.0536 - accuracy: 0.98
Epoch 3/10
79/79 [=====] - 85s 1s/step - loss: 0.0236 - accuracy: 0.99
Epoch 4/10
79/79 [=====] - 83s 1s/step - loss: 0.0094 - accuracy: 0.99
Epoch 5/10
79/79 [=====] - 82s 1s/step - loss: 0.0086 - accuracy: 0.99
Epoch 6/10
79/79 [=====] - 80s 1s/step - loss: 0.0122 - accuracy: 0.99
Epoch 7/10
79/79 [=====] - 78s 988ms/step - loss: 0.0055 - accuracy: 0
Epoch 8/10
79/79 [=====] - 78s 988ms/step - loss: 0.0052 - accuracy: 0
Epoch 9/10
79/79 [=====] - 78s 990ms/step - loss: 0.0019 - accuracy: 0
Epoch 10/10
79/79 [=====] - 78s 992ms/step - loss: 0.0032 - accuracy: 0
<keras.callbacks.History at 0x7f59aab99510>

```

## Save The Model

```
model.save('as1png2.h5')
```

## Import The Packages And Load The Saved Model

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

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

```
img=image.load_img('/content/Dataset/test_set/C/101.png',target_size=(400,500))
img
```



```
img=image.load_img('/content/Dataset/test_set/C/239.png',target_size=(400,500))
img
```



```
img=image.load_img('/content/Dataset/test_set/A/143.png',target_size=(400,500))  
img
```



### Load The Test Image, Pre-Process It And Predict

```
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)  
  
arr= image.img_to_array(img)  
  
frame=cv2.imread('/content/Dataset/test_set/A/143.png')  
data=detect(frame)
```

```
from google.colab.patches import cv2_imshow
cv2_imshow(frame)
cv2.waitKey(0)
cv2.destroyAllWindows()
```



```
frame=cv2.imread('/content/Dataset/test_set/C/101.png')
data=detect(frame)
from google.colab.patches import cv2_imshow
cv2_imshow(frame)
cv2.waitKey(0)
cv2.destroyAllWindows()
```



```
frame=cv2.imread('/content/Dataset/test_set/C/239.png')
data=detect(frame)
from google.colab.patches import cv2_imshow
cv2_imshow(frame)
cv2.waitKey(0)
cv2.destroyAllWindows()
```



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