



FLOWER RECOGNITION FRAMEWORK

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ABSTRACT

In the digital era, all the mechanisms are transformed to digital format based on novel techniques of flower recognition with text convince is proposed in the article. This technique is mainly forward as the identification of flower, botanical name and medical uses of the flower. The proposed technique is used for blind people scene it provides the voice message of the flower. The performance of the method is better accuracy.

Keywords: Flower recognition, Image processing, Botanical information, Audio synthesis, real-time webcam processing.

1.INTRODUCTION

In the modern world, identification of flower species is a difficult test and time consuming. Every day, several numbers of flowers are witnessed in homes, parks, road sides, fields and rooftop, but unable to identify the flower name, botanical name and medicinal usage of the flowers. To overcome, the flower recognition model is proposed to learn about flowers information accurately. In order to help blind people the

flower information is converted to voice message. The proposed flower detection system is implemented by developing a Convolutional Neural Network (CNN), which is a very efficient model for image classification. The flower recognition system, a complex combination of Computer Vision and Artificial Intelligence, emerges as an engaging solution for bringing the botanical world to life. The modern technologies such as OpenCV, NumPy and pytsx3, are utilized for the real time flower recognition system.

There are various guide books for flower knowledge however, finding the name is a challenging task. It is impossible for the human brain to remember all of the species is motivated by a twofold goal. To provide users with an immersive experience in the world of flowers while also demonstrating computer vision skills in a practical and entertaining manner. This method promises a seamless integration of technology and nature allowing users to explore, study and appreciate the fascinating of many flowers directly from their camera, combines to create a magical. The flowers are identified through a web camera.

The step-by-step implementations of the proposed method is given here under.

Step 1: Install the necessary libraries.

Step 2: Input the usage to the proposed model appropriate flowers like (clitoria, allamanda, hibiscus, etc.,)

Step 3: Split the image data for training and testing with the ratio of 70:30.

Step 4: Compare the live image with the captured images.

Step 5: The output of the flower units with all the details as text and voice message.

The remaining chapters are organized as follows: In the section 2, literature study of flower detection. The proposed methodology is given in section 3, The results and conclusion are given in Section 4 and Section 5 respectively.

2. LITERATURE REVIEW

Rohit Kumar Singh et al [1] proposed a machine learning algorithm strategy for classification. Convolutional Neural Networks (CNN) and Deep Learning techniques are utilized to classify flowers into different species. To boost accuracy, the system makes advantages of a CNN model that has already been trained. To build the Neural Network model, ideas like feed forward, back-propagation, and transfer learning are employed. The performance of the model is evaluated using accuracy and provides 85% accuracy.

In 2021, Sunil Bhutada et al [2] proposed a system for classification and recognition of flower recognition are used to classify flowers based on the information leave actuality, flowers dimensions and flowers measurements. This aims to identify

the characteristics of flower and dimensions of flower. The method is compared into KNN and Random Forest algorithm and provides better accuracy than other methods.

The combination of MKL (Multiple Kernel Labelling) and SVM (Support Vector Machine) method is proposed by Isha Patel et al [3] in 2019. In this method 25000 flower image dataset with 102 different spices is sampled. The method yielded 76.92% of accuracy.

In 2011, Y. Chai et al [4] proposed to classify the image with large number of flower species. The method uses a hybrid of SVM with the bag of words for extracting the features. Oxford flower 17 Data set with 849 images are utilized and the performance of method yielded an accuracy of 81.4%.

Tana Korn Tiya et al [5] was proposed flower recognition system. In this method, flower images are recognized based on the edges and colour pixels. The performance of the method was evaluated by the accuracy and yields 80% of accuracy.

In 2010, Verano et al [6] suggested the flower recognition system. The method segmenting the flower and extracting the features of the flower images are implemented through Android phone. The method obtained an 85% accuracy.

Y. Boykov and G. Funka-Lea [7] was proposed graph cuts efficient of N-D (N-Dimensional) image segmentation. In this method applied wide range using vision and graphics. The method yielded better performance.

