

# Flower Species Recognition System

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**Abstract:** Identifying and recognition of flowers in this environment such as in dense region, forest area, nearby homes is necessary to know about their presence. Flowers identification systems are large in use. In past few years flower species recognition is carried out based on their texture, color and shape. While now new technologies are available to search for a picture with flower, but it lacks quality assurance because of wide range of millions of varieties of flowers species existence. So in this research work a deep learning approach using Convolutional Neural Networks (CNN) is used to recognize flower species with high accuracy. Images of the flower species are stored prior in the system. The features from the images in the training dataset are extracted using CNN network. Then network is trained using various machine learning classifiers. Finally, images are given as input and accordingly flowers are predicted.

**Keywords:** Accuracy, Convolutional Neural Networks, Deep learning, Flower recognition, Machine learning classifiers.

## 1. Introduction

Flower species identification remain a challenge in Image processing and Computer Vision community mainly because of their very great extent existence, complex structure and unpredictable variety of species in nature. Because of these natural complexities, it is highly not possible to perform feature extraction or combining shape, texture and color features which results in less accuracy on benchmark datasets. Although some feature extraction techniques combining both global and local feature can give reasonable amount of accuracy in classifying flowers, still there we need proper and efficient system to automatically identify and recognize flower species when they are in large amount. Color characteristics of an image is not sufficient to quantify flowers because in a multi-species environment, two or more species could be of same color. As an example rose and tulip will have similar color. The user uploads stored image which are already captured (assuming the flower as the only object in foreground with some random background). It is then sent to a cloud storage platform where it gets stored (username, time, date, image id and image). At the server side, the recent flower image will be received by the trained flower dataset. The image is sent to the CNN where its output is predicted. After prediction, the label name is sent to the same username with same image id, from where the system receives response of the flower name from the storage platform. This entire process of acquiring an image and getting the predicted label of the image takes around few seconds after

tested.

## 2. Literature Review

The [1] styles say how we can recognize of wild flower, [2] styles say how a computer vision system for automatic plant species is identified, [3] styles say how a computational plant species identifies collaborate information system.

## 3. Image Processing

Setup of this system is done using machine learning approach. Machine learning is the scientific study of various algorithms and various statistical models that computers use to perform a particular task without using direct instructions. In Deep Learning, CNN are specifically applied for Image Classification and Object Recognition. And flower species recognition is a combination of both Object Recognition and Image Classification, as the system have to detect a flower in the image. To recognize the flower, a system should be trained with large set of images, so that it could predict the flower from its learned patterns. Keras is a high-level neural networks, written in Python. The main intension for using keras was for the use of deep learning libraries because they are through user friendliness, modularity, and extensibility.

*Pseudo code for Image processing*

```
Step 1: collect data set.  
Step 2: Data preprocessing  
for each image in dataset  
check file_type:  
if(file_type == .jpg)  
resize the image to 250*250  
else  
continue  
Step 3: create model  
Step 4: feature extraction  
for each image in the dataset  
extract image featuring  
end for  
Step 5: train the model  
if model accuracy > 80%  
stop training  
else  
goto step 3  
Step 6: store model weight to extend file for future reference
```

*Prediction:*

- Step 1: select input image
- Step 2: preprocess input image  
if(file\_type == .jpg)  
resize the image to 250\*250  
else  
go to step 1
- Step 3: load model weight from external file
- Step 4: extract feature of input text image
- Step 5: compare model weight with test image
- Step 6: fetch the class label

Table 1

Dataset	Rank-1 Accuracy	Rank-5 Accuracy
Flower	92.41%	98.66

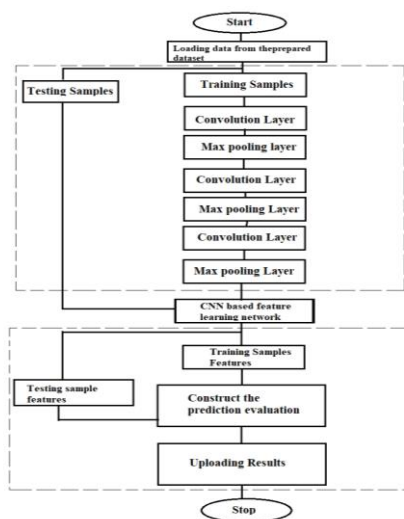


Fig. 1. Flow chart of flower recognition

**4. Conclusion**

This paper presented an overview on flower species recognition system.

**References**

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