

Plants Classification Using Machine Learning Algorithm

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Abstract - Water is the principle content in a plant. Along these lines, the development of plants are enormously reliant on the adjustments in plant water content. To advance plant development in water short and dry spell pressure conditions, numerous methods have been considered. The target of this paper is to structure and build up an astute framework, in light of Support Vector Machine (SVM) and machine vision that would advance plant development in a restricted water condition. At long last shading, morphological and textural highlights were separated from a lot of turf grass, wheat, rice plant pictures under dry season pressure conditions. At that point an information arrangement process was overseen utilizing an SVM and ANN. Results indicated that the general arrangement exactness of ANN was 92% and higher correct nesses were acquired when the SVM was utilized as the classifier with a general precision of 98.00% for plant condition (Fresh and Wilted).

KEYWORDS - Support Vector Machine, imaging, plant classification, plant segmentation, ANN.

I. INTRODUCTION

Plants live in all spots we live, and place without us. Many take significant data for the improvement of human culture. The basic circumstance is that numerous plants are at the danger of vanishing. Along these lines, it is having to set up a database for plant insurance. Plant parts and their items like organic products, leaves, stems and blossoms, and so forth are ingest in various manners by people and creatures. There is an additional activity where plants assume a significant job, yet basically, they are utilized for the development of nourishment things, drug, assembling of mustard oil, making of bio fuel and so forth.

Plants are perceived by their highlights like size, shape, tallness or shade of plant or its back to back parts. The grouping of the plant is all the more frequently finished with the assistance of leaves outwardly dependent on the highlights like size, surface, shape, and shade of them.

computer vision ideas, AI, picture handling is basically utilized in various applications like example acknowledgment, characterization, division and so on. The flowchart of plant distinguishing proof as appeared in Fig.1. From the previous barely any years, programmed perception of plants has pulled in numerous analysts in particular spaces. Learning is a successive circumstance since the presence of life. Throughout the years, ages of living creatures have grown, so have their learning aptitudes. Nowadays Machines get familiar with a similar route as people do. This learning action of machines is additionally called the preparation of a machine to make it astute. Different computer vision calculations floor a path for building machines canny because of their capacity to translate the pictured information. The machine does this by utilizing two huge components known as example acknowledgment and arrangement. The recognizable proof of plants depends on the Monitoring of its morphological highlights, for example, the structure of the stem, roots, leaves, natural products.

Leaves share a significant sum in adding to the plan of programmed frameworks because of their delayed presence. A leaf is perceived by its surface, concealing, and shape. computer vision ideas attempt to dispose of the customary practices and presented new techniques for division of plants. The programmed or computer supported plant division procedures and techniques planned are of much huge nowadays.

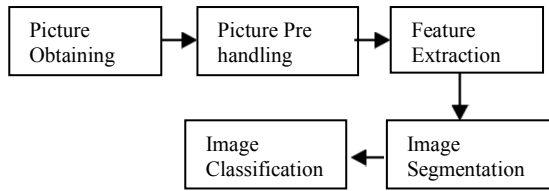


Fig.1. Plant Identification Flowchart

A few order apparatuses for these errands, including bolster vector machine (SVM), Artificial Neural Network (ANN). Looking at their exhibition utilizing cross approval on an adjusted enormous informational collection, we arrived at the end that help vector AI was ideal. This paper manages plant order by SVM classifier. Bolster vector machines (SVM) are an extremely ground-breaking system for deduction with little parameter decisions. This ought to convert into the favored change of SVM in numerous application areas by non-SVM specialists. The well-known accomplishment of earlier strategies like neural systems, hereditary calculations, and choice trees was upgraded by the natural inspiration of these methodologies that in some sense improved the end client's capacity to create applications freely and have a feeling of trust in the outcomes. The SVM will be prepared by around 50 pictures and afterward tried with a portion of the pictures and afterward will perceive what number of test pictures have been ordered precisely.

II. LITERATURE REVIEW

Many researchers have used hierarchical system or other approaches to study the classification process. They have categorized on the basis of leaves, weeds, etc. in the following papers and the characteristics used for extraction are color, texture. Using different transformation, the color characteristics are extracted and even given the explanation for different transformation. In addition, the classification process uses the classifiers or other neural networks in other relevant papers. But we used SVM classifier in this project for better extraction of the function, accordingly the related papers were included.

