

FYTOLYZER: Plant Identification and its Utilities

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Abstract: Plants are among the earth's helpful and attractive products of environment. A plant has been vital to mankind's endurance. The urgent require is the more plant was at the risk of killing. An Ayurveda medicines can be prepared by using the plant leaves and this plant class belong to the endanger group. So, it is pivotal to set up the database for plant defense. Plant leaf spotting has been challenging for several researchers. In this paper, introduced on the survey of various categorization methods is used for the plant leaves classification. The method of classification deals with classify of each model in the distinct classes. A categorization is a method that leaf can be classified on its various morphological features. It is a big challenging task to analyze plant leaves images by a layman because there is extremely minute variation in few plants leaves & big data set for study. This is a pretty complex to build an automated recognition scheme which is the process on large data and gives correct assessment.

Keywords: Categorization, Classification., Feature Extraction, Leaf Images, Morphological features.

1. INTRODUCTION

Leaves are the identity of trees. There are various kinds and various species of trees found in this earth. We can see and observe the innumerable tree species around us which we cannot even identify their types. Here comes the role of tree identification. It is very important in our daily life. Various laboratory methods have been studied for tree identification. Initially, the morphological and genetical characteristics were used for identification of leaves. But it turned out to be more complex and difficult to identify due to the presence of varieties of wide morphological characteristics. And this is due to the evolutionary changes that occurred during the last few decades, studies have been made on various diversities among leaf due to the number of evolutionary changes. Hence, they proposed leaf structures which includes their shapes, leaf arrangement, leaf margin, vein structure which help in understanding and identifying different varieties of leaves. Plant identification plays an important role in various fields such as education and research.

1.1 Goals or Objective:

- To provide an automated system for plant species determination.
- Reducing the human efforts and time required for plant identification than required manually.
- An easy method to provide accurate information about the plants than possible manually.
- Along with the identification it will also provide the utilities of that plant.
- Manually identification of the plants is eliminated.

- Accurate information of the plant is obtained.
- Reduces human effort and time.

2. Literature Survey

Before making our project, we have gone through many literature surveys to overcome the advantages & disadvantages of the applications. There are many disadvantages in the applications which we came across while studying the identification of plants species and its information. Some of them are as followed:

Computer based identification system is used for automatic plant identification. Above all the plants organs, plant leaf is selected for identifying the features of the plants. Digital processing techniques are used for calculating the five geometrical parameters in the process. On the basis of the geometrical parameters extracted, six basic morphological features are extracted used for the further processing. On the basis of the features extracted, vein feature as derived features is also extracted. Using the digital scanner at first, the images of the leafis obtained. After all of the extraction, the accuracy of the algorithm is tested on two different databases and are compared. For both the databases the false rejection ratio is calculated [1].

This part reviews the main computational part where different features are being extracted which are termed as morphological features as well as image processing methods, these are been used to analyze images of plants providing readers a relevant botanical concept. It mainly focuses on the measurement of leaf outlines, flower shape, vein structures and leaf textures, and describe a wide range of analytical methods in use [2].The systematic literature paper came with a comparison and analysis of computer vision.From 10 years (2005-2015), around 120 peer-reviewed studies has been identified selected from multi-staged processes.

After carefully studying the plant organs we have described these features into some categories i.e. shape, color, vein structure, textureetc. [3].

It'sa fully automatic leaf-based plant identification application possesses following functionalities like petal detection, orientation normalization and identification of plant leaf based on modified kernel descriptor. From fully manual this tool switches to semi-automatic and then fully automatic. This system is useful for many experienced users like experts in biology as this system switches from fully manual to fully automatic, as system is fully automatic it is dedicated to beginner[4].

We studied the various machine learning techniques that is used in the detection of the plant leaves.It goes through the challenges of image-based plant identification and expands the importance of various plant organs and their characteristics in the plant identification process. It highlights the future researches in identification of plants and computer vision[5].

Image processing is used to work on digital images using an algorithm, Plant image identification has become the recent trend in both botanical taxonomy and computer vision. Firstly, plant image dataset is collected by mobile phone or by any other capturing device in natural scene it contains 10,000 images of 100 or more plant species. For classification of plants in natural environment deep learning techniques are being used [6].

Purpose of this application is to identify a unique automatic species using sparse representation of zigzag features of leaf. First image corners are detected then abnormal image corner is removed by Pau Ta criteria. The bottom and top

tooth edges are distinguished to effectively correspond to the extracted image corners while deleting abnormal image corner then four-leaf tooth features are extracted and connected to form feature vector. At last deficient representation-based classifier identifies a plant species sample. Tested real-world leaf image dataset show that our proposed System is feasible for species detection and identification. [7]

Some similar Applications identified during survey:

PlantNet: This application has a drawback of only limited species. After capturing the image of the plant, it gives us the option to confirm the plant name by looking at several such relatable images [8].

PictureThis: Instantly Identify thousands of plants, flowers, and trees with advanced artificial intelligence. And get suggestions and advice from a network of friendly garden and horticulture specialists [9].

PlantSnap: Try snapping a plant, flower or tree for free and have your photos instantly recognized by our always-growing algorithm. Plant names, location & more fascinating information on the world around [10].

Plantix: Every disease, pest and deficiency leaves behind a specific pattern. Plantix recognizes these patterns. One photo is enough and you know what your plant is missing [11].

3. Proposed Work

The Plant identification and its utility is same as other identification applications but with overcoming its disadvantages. The complete flow and functional modules of the application are given below.

