Trần Ngọc Đoàn - 19146175

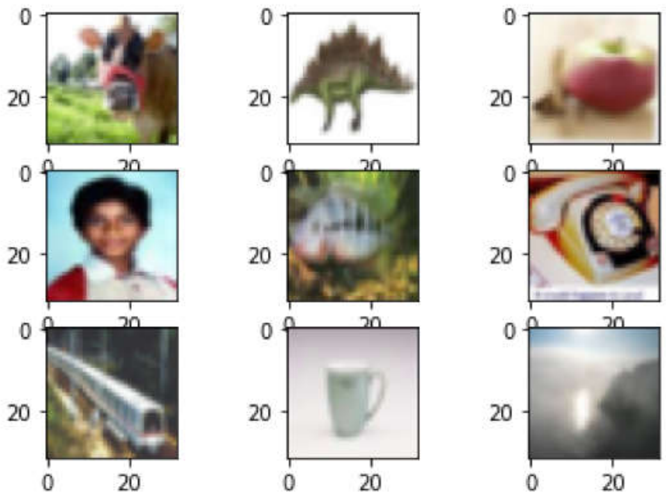
https://github.com/DoanAI/Cifar100.git

```
import matplotlib.pyplot as plt
from keras.datasets import cifar100
```

```
(x_train,y_train), (x_test,y_test) = cifar100.load_data()
print(x_train.shape)
print(x_test.shape)
```

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

```
for i in range(9):
  plt.subplot(330+i+1)
  plt.imshow(x_train[i])
plt.show()
```



```
from tensorflow.keras.utils import to_categorical
```

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

```
model.add(Conv2D(64,(3,3), activation='relu', padding='same', input_shape=(32,32,3)))
model.add(Conv2D(64,(3,3), activation='relu', kernel_initializer='he_uniform',padding='s
model.add(MaxPooling2D((2,2)))
```

```
model.add(Conv2D(128,(3,3), activation='relu', padding='same', input_shape=(32,32,3)))
model.add(Conv2D(128,(3,3), activation='relu', kernel_initializer='he_uniform',padding='
model.add(MaxPooling2D((2,2)))
```

```
from keras.layers import Dense, Activation, Dropout
model.add(Flatten())
model.add(Dense(128,activation='relu', kernel_initializer='he_uniform'))
model.add(Dense(100,activation='softmax'))
```

```
from tensorflow.keras.optimizers import SGD
opt = SGD(lr=0.01,momentum = 0.9)
model.compile(optimizer=opt, loss='categorical_crossentropy', metrics=['accuracy'])
```

```
/usr/local/lib/python3.7/dist-packages/keras/optimizer_v2/gradient_descent.py:102:
  super(SGD, self).__init__(name, **kwargs)
```

```
history = model.fit(x_train, y_train, epochs=5, batch_size=64, validation_data=(x_test, 
```

```
Epoch 1/5
782/782 [==============================] - 337s 430ms/step - loss: 4.2002 - accurac
Epoch 2/5
782/782 [==============================] - 333s 426ms/step - loss: 3.4514 - accurac
Epoch 3/5
782/782 [==============================] - 339s 434ms/step - loss: 2.9796 - accurac
Epoch 4/5
782/782 [==============================] - 333s 425ms/step - loss: 2.6476 - accurac
Epoch 5/5
782/782 [==============================] - 332s 424ms/step - loss: 2.3701 - accurac
```

```
score = model.evaluate(x_test, y_test,verbose=0)
print('Sai so kiem tra la:', score[0])
print('Do chinh xac kiem tra la:', score[1]*100)
```

```
Sai so kiem tra la: 2.5417397022247314
Do chinh xac kiem tra la: 36.14000082015991
```

```
model.save('Cifar100.h5')
```

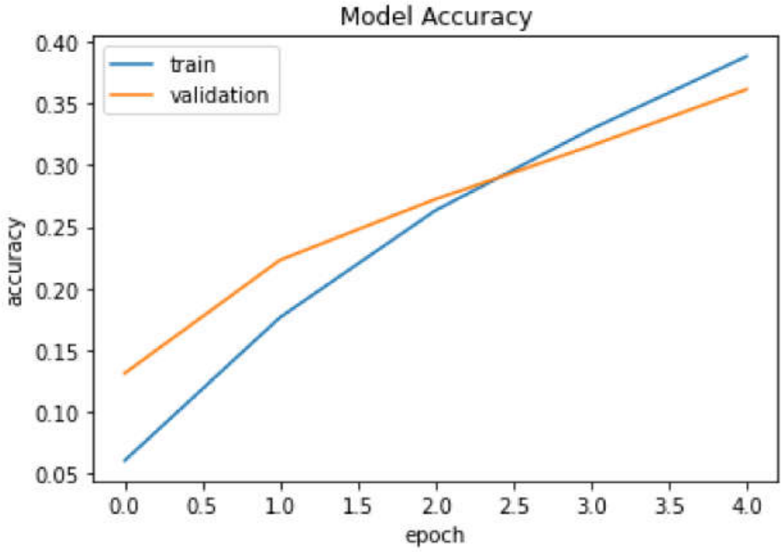
```
from keras.models import load_model
```

```
model1 = load_model('Cifar100.h5')

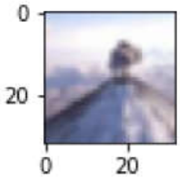
plt.plot(history.history['accuracy'])
plt.plot(history.history['val_accuracy'])
plt.title('Model Accuracy')
plt.ylabel('accuracy')
plt.xlabel('epoch')
plt.legend(['train','validation'], loc='upper-left')
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:6: MatplotlibDeprecati
        best
        upper right
        upper left
        lower left
        lower right
        right
        center left
        center right
        lower center
        upper center
        center
This will raise an exception in 3.3.

<matplotlib.legend.Legend at 0x7f945d5cd890>
```



```
import numpy as np
y_pred = model.predict(x_test)
for i in range (9):
  plt.subplot(330+i+1)    # 330 mean: 3 hang 3 cot
  plt.imshow(x[i])
  plt.show()
  print(np.round(y_pred[i]))
```



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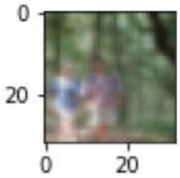

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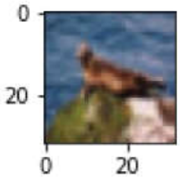

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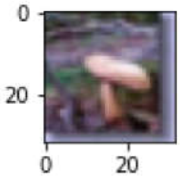

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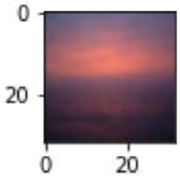

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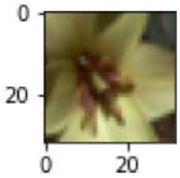

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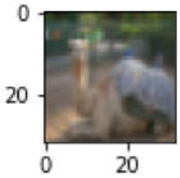

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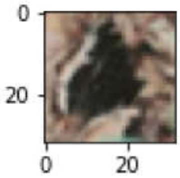

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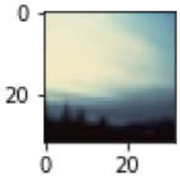

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```

✓ 21 giây hoàn thành lúc 21:54