

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

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```
In [1]: from keras.preprocessing.image import ImageDataGenerator  
train_datagen = ImageDataGenerator(rescale = 1./255, shear_range=0.2, zoom_range=0.2,  
test_datagen = ImageDataGenerator(rescale=1./255)
```

```

Using TensorFlow backend.
c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\tensorflow
\python\framework\dtypes.py:516: FutureWarning: Passing (type, 1) or '1type' as a
synonym of type is deprecated; in a future version of numpy, it will be understood
as (type, (1,)) / '(1,)type'.
_np_qint8 = np.dtype [("qint8", np.int8, 1)])
c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\tensorflow
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c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\tensorflow
\python\framework\dtypes.py:518: FutureWarning: Passing (type, 1) or '1type' as a
synonym of type is deprecated; in a future version of numpy, it will be understood
as (type, (1,)) / '(1,)type'.
_np_qint16 = np.dtype [("qint16", np.int16, 1)])
c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\tensorflow
\python\framework\dtypes.py:519: FutureWarning: Passing (type, 1) or '1type' as a
synonym of type is deprecated; in a future version of numpy, it will be understood
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_np_quint16 = np.dtype [("quint16", np.uint16, 1)])
c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\tensorflow
\python\framework\dtypes.py:520: FutureWarning: Passing (type, 1) or '1type' as a
synonym of type is deprecated; in a future version of numpy, it will be understood
as (type, (1,)) / '(1,)type'.
_np_qint32 = np.dtype [("qint32", np.int32, 1)])
c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\tensorflow
\python\framework\dtypes.py:525: FutureWarning: Passing (type, 1) or '1type' as a
synonym of type is deprecated; in a future version of numpy, it will be understood
as (type, (1,)) / '(1,)type'.
_np_resource = np.dtype [("resource", np.ubyte, 1)])
c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\tensorboar
d\compat\tensorflow_stub\dtypes.py:541: FutureWarning: Passing (type, 1) or '1typ
e' as a synonym of type is deprecated; in a future version of numpy, it will be un
derstood as (type, (1,)) / '(1,)type'.
_np_qint8 = np.dtype [("qint8", np.int8, 1)])
c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\tensorboar
d\compat\tensorflow_stub\dtypes.py:542: FutureWarning: Passing (type, 1) or '1typ
e' as a synonym of type is deprecated; in a future version of numpy, it will be un
derstood as (type, (1,)) / '(1,)type'.
_np_quint8 = np.dtype [("quint8", np.uint8, 1)])
c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\tensorboar
d\compat\tensorflow_stub\dtypes.py:543: FutureWarning: Passing (type, 1) or '1typ
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c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\tensorboar
d\compat\tensorflow_stub\dtypes.py:550: FutureWarning: Passing (type, 1) or '1typ
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_np_resource = np.dtype [("resource", np.ubyte, 1)])

```

```
In [2]: x_train = train_datagen.flow_from_directory('dataset/training_set',target_size=(64,
```

```
x_test = test_datagen.flow_from_directory('dataset/test_set',target_size=(64,64),b
```

Found 15750 images belonging to 9 classes.

Found 2250 images belonging to 9 classes.

```
In [3]: 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
```

```
In [4]: model = Sequential()
```

WARNING:tensorflow:From c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\keras\backend\tensorflow_backend.py:74: The name tf.get_default_graph is deprecated. Please use tf.compat.v1.get_default_graph instead.

```
In [5]: model.add(Convolution2D(32,(3,3),input_shape=(64,64,1),activation='relu'))
```

WARNING:tensorflow:From c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\keras\backend\tensorflow_backend.py:517: The name tf.placeholder is deprecated. Please use tf.compat.v1.placeholder instead.

WARNING:tensorflow:From c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\keras\backend\tensorflow_backend.py:4138: The name tf.random_uniform is deprecated. Please use tf.random.uniform instead.

```
In [6]: model.add(MaxPooling2D(pool_size=(2,2)))
```

WARNING:tensorflow:From c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\keras\backend\tensorflow_backend.py:3976: The name tf.nn.max_pool is deprecated. Please use tf.nn.max_pool2d instead.

```
In [7]: model.add(Flatten())
```

```
In [8]: model.add(Dense(units=512,activation='relu'))
model.add(Dense(units=9,activation='softmax'))
```

```
In [9]: model.compile(loss='categorical_crossentropy',optimizer='adam',metrics=['accuracy'])
```

WARNING:tensorflow:From c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\keras\optimizers.py:790: The name tf.train.Optimizer is deprecated. Please use tf.compat.v1.train.Optimizer instead.

WARNING:tensorflow:From c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\keras\backend\tensorflow_backend.py:3295: The name tf.log is deprecated. Please use tf.math.log instead.

```
In [10]: model.fit_generator(x_train,steps_per_epoch=24,epochs=10,validation_data=x_test,va
model.save('signlanguage.h5')
```

WARNING:tensorflow:From c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\tensorflow\python\ops\math_grad.py:1250: add_dispatch_support.<locals>.wrapper (from tensorflow.python.ops.array_ops) is deprecated and will be removed in a future version.

Instructions for updating:

Use tf.where in 2.0, which has the same broadcast rule as np.where

WARNING:tensorflow:From c:\users\adars\appdata\local\programs\python\python37\lib\site-packages\keras\backend\tensorflow_backend.py:986: The name tf.assign_add is deprecated. Please use tf.compat.v1.assign_add instead.

Epoch 1/10

24/24 [=====] - 17s 720ms/step - loss: 1.3771 - acc: 0.62
65 - val_loss: 0.5072 - val_acc: 0.8809

Epoch 2/10

24/24 [=====] - 15s 635ms/step - loss: 0.3532 - acc: 0.90
39 - val_loss: 0.2881 - val_acc: 0.9302

Epoch 3/10

24/24 [=====] - 15s 633ms/step - loss: 0.1826 - acc: 0.95
22 - val_loss: 0.1999 - val_acc: 0.9471

Epoch 4/10

24/24 [=====] - 15s 645ms/step - loss: 0.1130 - acc: 0.97
07 - val_loss: 0.1902 - val_acc: 0.9676

Epoch 5/10

24/24 [=====] - 15s 630ms/step - loss: 0.0773 - acc: 0.98
02 - val_loss: 0.1742 - val_acc: 0.9653

Epoch 6/10

24/24 [=====] - 15s 641ms/step - loss: 0.0534 - acc: 0.98
72 - val_loss: 0.1953 - val_acc: 0.9733

Epoch 7/10

24/24 [=====] - 15s 633ms/step - loss: 0.0366 - acc: 0.99
17 - val_loss: 0.1920 - val_acc: 0.9698

Epoch 8/10

24/24 [=====] - 15s 637ms/step - loss: 0.0314 - acc: 0.99
36 - val_loss: 0.2024 - val_acc: 0.9716

Epoch 9/10

24/24 [=====] - 15s 630ms/step - loss: 0.0271 - acc: 0.99
39 - val_loss: 0.2371 - val_acc: 0.9738

Epoch 10/10

24/24 [=====] - 15s 634ms/step - loss: 0.0192 - acc: 0.99
65 - val_loss: 0.1944 - val_acc: 0.9747