The method computational approach to edge detection was proposed by J.Canny et al [8] in 1986. The method utilized elongated and enlarge operator for the integrated comprehensive edge points on the images.

Z.Huang and J.Leng et al [9] approached analyse of Hu's moment invariants on image scaling and notation processed is used minimizing the transformation.

3. PROPOSED SYSTEM

The proposed Flower Detection System aims to leverage cutting-edge technologies, including OpenCV, NumPy, and pytsx3. To provide a real-time and interactive experience for recognizing and learning about various flowers. The system utilizes computer vision techniques to analyse live webcam feeds, identify flowers and deliver detailed information through both visual and audio.

3.1 SYSTEM MODULES

3.1.1 Image Processing and Recognition Module

- Process live video frames from the webcam using OpenCV.
- Implement flower recognition algorithms based on defined colour ranges and contour analysis.

3.1.2 Display Module

Create a combined image that displays real-time video frames along with detailed information about the recognized flower. Use NumPy to merge images and create visually appealing outputs.

3.1.3 Text-to-Speech

Provide an additional layer of interactivity by synthesizing recognized flower details into spoken words.

4.1 FLOWER RECOGNITION

4.1.1 Haar-Cascade Classifier Algorithm

The Flower Recognition Algorithm is an advanced object recognition technique inspired by Viola and Jones novel 2001 publication, "Rapid Object Detection using a Boosted Cascade of Simple Features."

The Haar-Cascade Classifier, renowned for its effectiveness in object detection, has been skilfully adapted for the intricate task of recognizing flowers in images. Originally designed for face detection, this algorithm undergoes specialized training process to identify the unique patterns and features associated with different types of flowers. The new algorithm, that uses the powerful Haar Cascade Classifiers, has been carefully designed in order to specialize in the identification of flowers within photos or real-time recordings.

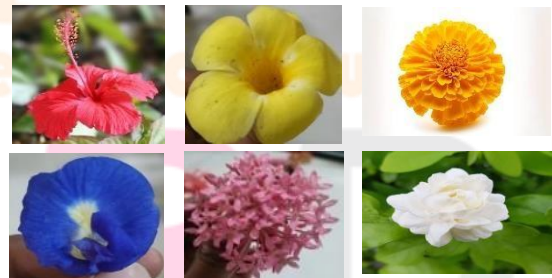


Figure 1:Input Image

4.1.2 Real-Time Flower Recognition Systems

Research in real-time flower recognition, as demonstrated by projects like "Real-Time Flower Recognition System Using Deep Learning" by Zhang et al.

(2018), emphasizes the importance of quick and accurate identification, providing applications in fields such as botany, agriculture, and environmental monitoring. These images are essential for correctly recognizing flower image in the input. The input of the sample images are shown in Fig. 1.

4.2. Advantages of the Method:

Flora Vision is useful in a variety of real-world circumstances, making it a versatile tool for a variety of user groups.

Educational Institutions:

Enrich biology classes with an interactive and entertaining study of flowers.

Home Gardening:

Provide real-time insights into garden blooms, as well as instructive content.

Nature Walks and Museums:

Turn flower exploration on nature walks or museum visits into an instructive and engaging adventure.

Accessibility for the Blind:

Flora Vision is a significant tool for the visually handicapped because of the real-time audio explanations, which develop a relationship with nature through sound. Flora Vision stands out for its adaptability and customization options.

Custom Flower Dictionaries:

Users can create their own flower dictionaries by contributing information about specific flowers and to store the flower information database.

