Automated Flower Species Detection and Recognition using Neural Network

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***Abstract* - In the proposed to have a strategy for characterization of blossoms utilizing Neural Network (NN) classifier. The proposed strategy depends on textural highlights, for example, Gray level co-event network (GLCM) and discrete wavelet change (DWT). A bloom picture is divided utilizing an edge based technique. The informational collection has distinctive bloom pictures with comparative appearance .The database of blossom pictures is a blend of pictures taken from World Wide Web and the pictures taken by us. The ANN has been prepared by 50 examples to order 5 classes of blossoms and accomplished arrangement exactness over 85% utilizing GLCM includes as it were.**

Keywords - Neural Network, DWT, GLCM, Segmentation.

I. INTRODUCTION

It is very important to identify naturally occurring objects and recognize its type. It is useful to identify flower type in various fields such as gardening, botany research, Ayurveda, treatment, farming, Floriculture etc. Nature has many different kinds of flowers, similarity in some features is found between the flowers. For example, many flowers share the red colour. On the other hand, these red flowers are different from other features. Red flowers do not necessarily share the same shape. These similarities and differences highlight the difficulty of identifying each flower species automatically. Traditional flower recognition task is done by a botanist. Many challenges are facing botanist through flower recognition task.

Our project aim is to providing an automated system that detects and recognizes flower species. The importance of building automated flower recognition method stands out in many benefits such as providing fast recognition for educational purpose, as automated method accelerates the learning process. Automated flower recognition gives the people with limited experience in flower species, the ability to recognize the species of a flower, with the advantages.

Computerized picture preparing manages control of advanced pictures through a computerized PC. It is centers around building up a PC framework that can perform preparing on a picture. Computerized picture preparing advancements, for example, Classification, Feature extraction, Pattern acknowledgment and so forth are helpful to order the pictures

II. BACKGROUND

With increment in number of investigates and innovation, new types of blossoms are found every now and again. Not every person has the information on these blossoms. We need master's understanding and down to earth information that is very troublesome. With only the image, there is no way we can obtain further details about the flowers unless consulting a botanist. In order to search the information over the internet, at least a keyword related to that flower should be known. Although there is a method of searching images by input image (Google Image Search), derived results are often irrelevant to what we want. Recently there has been the development of android applications and researches on the use of machine learning for recognitions of objects including flowers.

As the machine learning technology advances, sophisticated models have been proposed for automatic plant identification. It used the probabilistic neural network as a classifier to identify the plant leaf images. Similarly, our application “Automated Flower Recognition” help to recognize a flower image in order to get further information about their common names, scientific names, kingdom, its uses and ways to cultivate it. In this proposed software color, shape and texture are used to extract the features to feed the models for comparison of the images to find the exact flower.

The main base of the software is a data set containing various images of flowers, which is further split into train sets and test sets. keeps all the information related to the image of the flower. There are various models like uses Random forest, Gaussian Naïve Bayes and Support Vector Machine models, Logistic Regression, Linear Discriminate Analysis, Decision Trees, K-Nearest Neighbors. Our application uses Random forest, Gaussian Naïve Bayes and Support Vector Machine models to train the datasets. For comparison the image has to be uploaded. User will be able to derive important information related to the input flower image such as flower’s scientific name, botanical information and so on. The information provided can then be used for further information gathering activities.

III. METHODOLOGY

A. Problem Statement :

Similar projects have been recently developed for identifying flowers as well as plants through leaves. The key challenges faced by the developers are finding proper feature extraction factors relating to the plants and flowers since there are many variations in shape, color and texture of flowers. During the development of these projects, it was observed that most of the systems focused on computational logic involved in image representation. Thus the main challenge identified

was the semantic gap which occurs because of the difference in the representation of the digital image and the human perception.