3.1 Flow of the system:

The basic flow of Fytolyzer is the user can directly access the application without registering to it. Once the User open the application, the user is provided with two options. First is to click the image of the leaf from mobile. Second is to upload the picture of the leaf from mobile gallery.

The user has the advantage to choose the type he wants to take the leaf for identification. If the user captures the image from mobile, then below the captured image user will get do options of „Yes“ or „No“. If the user wants to again capture the image he will click on „No“ else „Yes“ and continue.

After the perfect image is gotten the image the features are extracted and image is processed using image processing. The processed image will send the extracted features to the server. Then the server will match the extracted features of the leaf to its database. If it matches any image from its server it will provide the output with leaf identified name and its utility, biological conditions, medical uses will be provided. The same process is done when the image of the leaf is uploaded from the gallery.

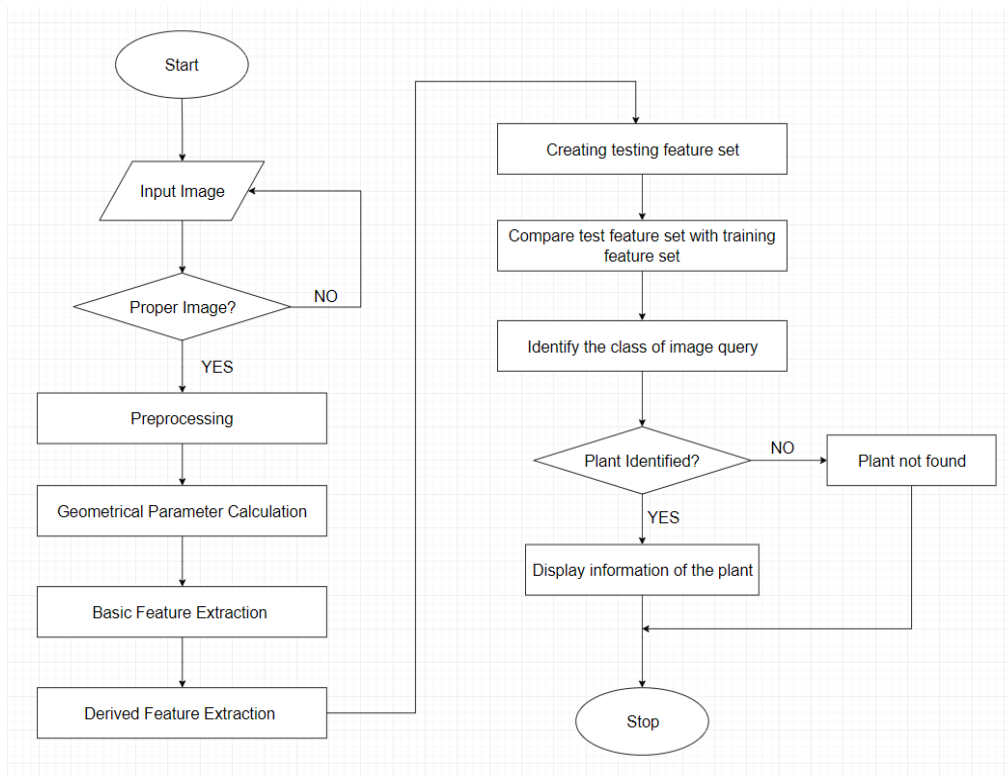


Fig.3.1. Flowchart of Plant Identification and its utilities.

3.2 Functional Modules:

The whole system if divided into three modules:

3.2.1 Creation of Dataset module:

In this module, the dataset will be created by extracting the morphological features of the plants which is used to extract the key features of the plants leaf. Some basic features that are kept in mind while extracting the features of leaf are length, width, area, perimeter and circumference. Using these parameters morphological features are extracted of a leaf. These morphological features are used to extract the exact leaf which can be compared with the captured/uploaded image to identify it.

3.2.2 Admin Module:

In this module, the admin plays a partially important role. The admin can update information, add an image and its information and delete the wrong information. The admin has the direct access to the database. If the user gives any kind of a feedback, then the admin module has to respond to the feedback of the user.

3.2.3 User Module:

In User module, the user will capture/upload the image from Mobile camera/gallery. If user finds the image captured good to go, he will submit the image for further processing else user will again capture the image. After all the processing this user will get the output of the identified leaf with its name, utility, biological conditions, medicinal use, medicinal name etc. If the leaf is not identified the user will get the output as "Plant not found". If the user, then wants to send the feedback user will be able to give the feedback.

3.3 Tools

- Android Studio is the IDE for Android OS

It is built on JetBrains' IntelliJ IDEA software and it is designed specifically for developing of Android apps and also helps us to build the highest-quality apps for every Android device. It also offers tools custom-tailored for Android developers such as rich code editing, debugging, testing, etc.

- Tensorflow

It is an open-sourced library using dataflow graphs to build models and differentiable programming, and is commonly used for machine learning purposes. Tensorflow was developed by Google, and it provides developers with access to a library of functions such as creating large scale neural networks with many layers and also machine learning applications such as image classification.

4. CONCLUSION

This survey helps in identification of plants easily on the basis of their leaf structure. It reduces the time as well as human efforts. It will eliminate the manual identification of plants which involves a lot of time for performing various tasks and processes. By using this application, the user will get the accurate information of the plant along with its detailed information. This application will be useful for many purposes like education, medicinal, agriculture etc. This app can be used as information provider for the plants used in medical fields developed for medicinal use. This go-to application will help people to increase their knowledge about the plants around them. This application is very useful for the nature lovers who keep on exploring the nature and want to keep information of various plants around them.

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