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IDENTIFICATION OF AYURVEDIC MEDICAL PLANT(GILOY LEAF) USING CNN

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ABSTRACT

Giloy is one of the ayurvedhic leaf having many health benefits and use for medical treatment such as chronic fever, dengue fever, hay fever, corona virus infection, control blood sugar level, immunity, to improve digestion, to reduce stress and anxiety, to treat arthritis, gout, and to improve eye sight. In modern life many people are purchasing Giloyleaf's powder through online. Many of village people don't know about Giloy leaf's and trees that are available in village surroundings. Many trees in village surroundings looks like Giloy leaf's, it seems very difficult to find Giloy tree. For testing the Giloy leaf recognition system database is collected form several trees surroundings of villages in Venkatgiri(Nellore District)- Andhra Pradesh. The data base having both Giloy and Non Giloy leaf's. The proposed recognition system is based on leaf feature matching. Several feature matching techniques such as PCA (Principal Component Analysis), 2DPCA(2 Dimensional Principal Component analysis), ICA (Independent Component Analysis) with mahalanalobis, Euclidian, Cosine distance measures are applied for feature matching. Giloy leaf recognition by feature matching using ICA features with Euclidian distance proves robustness with a high accuracy.

Keywords: Giloy leaf,PCA,2DPCA,ICA

INTRODUCTION

Giloy tree leaves powder and juice is very healthy for mankind. Giloy trees are usually identified by human based on leaves and tree pattern. Recent advances in computer vision have significantly assisted in leaf recognition based on pattern recognition. This eases people, especially those that are lacking experience in Giloy tree identification. The powerful tool for recognition is computation combined with statistics. In this work, Giloy plants and

leaves recognition system is developed by using the images of their leaves. For potential matching the system first pre-process the image and then feature extraction technique is applied on the image for comparing the features of image with the ones features in the database.

Image processing is the recent growing technique in the world. It refers to the processing of digital images by means of a digital computer. Images play a major role in human perception. Image analysis is between image processing and computer vision. There are no clear boundaries with image processing and computer vision. Image processing basically includes the following three steps: 1. importing the image with optical scanner or by digital photography. 2. Analyzing and manipulating the image which includes data compression and image enhancement and spotting patterns that are not to human eyes like satellite photographs. 3. Output is the last stage in which result can be altered image or report that is based on image analysis. The main objective of the paper is to develop a leaf classifier which works on the principle of extracting information based on its architecture using image processing to classify correctly in the plant kingdom. Plants play an important role for the development of human society. The urgent situation is that due to environmental degradation, many rare plant species on the earth are still unknown and are at the margin of extinction, so it is necessary to keep record for plant protection. This research focuses on using digital image processing for the purpose of automate classification and recognition of plants based on the images of the leaves. This research focuses on using digital image processing for the purpose of automate classification and recognition of plants based on the images of the leaves. The system consists of 4 main modules, 1) image acquisition, 2) image pre-processing, 3) image recognition and 4) display result. In the image acquisition module leaf image is captured by using digital camera. In the image pre-processing module, various image processing techniques are applied for preparing a leaf image for the features extraction process. In the image recognition module, various features are extracted from the leaf image and recognize it. In the display result module displays the recognition results. 12 kinds of leaves were taken to carry out the experiment. We have to take two algorithms for identifying the leaf images. The

algorithms are MLPNN Algorithm and Firefly algorithm. In this paper to identify the leaf images then classify the images to select a correct leaf.First, image segmentation was done on the leaf images; then eight geometric features such as rectangularity, circularity, eccentricity, and seven moment invariants were extracted for classification. Finally, these shape features was addressed using a hyper sphere classifier. The next phase in the plant leaf identification is the feature extraction phase. The main advantage of this stage is that it removes redundancy from the image and the Giloy leaf images are represented by a set of numerical features. The classifier used these features to classify the data. The Texture Feature Extraction is one of the main subjects in pattern recognition. We used GLCM for texture feature extraction.

LITERATURE REVIEW

Plants are the key factor for the survival of life on earth[1]. As plants are essential for natural security, it is more vital to distinguish and characterize them precisely. Categorization of plants has a wide usage forthcoming in horticulture and medication, and is particularly critical to the science assorted qualities explore[2]. Leaf image Classification method is the most preferred choice when compared to methods like Cell biology or Molecule Biology methods for leaf plant classification. In the previous decade studies have been conducted on computerization. Plants are distinguished and made less complex via automation of PC.[3] A plant ID ought to be founded on a plant characterization system on the grounds that there are more than one-half million of plants on the Earth and acknowledgment without grouping is a mind-boggling undertaking.

Leaf identification forms a vital part in plant classification[4]. Plants can be regularly grouped based on different parts of plants. However, there are three dimensional objects that expands intricacy. Hence for the purpose of plant classification, recognizing its respective leaf image is a simple and easier way. Each leaf image is classified through a number of related processes. Initially a data base is created using sample images of all kinds of leaves. Each leaf image is linked to the corresponding plant details[5].