2.2 Proposed Methodology :

In the proposed to have a strategy for arrangement of blossoms utilizing Neural Network (NN) classifier. The proposed strategy depends on textural highlights, for example, Gray level co-event grid (GLCM) and discrete wavelet change (DWT). A blossom picture is portioned utilizing an edge based strategy. The informational collection has diverse blossom pictures with comparative appearance .The database of bloom pictures is a blend of pictures taken from World Wide Web and the pictures taken by us. The ANN has been prepared by 50 examples to order 5 classes of blossoms and accomplished characterization exactness over 85% utilizing GLCM includes as it were.

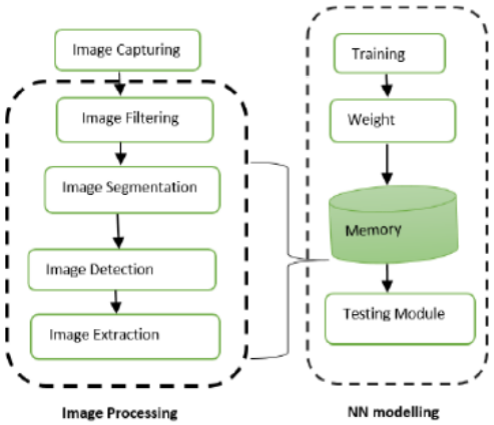

Figure 2.2: Process flow diagram

This dataset contains labeled 4242 images of flowers. The pictures are isolated into five classes: chamomile, tulip, rose, sunflower, dandelion. For each class there are around 800 photographs. Photographs are not high goal, about 320x240 pixels. Photographs are not diminished to a solitary size, they have various extents. The information assortment depends on scratched information from flickr, google pictures, and yandex images[5]. However, more pictures were made as trial results demonstrate the need to explore the effect of higher number of pictures on the order precision.

One thing to note is that a few blossoms are from similar sorts yet having various hues as shading is one of the qualities under scrutiny. Information arrangement stage includes picture preparing assignments by utilizing Anaconda apparatus. In bloom pictures distinguishing proof and arrangement, this is the most significant undertaking that should be dealt with cautiously as the precision of the grouping model relies upon this stage. This stage incorporates 4 stages of picture preparing, which are picture sifting, picture division, district identification, and highlight extraction.

These means are significant in arrangement of a decent informational index, especially for building a NN model. When picture catching has been done, picture sifting is performed to change or improve a picture just as taking out the clamor from the picture. Picture division exploits the shading contrasts among areas and the picture foundation is evacuated by shading division.

In locale location stage, objects in pictures are acted so as to extricate their shading and surface highlights for additional preparing. Highlight extraction catches the basic qualities of the examples. For this examination, two highlights extraction are thought of, to be specific the shading and surface. All bloom pictures are caught in RGB (Red, Green, Blue) shading space. Since RGB shading space is effectively being impacted by power and enlightenment from sun or camera electric lamp, this prompts awkwardness view of shading divergence. One answer for this issue is to change over the pictures into Hue, Saturation, Value (HSV) design view since HSV group disregards the force or brightening brought about by sun or lighting. For this investigation, we are utilizing K-NN and Neural system model. The underlying trials led mean to locate the beginning stage for preparing and testing the blossom pictures dataset. Since bloom picture arrangement contemplates are not broad, it is critical to investigate the sensible number of pictures required to speak to a class of blossom that would deliver sensible presentation, for instance in any event 80%.

The framework configuration process segments the necessities to either equipment or programming frameworks.

