

# Step By Step Tutorial: Image Classification Using Scikit Learn Keras And

Are you interested in learning how to classify images using Scikit Learn, Keras, and Python? Look no further! In this step by step tutorial, we will guide you through the process of building an image classification model that can accurately classify different objects in images. Whether you are a beginner or an experienced programmer, this tutorial will provide you with the necessary knowledge to get started with image classification using Scikit Learn and Keras.

## What is Image Classification?

Image classification is a popular field within the domain of computer vision. It involves training a model to recognize and classify different objects or patterns within images. This can be extremely useful in various applications, such as object detection, facial recognition, and even autonomous vehicles. By accurately classifying objects within images, we can enable powerful automation and analysis capabilities.

## The Importance of Scikit Learn and Keras

Scikit Learn and Keras are two powerful libraries in Python that can be used for image classification tasks. Scikit Learn provides a wide range of machine learning algorithms and tools that make it easy to build and train models. Keras, on the other hand, is a high-level deep learning library that provides a simple and intuitive interface for building neural networks. By combining the strengths of both libraries, we can leverage the best of both worlds and create a powerful image classification system.



## Step by Step Tutorial IMAGE CLASSIFICATION Using Scikit-Learn, Keras, And TensorFlow with PYTHON GUI by Vivian Siahaan(Kindle Edition)

★★★★☆ 4.3 out of 5

Language : English  
File size : 11409 KB  
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Enhanced typesetting : Enabled  
Lending : Enabled  
Screen Reader : Supported  
Print length : 141 pages



### Getting Started: Installing the Required Libraries

To get started with image classification using Scikit Learn and Keras, we first need to install the necessary libraries. Open your command prompt or terminal and run the following command to install Scikit Learn:

```
pip install scikit-learn
```

Next, we need to install Keras. Run the following command to install Keras:

```
pip install keras
```

### Preparing the Dataset

Before we can train our image classification model, we need a dataset of labelled images. There are several popular datasets available for image classification

tasks, such as MNIST and CIFAR-10. In this tutorial, we will use the CIFAR-10 dataset, which consists of 60,000 32x32 color images in 10 different classes.

Download the CIFAR-10 dataset from the official website and extract it to a folder on your computer. Make sure to keep track of the location of this folder, as we will need it later when loading the dataset into our code.

## Loading and Preprocessing the Dataset

Once we have the dataset prepared, we can start loading and preprocessing it. Scikit Learn provides a convenient function to load the CIFAR-10 dataset, as shown below:

```
from sklearn.datasets import cifar10 (X_train, y_train),(X_test, y
```

Next, we need to normalize the pixel values in the images. This can be done by dividing each pixel by 255, which scales the pixel values to the range of 0-1. It is important to normalize the pixel values as it helps the model converge faster during training. Here is an example of how to normalize the pixel values:

```
X_train = X_train.astype('float32') / 255 X_test = X_test.astype('
```

## Building and Training the Model

Now that we have loaded and preprocessed the dataset, we can proceed to build and train our image classification model. Keras provides a simple and intuitive API for building neural networks. Here is an example of how to build a simple convolutional neural network (CNN) for image classification:

```
from keras.models import Sequential from keras.layers import Conv2
```

The above code builds a CNN with two convolutional layers, two max pooling layers, and two dense layers. The output layer consists of 10 neurons, which corresponds to the 10 different classes in the CIFAR-10 dataset. We compile the model with the Adam optimizer and use the sparse categorical cross-entropy loss function for multi-class classification. Finally, we train the model for 10 epochs and evaluate its performance on the test set.

## Evaluating and Improving the Model

After training the model, it is important to evaluate its performance and make improvements if necessary. Keras provides a built-in function to evaluate the model on the test set, as shown below:

```
loss, accuracy = model.evaluate(X_test, y_test) print("Test loss:")
```

If the model's performance is not satisfactory, there are several ways to improve it. Some common techniques include adding more layers, increasing the number of neurons, or using different activation functions. Additionally, data augmentation techniques such as rotation, zooming, and flipping can be applied to increase the training dataset and improve generalization.

In this tutorial, we have covered the basics of image classification using Scikit Learn, Keras, and Python. We started by installing the necessary libraries and preparing the CIFAR-10 dataset. Then, we loaded and preprocessed the dataset before building and training a CNN model. Finally, we evaluated the model's performance and discussed ways to improve it.

With the knowledge gained from this tutorial, you can now explore more advanced image classification techniques and apply them to various real-world problems. The field of computer vision is constantly evolving, and there are endless possibilities for using image classification to unlock valuable insights and automate tasks. Get started today and dive into the exciting world of image classification!



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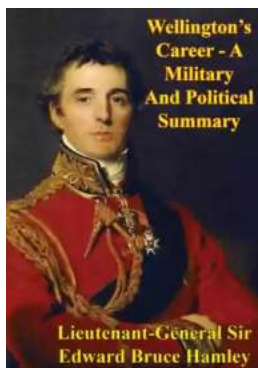


This book implements deep learning-based image classification on classifying monkey species, recognizing rock, paper, and scissor, and classify airplane, car, and ship using TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries.

In Chapter 1, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform how to classify monkey species using 10 Monkey Species dataset provided by Kaggle (<https://www.kaggle.com/slothkong/10-monkey-species/download>).

In Chapter 2, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform how to recognize rock, paper, and scissor using 10 Monkey Species dataset provided by Kaggle (<https://www.kaggle.com/sanikamal/rock-paper-scissors-dataset/download>).

In Chapter 3, you will learn how to use TensorFlow, Keras, Scikit-Learn, OpenCV, Pandas, NumPy and other libraries to perform how to classify airplane, car, and ship using Multiclass-image-dataset-airplane-car-ship dataset provided by Kaggle (<https://www.kaggle.com/abtabm/multiclassimagedatasetairplanecar>).



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