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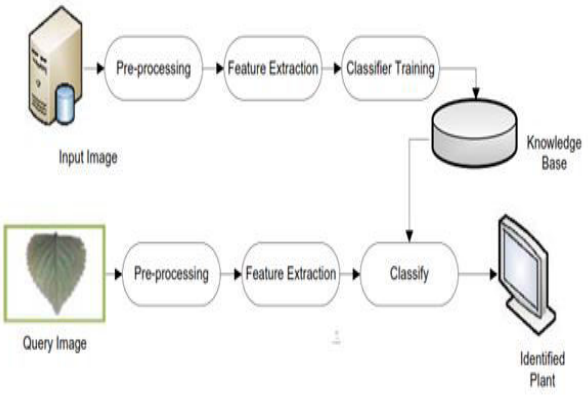

Figure 1: General Framework of Leaf Identification System

When the leaf image is uploaded to PC and then its essential features are identified and recorded using image processing methods. Feature extraction is a critical stage because the ability of a system to discriminate various types of leaves depends on the features extracted. The features have to be stable in order to make the identification system robust. Subsequently the plant leaf is recognized using techniques of machine learning.

Figure 1 illustrates the general framework of leaf identification system. The traditional steps followed in order to identify a plant from a given leaf image are as described below: Foremost step in the Plant leaf classifications digitization. Leaf image is captured in a digital camera and it is termed as an input Image. The input image is pre-processed to enhance the important features[6]. Enhancing process includes images to be converted to grayscale, image segmentation i.e. the procedure ofKnowledge Base Identified Plantpartitioning a digital image to binary conversion, image smoothing and multiple segments[7]. The objective of image preprocessingistoshowsignsofimprovement in getting image information so that it canSuppress unwanted information and it concentrates on enhancing the relevant image features for further processing. In the next process, the significant attributes are drawn and mapped by the image in the database[8]. The input image is classified to the plant whose leaf image comprises most extreme match score using some matching algorithm from which the information about the input image is obtained.

EXISTING METHOD

In existing system, we have many techniques to identify leaf diseases but identification of giloy leaf using CNN is not implemented.Giloy leaf identification is very important in medical field to reduce many diseases.

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Several feature matching techniques such as PCA (Principal Component Analysis), 2DPCA (2Dimensional Principal Component analysis), ICA (Independent Component Analysis) with Euclidian, Cosine distance measures are applied for feature matching.

PROPOSED METHOD

The system proposed in this paper is constructed as shown in figure below. The method proposes to improve classification performance by using a CNN that extracts and learns feature points.Giloy leaf recognition by feature matching using CNN proves robustness with a high accuracy.

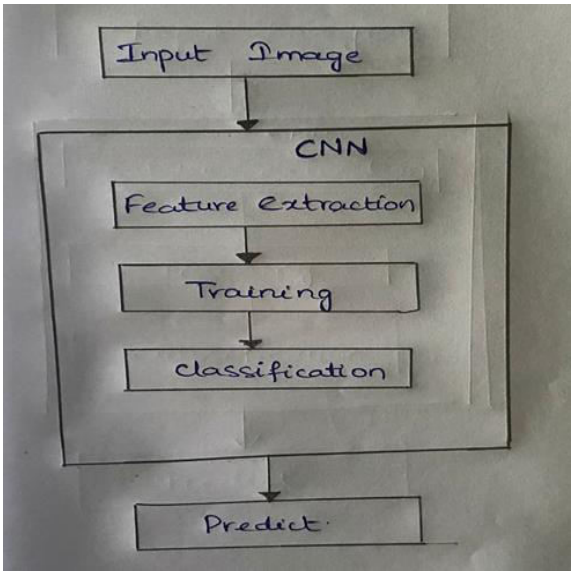
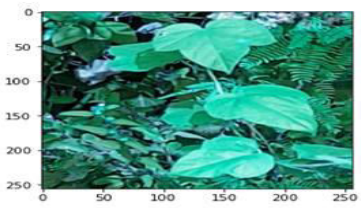


Figure 2: Flow Chart of Giloy Leaf Identification

METHODS OR TECHNIQUES USED

The methods and techniques used in proposed system is based on leaf feature matching. Severalfeature matching techniques such as PCA (Principal Component Analysis), 2DPCA(2-Dimensional Principal Component analysis), ICA (Independent Component Analysis) with mahalanalobis, Euclidian, Cosine distance measures are applied for feature matching. Giloy leaf recognition by feature matching using ICA features with Euclidian distance proves robustness with a high accuracy.We use python language for coding.

RESULT




```
[31]: img=img.reshape(-1,256,256,3)
[33]: predict_class=np.argmax(model.predict(img), axis=-1)
[34]: predict_class
[34]: array([1], dtype=int64)
[35]: categories[predict_class[0]]
[35]: 'nongiloy'
[ ]:
[ ]:
```

CONCLUSION

In this paper, we proposed a new method to classify leaves using the CNN model, and created two models by adjusting the network depth using Python tensor flow and Karas. We evaluated the performance of each

model according to the discoloration of, or damage to, leaves. The recognition rate achieved was greater than 94%, even when 30% of the Giloy leaf was damaged.

FUTURE SCOPE

In future research we will attempt to recognize leaves attached to branches, in order to develop a visual system that can replicate the method used by humans to identify plant types. It may play a crucial role in medical field.

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