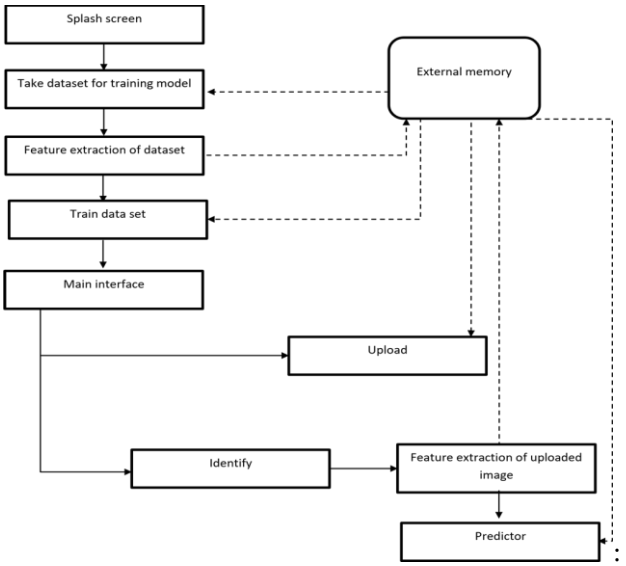

Figure 2.3: Dataflow diagram

B. Algorithm :Major algorithm

1.Start
2.Import Required Libraries and files
3.Shows Splash Screen for 2 seconds
4.Get the training path of the Image folders
5.Color, shape and texture extraction of each images in the Image folders
6.Merge the feature extraction (Global Extraction)
7.Normalize and Convert the Global Extraction (to simple array using numpy)
8.Store the Converted array in h5py file
9.Split the Converted array to training and testing data
10.Train the different algorithm used using the training data
11.If upload button is clicked:
Show FileOpenDialog to get path of Image to be identified

12.If identify button is clicked:
If path of Image to be identified is not null:
Extract the three Feature of the image
Compare the extracted feature with Global Feature using different algorithms
Each algorithm predict the image and merge the predicted Flower
Show the Predicted Flower with its Specification, how to cultivate and Uses Information
else:
Show warning message to check path of Image
13.End

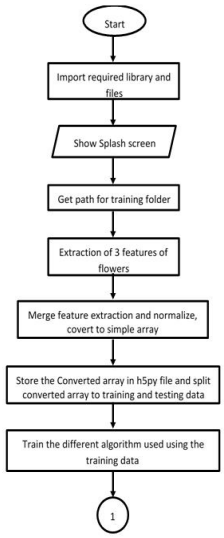

Figure 2.3.1:Major import required library and files Extraction.

2.3.2 Program Start Algorithm :
1.Start
2.Shows a splash screen for 2 seconds
3.Feature extraction of the Dataset
4.Shows Main interface
5. If Upload button is clicked:
takes the image path and store in a variable
6.If Identify button is clicked:
Feature extraction of uploaded image
Predict the image using different algorithm
Show the Details and Uses of the Flower Predicted
7.End

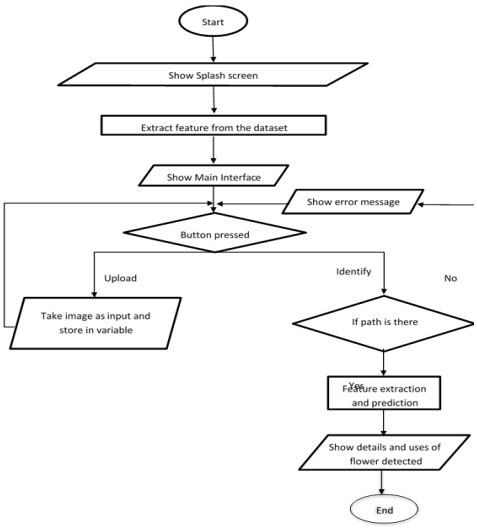

Figure 2.3.2 : Function of extraction features from the dataset.

I. IMPLEMENTATION

3.1 K-Nearest Neighbour Algorithm

The k-Nearest Neighbors calculation is simple calculation to comprehend and to actualize, and a useful asset to have available to you. The execution will be explicit for order issues and will be exhibited utilizing the blossoms arrangement issue.

