

Real –Time Communication System Powered by AI for Specially Abled Team ID : PNT2022TMID14463

Model Building

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_flip=True)

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

IMPORTING tensorflow

import tensorflow as tf
import os

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

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 (1).zip'

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inflating: Dataset/training_set/I/679.png
inflating: Dataset/training_set/I/68.png
inflating: Dataset/training_set/I/680.png
inflating: Dataset/training_set/I/681.png
inflating: Dataset/training_set/I/682.png
extracting: Dataset/training_set/I/683.png
inflating: Dataset/training_set/I/684.png
inflating: Dataset/training_set/I/685.png
inflating: Dataset/training_set/I/686.png
inflating: Dataset/training_set/I/687.png
inflating: Dataset/training_set/I/688.png
inflating: Dataset/training_set/I/689.png
inflating: Dataset/training_set/I/69.png
inflating: Dataset/training_set/I/690.png
inflating: Dataset/training_set/I/691.png
inflating: Dataset/training_set/I/692.png
inflating: Dataset/training_set/I/693.png
extracting: Dataset/training_set/I/694.png
inflating: Dataset/training_set/I/695.png
extracting: Dataset/training_set/I/696.png
extracting: Dataset/training_set/I/697.png
inflating: Dataset/training_set/I/698.png
inflating: Dataset/training_set/I/699.png
extracting: Dataset/training_set/I/7.png
extracting: Dataset/training_set/I/70.png
extracting: Dataset/training_set/I/700.png
inflating: Dataset/training_set/I/701.png
inflating: Dataset/training_set/I/702.png
inflating: Dataset/training_set/I/703.png
inflating: Dataset/training_set/I/704.png
extracting: Dataset/training_set/I/705.png
inflating: Dataset/training_set/I/706.png
inflating: Dataset/training_set/I/707.png
inflating: Dataset/training_set/I/708.png
inflating: Dataset/training_set/I/709.png
inflating: Dataset/training_set/I/71.png
inflating: Dataset/training_set/I/710.png
inflating: Dataset/training_set/I/711.png
inflating: Dataset/training_set/I/712.png
inflating: Dataset/training_set/I/713.png
inflating: Dataset/training_set/I/714.png
inflating: Dataset/training_set/I/715.png

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

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
inflating: Dataset/training_set/I/988.png
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),batch_size=200,  
                                         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=200,  
                                       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,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 - accuracy: 0.9982 - val_loss: 0.3722 - val_accuracy: 0.9751

Epoch 5/10

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

Epoch 6/10

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

Epoch 7/10

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

Epoch 8/10

79/79 [=====] - 86s 1s/step - loss: 0.0027 - accuracy: 0.9992 - val_loss: 0.44
29 - val_accuracy: 0.9756
Epoch 9/10
79/79 [=====] - 84s 1s/step - loss: 0.0073 - accuracy: 0.9981 - val_loss: 0.49
07 - val_accuracy: 0.9756
Epoch 10/10
79/79 [=====] - 85s 1s/step - loss: 0.0048 - accuracy: 0.9987 - val_loss: 0.48
66 - val_accuracy: 0.9702

Save The Model

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