In [ ]:

```
from keras.preprocessing.image import ImageDataGenerator
train_datagen=ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range
=0.2,horizontal_flip=True)
test_datagen=ImageDataGenerator(rescale=1./255)
```

In [ ]:

```
x_train =
train_datagen.flow_from_directory('/content/Dataset/training_set',target_s
ize=(64,64),batch_size=300,class_mode='categorical',color_mode="grayscale"
)
```

```
Found 15750 images belonging to 9 classes.
```

In [ ]:

```
x_test =
test_datagen.flow_from_directory('/content/Dataset/test_set',target_size=(
64,64),batch_size=300,class_mode='categorical',color_mode="grayscale")
```

```
Found 2250 images belonging to 9 classes.
```

In [ ]:

```
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 [ ]:

```
model = Sequential()
```

In [ ]:

```
model.add(Convolution2D(32,(3,3),input_shape=(64,64,1),
activation='relu'))
#no. of feature detectors, size of feature detector, image size,
activation function
```

In [ ]:

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

In [ ]:

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

In [ ]:

```
model.add(Dense(units=512, activation = 'relu'))
```

In [ ]:

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

In [ ]:

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

In [ ]:

```
model.fit_generator(x_train,steps_per_epoch=24,epochs=10,validation_data =
x_test, validation_steps= 40)
#steps_per_epoch = no. of train images//batch size
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:1: UserWarnin
g: `Model.fit_generator` is deprecated and will be removed in a future ver
sion. Please use `Model.fit`, which supports generators.
  """Entry point for launching an IPython kernel.
```

```
Epoch 1/10
24/24 [==============================] - ETA: 0s - loss: 1.2714 - accuracy
: 0.6219
WARNING:tensorflow:Your input ran out of data; interrupting training. Make
sure that your dataset or generator can generate at least `steps_per_epoch
* epochs` batches (in this case, 40 batches). You may need to use the repe
at() function when building your dataset.
24/24 [==============================] - 41s 2s/step - loss: 1.2714 - accu
racy: 0.6219 - val_loss: 0.4031 - val_accuracy: 0.8982
Epoch 2/10
24/24 [==============================] - 33s 1s/step - loss: 0.2827 - accu
racy: 0.9211
Epoch 3/10
24/24 [==============================] - 34s 1s/step - loss: 0.1448 - accu
racy: 0.9615
Epoch 4/10
24/24 [==============================] - 32s 1s/step - loss: 0.0958 - accu
racy: 0.9746
Epoch 5/10
24/24 [==============================] - 34s 1s/step - loss: 0.0679 - accu
racy: 0.9826
Epoch 6/10
24/24 [==============================] - 32s 1s/step - loss: 0.0424 - accu
racy: 0.9909
Epoch 7/10
24/24 [==============================] - 32s 1s/step - loss: 0.0373 - accu
racy: 0.9908
Epoch 8/10
24/24 [==============================] - 33s 1s/step - loss: 0.0319 - accu
racy: 0.9915
Epoch 9/10
24/24 [==============================] - 32s 1s/step - loss: 0.0235 - accu
racy: 0.9940
Epoch 10/10
24/24 [==============================] - 32s 1s/step - loss: 0.0170 - accu
racy: 0.9972
```

Out[ ]:

In [ ]:

```
model.save('aslpng1.h5')
```

In [ ]:

```
from keras.models import load_model
import numpy as np
import cv2
```

In [ ]:

```
model=load_model('aslpng1.h5')
```