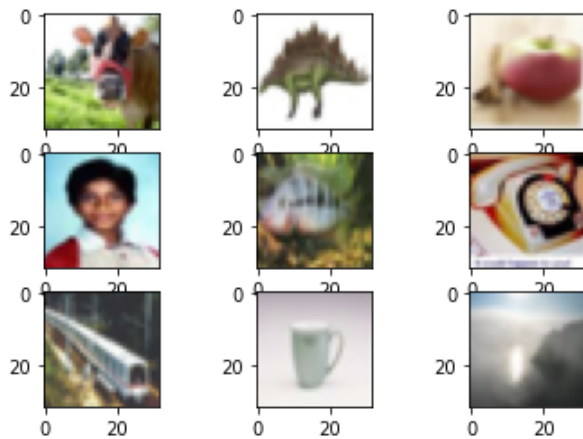


```
import numpy as np
from keras.datasets import mnist
from keras.models import Sequential
from keras.layers import Dense, Dropout, Flatten
from keras.layers.convolutional import Conv2D, MaxPooling2D
from keras.utils import np_utils
from keras.models import Sequential
from keras.datasets import cifar100
(x_train,y_train),(x_test,y_test)= cifar100.load_data()

Downloading data from https://www.cs.toronto.edu/~kriz/cifar-100-python.tar.gz
169009152/169001437 [=====] - 2s 0us/step
169017344/169001437 [=====] - 2s 0us/step
```

```
import matplotlib.pyplot as plt
for i in range(9):
    plt.subplot(330+i+1)
    plt.imshow(x_train[i])

plt.show()
x_train.shape, y_train.shape, x_test.shape, y_test.shape
```



```
((50000, 32, 32, 3), (50000, 1), (10000, 32, 32, 3), (10000, 1))
```

```
from tensorflow.keras.utils import to_categorical

x_train= x_train.astype('float32')
x_test= x_test.astype('float32')
x_train/=255
x_test/=255
y_train= to_categorical (y_train,100)
y_test= to_categorical (y_test,100)

from keras.layers import Dense
from keras.layers.convolutional import MaxPooling2D
from keras.layers import Flatten
from tensorflow.keras.layers import Conv2D
model = Sequential()
model.add(Conv2D(32,(3,3),activation='relu',kernel_initializer='he_uniform',padding='same',input_shape=(32,32,3)))
model.add(Conv2D(32,(3,3),activation='relu',kernel_initializer='he_uniform',padding='same',))
#model.add(MaxPooling2D((2,2)))
model.add(Conv2D(64,(3,3),activation='relu',kernel_initializer='he_uniform',padding='same',))
```


```
model.add(Conv2D(128,(2,2),activation='relu',kernel_initializer='he_uniform',padding='same',))
#model.add(MaxPooling2D((2,2)))
```

```
model.add(Flatten())
model.add(Dense(256,activation='relu', kernel_initializer='he_uniform'))
model.add(Dense(100, activation='softmax'))
model.summary()
```

Model: "sequential"

Layer (type)	Output Shape	Param #
conv2d (Conv2D)	(None, 32, 32, 32)	896
conv2d_1 (Conv2D)	(None, 32, 32, 32)	9248
conv2d_2 (Conv2D)	(None, 32, 32, 64)	18496
conv2d_3 (Conv2D)	(None, 32, 32, 128)	32896
flatten (Flatten)	(None, 131072)	0
dense (Dense)	(None, 256)	33554688
dense_1 (Dense)	(None, 100)	25700
Total params: 33,641,924		
Trainable params: 33,641,924		
Non-trainable params: 0		

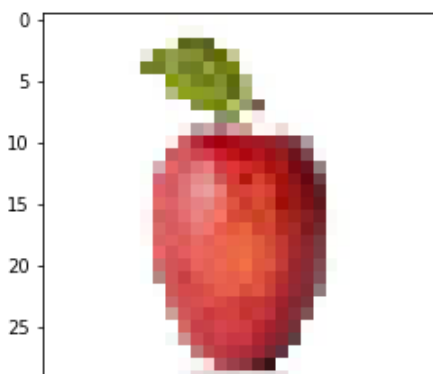
```
from tensorflow.keras.optimizers import SGD
opt=SGD(lr=0.01,momentum=0.9)
model.compile(opt,loss='categorical_crossentropy',metrics=['accuracy'])
history=model.fit(x_train,y_train,epochs=1
                  ,batch_size=64,
                  verbose=1,
                  validation_data=(x_test,y_test))
model.save("dulieucifar100.h5")
```

 /usr/local/lib/python3.7/dist-packages/keras/optimizer\_v2/gradient\_descent.py:102: UserWarning  
super(SGD, self).\_\_init\_\_(name, \*\*kwargs)  
782/782 [=====] - 18s 22ms/step - loss: 0.0670 - accuracy: 0.9808 - v

```
from keras.models import load_model
new_model = load_model ('dulieucifar100.h5')

from keras.preprocessing.image import load_img,img_to_array
img=load_img('apple.jpg',target_size=(32,32))
plt.imshow(img)
img=img_to_array(img)
img=img.reshape(1,32,32,3)
img=img.astype('float32')
img=img/255
img.shape
```

```
(1, 32, 32, 3)
```



```
import numpy as np
```

```
np.argmax(new_model.predict(img),axis=1)
```

```
WARNING:tensorflow:6 out of the last 11 calls to <function Model.make_predict_function.<locals:
array([0])
```