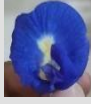

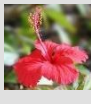
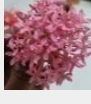


Flower name	Flower Image	Botanical Name	Description/Uses
clitoria		Clitoria ternatea	Clitoria flowers, also known as Butterfly Pea flowers, are vibrant and attractive with a striking blue color.
Golden Trumpet		Allamanda cathartica	Allamanda cathartica, commonly used in landscaping and gardens for its attractive blooms. is a tropical and vibrant yellow flower
Hibiscus		Hibiscus rosa-sinensis	Hibiscus flowers, Used in herbal teas and as an ornamental plant.
Pink Ixora		Ixora coccinea	Pink Paradise, is a vibrant and exotic flower with striking pink petals. Appreciated for its beauty in floral arrangements
Marigold		Tagetes spp	Minor skin injuries and inflammation can also be successfully treated. Marigolds have ranging from yellow and gold to orange, red, and mahogany
Jasmine		Jasminum	They are shrubs or vines that grow in moderately warm climates. Jasmine is inhaled to improve mood, reduce stress, and reduce food cravings.

Table 1: Flower Details.

5.1 RELATED WORK:

5.1.1 Image Processing for Flower Recognition:

Several literature studies have been undertaken to improve image processing approaches for effective flower recognition. shape analysis, and the extraction of critical textural data are all important in the correct

identification and classification of various flowers.

5.1.2 Deep Learning Approaches:

Recent advances in deep learning, particularly Convolutional Neural Networks (CNNs), are being applied to flower recognition problems. These advanced models are capable of independently learning hierarchical characteristics from photos, resulting in a significant improvement in recognition accuracy.

5.1.3 Text-to-Speech (TTS) Integration in Human-Computer Interaction:

The integration of voice synthesis, specifically Text-to-Speech (TTS), inside human computer interaction is a well-studied area. Several initiatives and studies are looking into the usability and effectiveness of voice synthesis, especially in terms of improving user experiences. TTS's new addition to our flower recognition project offers an unusual viewpoint that enables users to audibly receive details about detected flowers, such as botanical names, uses, and its descriptions is shown in Table 1.

6. EXPERIMENTAL RESULTS:

The proposed approach has been tested and each blossom has a unique path. **Table 1** illustrates the experimental results. The flowers common name, image, botanical name, and description and usage.

Recognition Path:

Each flower follows a unique recognition path based on its distinct characteristics, contributing to a personalized and accurate identification process.

Images:

Visual representation of each recognized flower for a more immersive and engaging experience. The flower identified results are given in Fig.2, 3, 4, and 5 respectively.



Figure 2: The Result of Hibiscus Flower.

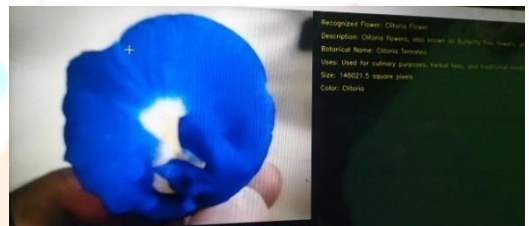


Figure 3: The Result of Clitoria Flower.



Figure 4: The Result of Golden Trumpet Flower.

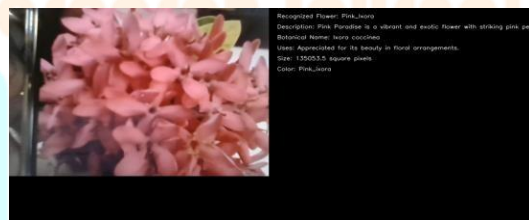


Figure 5: The Result of Pink ixora Flower.

7. CONCLUSION:

In summary, this creative attempt successfully combines picture processing and speech generating technology to provide a digital entrance to the wonderful world of flowers. With the help of deep learning algorithms, picture analysis, and voice production, our system is able to produce sensitive speech and identify

flowers with efficiency. The successful results of the experiment, which are displayed in **Table 1**, demonstrate the creativity and clarity obtained in differentiating between flowers. This represents a significant leap in the realtime of human-computer interaction by providing users with a fun and educational experience while they explore the large domain of flowers beauty.

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FUTURE PLAN OR UPDATE:

Flora Vision is a growing ecosystem, with plans for future developments and community engagement.

- **Expansion of flower information database:** Continuous efforts will expand the flower info database, incorporating user contributions.
- **Collaboration with Educational Platforms:** Flora Vision aims to collaborate with educational platforms to integrate real-time learning into broader curricula.