3.2 Neural Network Algorithm

NN has been utilized by blossom picture analysts so as to comprehend the bloom picture highlights and characterized bloom pictures by joining the shading, surface, and shape utilizing closest neighbor and staggered affiliation manages individually, while incorporate spatial data include utilizing shading bunching and area information. To defeat the issue of ordering pictures of blossoms for looking through a bloom licenses database.

3.3 Functional Requirements

Utilitarian necessities characterize elements of programming framework or its components, where a capacity is portrayed as a detail of conduct among yields and information. They perhaps estimations, specialized subtleties and other specialized usefulness that characterizes what framework should achieve. The frameworks fundamental usefulness is to removing the sound example through the given datasets and send message as yield in internet browser.

Effectiveness: Determines how proficiently the framework works and relies upon its handling limit.

3.3.1 Hardware Requirements :

8GB of RAM
intel®core™ i3-500cpu @2.00GHz 2.00GHz
64-bit Operating System

3.3.2 Software Requirements :

Anaconda software using python programming language.
Desktop web using html.
Using machine learning algorithms and those are K-means and neural networks.

3.4 Non Functional Requirements:

Non useful prerequisite is a necessity that indicates the standards that can be utilized to pass judgment on the activity of framework, as opposed to explicit practices they are

diverged from a useful prerequisites that characterize explicit conduct or capacities. Non utilitarian necessities are as per the following:

Reliability: The system should be trustworthy to use and reliable in all kinds of situations.

Performance: The system will recognize all the seven emotions accurately.

II. RESULT

4.1 Predicted with their flowers:

1. Daisy

2. **Dandelion**

3. **Rose**

4. **Tulips**

Figure 4.2: Login to page.

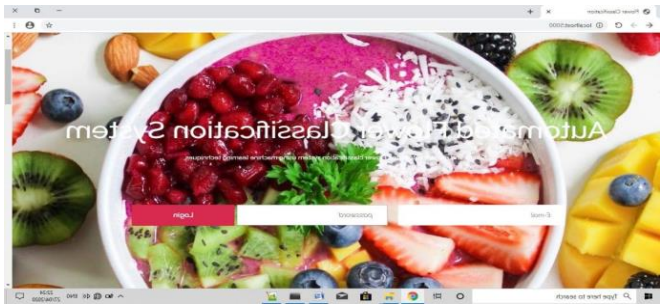

Figure 4.3: Upload the image.

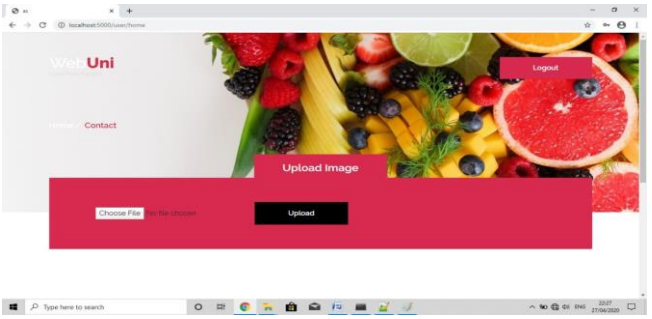

Figure 4.4: Select the flower image.

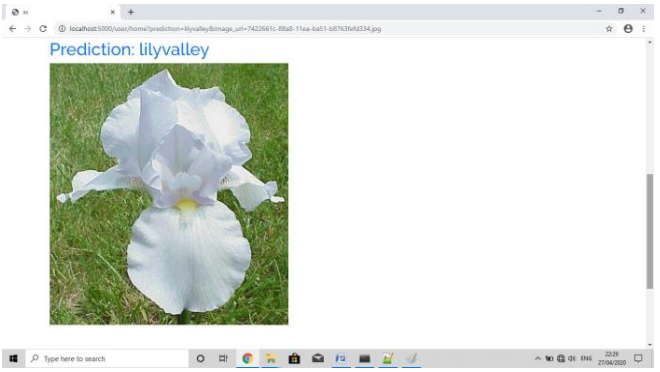

Figure 4.5: The image is predicted.

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