Bakhsh pour [1] proposed weed recognition utilizing shape highlights. Weed rearrangement is as yet a basic issue for mechanical weed expulsion. Little self-control between the cutting tine and primary yield position requires profoundly precise separation of the weed against the principle crop. Close likenesses between the shape highlights of sugar beet and normal

weeds make it hard to characterize a total component to have the option to proficiently recognize every one of the weeds with satisfactory precision. Consequently, in this investigation, it was attempted to join a few shape highlights to give an example to every assortment of the plants. To empower the vision framework in the fear of the weeds dependent on their example, bolster vector machine and counterfeit neural net-works were locked in. Shape highlight sets with Fourier descriptors and minute invariant highlights. Results demonstrated that the general arrangement exactness of ANN was 92.92%, where 92.50% of weeds were precisely ordered. Higher exactness's were gotten when the SVM was utilized as the classifier with a general precision of 95.00% though 93.33% of weeds were precisely arranged. Additionally, 93.33% and 96.67% of sugar beet plants were precisely grouped by ANN and SVM individually.

Sue Han Lee [2] present a half and half nonexclusive organ convolution neural system (HGO-CNN), which is spread both organ and conventional data, connecting them utilizing another element combination conspire for species order. Next, rather than utilizing a CNN-put together strategy to create with respect to one picture with a solitary organ, we expand our procedure. they present another system for plant auxiliary getting the hang of utilizing the repetitive neural system-based technique. This tale system underpins arrangement dependent on an alternate number of plants sees, catching at least one organs of a plant, by expanding the relevant conditions between them. We additionally present the dependent outcomes.

Vippon Preet Kour [3] presented a novel strategy is introduced for the division and characterization of the seven unique plants, named Guava, Jamun, Mango, Grapes, Apple, Tomato, and Arjun, in light of their leaf pictures. In the primary stage, both continuous pictures and pictures from the crowdAI database are gathered and preprocessed for commotion expulsion, resizing, and differentiate improvement. At that point, in the subsequent stage, various qualities are removed dependent on shading and surface. The third stage includes the division of pictures utilizing a k-means calculation. The fourth stage comprises of the preparation of help vector machine, lastly, in the last stage, the testing is executed. Molecule swarm enhancement calculation is utilized for picking the best practical estimation of the instatement parameter in both the division and grouping forms. The proposed work arrived at higher exploratory outcomes, for example, affectability = 0.9581, explicitness = 0.9676, and precision = 0.9759, for division and arrangement exactness = 95.23 when contrasted and different techniques.

M.M.Ghazi [4] recommended distinguishing the issue of computerizing the tallying procedure utilizing computer vision and UAV symbolism. They give an administered location based tallying structure for assessing the quantity of planting small scale locales on a precisely arranged square. The framework is prepared disconnected to take in component portrayals from semi-consequently explained pictures. Hill identification and checking are then performed on multispectral UAV pictures caught at a height of 100 m. Our divulgence system continues by making area proposition dependent on neighborhood parallel examples (LBP) highlights separated from close infrared (NIR) patches. A convolution neural system (CNN) is then utilized for characterizing competitor districts by considering multispectral picture information.

III. ANALYSIS AND DESIGN

The plant classification model of the proposed system is given by Fig.2. The figure consists the input image module, feature extraction module, SVM classifier module.

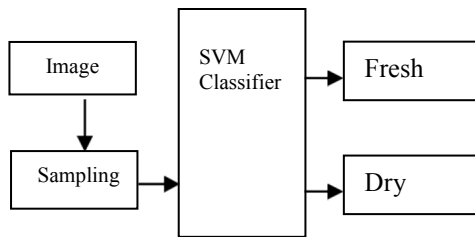


Fig .2. Plant classification model

A. Input Image

The information and data of Images is increasingly significant in natural sciences. In this way, pictures can be caught from advanced camera. At the point when pictures are treated as imperative to any further tasks then we go for pre-preparing strategy. In the process the commotion and different things are evacuated.

B. Feature Extraction

Feature extraction completely dependent on the three sort of highlights that is shading histogram, edge histogram, sobel edge bearing. Shading histogram utilized for produce the shading difference in the picture. there are diverse shading space models like RGB, HSV, YCbCretc. These diverse space models portrayal changes habitually.

The info picture is called as RGB shading space pictures, so at first changing over RGB to HSV shading space can be get. The HSV shading space model is accustomed to gathering the shading histogram impeccably since H is the tone which is mean the genuine wavelength of the shading.

C. Texture Feature

Surface is a component. It is utilized to change over the pictures into the locales and it will group these sorts of areas. There are parcel of surface examination procedures which is utilized with discrete criteria for include extraction: measurable strategies; channel methods. The different highlights are determined by nearby picture highlights.

D. Support Vector Machine (SVM)

The help Support Vector Machine (SVM) is regulated learning calculations. SVM utilized for grouping and relapse process. It utilizes part procedure for change the information and relies on the change it will locate the ideal limits between the comparing yields.

In the help vector machine models, there are a more prominent number of pieces we can utilized. Radial basis function (RBF), polynomial, and sigmoid these parts which is utilized in the SVM. The most mainstream decision of the bit sort is RBF. This is fundamental due to their principles and limited criticism over the entire scope of the genuine x-pivot.

IV. RESULTS AND DISCUSSION

In this proposed framework we have to prepare the 50 input pictures and compute the exactness of characterization dependent on the test pictures. The arrangement precision is extent of number of test pictures ordered appropriately by absolute number of pictures increased by 100.

$$\text{classification Rate} = \frac{\text{Correctly classified}}{\text{Total no of samples}} * 100$$

Grouping utilizing Support Vector Machine dependent on Hyper plane classifier: A product routine was written in MATLAB that would take in .mat file speaking to the preparation and test information, train the classifier utilizing the train documents and afterward utilize the test record to play out the arrangement task on the test information. The plants classification MATLAB result is given as Fig.3.

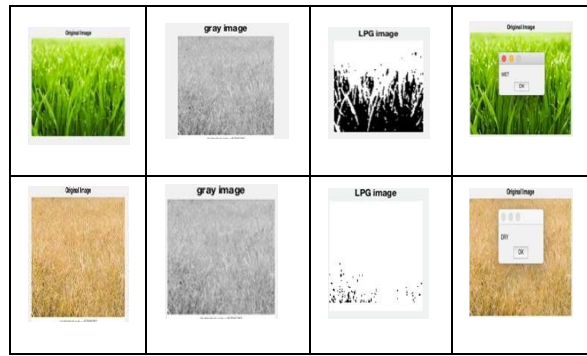


Fig. 3. Plant classification Result

V. COMPARISON OF ANN AND SVM

Algorithm	No of Images	Accuracy
ANN	50	92%
SVM	50	98%

Table .1. Comparisons of ANN and SVM

The generated feature sets are aided into Linear SVM is a supervised computing device learning algorithm which can be used for classification and regression challenges. The classifier will assign the label to the photograph and it specifies which category it belongs to, from where the classifier is predefined primarily based upon the feature. This classification is used for each analysis and the trying out phase. SVM makes use of the method referred to as the kernel. Artificial neural networks (ANN) take input as an unstructured image apply computational model that works on and convert images into identical classification output labels. It requires fewer preprocessing efforts and trained to learn the needed attributes for classification intension. A comparison between the performances of SVM and ANN classifiers has been done. Two models have been trained using the same data. The comparison of classification accuracies of both the classifiers using reduced color, texture and combined features. Table 1 presents the overall results with comparative graph shown in Fig .4.

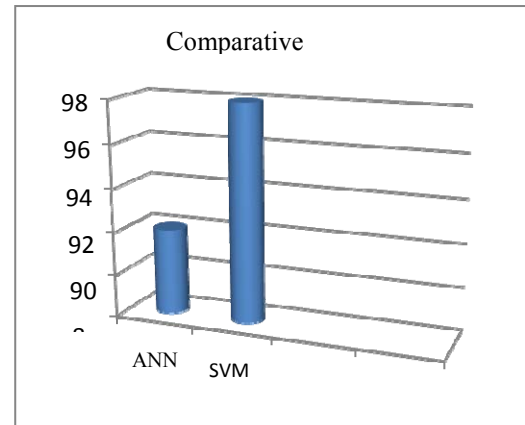


Fig .4. Comparison Graph of ANN and SVM

VI. CONCLUSION

The plant classification is depending on few essential aspects like color, structure using SVM classifier. In the proposed work, we performed two distinct plans for image classification. With an appropriate research operation, we could inspect that SVM classification better than ANN classification. Although the performance of ANN was very low compared to SVM, this was due to the fact that the ANN classifier could not distinguish plant whereas SVM was very effective in classifying plant (fresh and wilted). Finally, the accuracy percentage for SVM was found to be 98% and for ANN it was 92%. For future work, organize to add some real-time images based on basic approach of wireless sensor network or internet of things.

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