International Journal of Future Generation Communication and Networking
Vol. 13, No. 3, (2020), pp. 1739 – 1746

Rot Detection of Fruit and Leaf Using Image Processing and Fuzzy Logic Techniques

[1]Dr. M. Jagadeesan, [2]Dr. P. A. Selvaraj, [3]Ms. T. Mythili, [4]Mr. R. Sri Ragavendran, [5]Mr. V. Guna

[1]Assistant Professor, Department of Computer Applications, Kongu Engineering College, Perundurai, Tamilnadu, India.
[2]Assistant Professor, Department of Computer Applications, Kongu Engineering College, Perundurai, Tamilnadu, India.
[3]PG Scholar, Department of Computer Applications, Kongu Engineering College, Perundurai, Tamilnadu, India.
[4]PG Scholar, Department of Computer Applications, Kongu Engineering College, Perundurai, Tamilnadu, India.
[5]PG Scholar, Department of Computer Applications, Kongu Engineering College, Perundurai, Tamilnadu, India.
[1]jagadeesan@gmail.com, [2]kpsraj2001@gmail.com,
[3]mythilithirumoorthy@gmail.com,
[4]ragavendransri4@gmail.com,crazyguna45@gmail.com

Abstract

The main exertion in finding out about plants is watching plant highlights. This venture built up a plant search framework that permits clients to do a pursuit in any event, when they don't have the foggiest idea about the plant name essentially by watching plant qualities. The framework comprises of a plant highlights, scans for the highlights as indicated by the information highlights, and returns the leaves with chose clusters.Now, the leaf characterization utilizes machine vision to disintegrate and break down shading, size, shape, and surface. Be that as it may, the proposed extraction edge technique must be completed generally and there is as yet a distinction between the edge of the removed shape, polygon, and the edge of the state of the first image.This venture bunches the leaves utilizing picture zone size, pixel shading esteems similitude, in view of splendor estimations of the picture and leaf shapes. Furthermore, the undertaking points in finding the decays in the leaves. In light of the tally of pixels of spoil hues, the all out decay percent in the leaf is determined and shown. This helps with assessing the leaf quality. In the event that future analysis were to extend to different highlights, leaf pinnacle, and so forth., even those that are difficult to evaluate, can likewise be measured.

Keywords*: Image Selection and Color Values Extraction, Cluster Based On Area Size,Cluster Based On Pixel Color Values Similarity, Cluster Based On Brightness Values Count, Rot Area Calculation.*

1.Introduction:

As of now, most plant search frameworks use RFID or QRCode to get plant data. Nonetheless, these two advances have explicit equipment prerequisites that must be arrangement ahead of time to help out examining and detecting through a cell phone to locate the particular name of the plant. Since the inconstancy of plants is very various and spreads a decent range, these two techniques have territorial confinements. A few specialists have endeavor to arrange diverse tobacco leaves utilizing the Fuzzy Function. Their auto-reviewing and evaluating framework utilizes machine vision to deteriorate and

break down shading, size, shape, and surface. Nonetheless, the proposed extraction edge technique must be controlled generally there's as yet a distinction between the edge of the removed shape, polygon, and in this manner the edge of the state of the first picture. Subsequently, to improve the technique for catching the plant diagram, this examination proposes a Centroid-Contour separation to catch the blueprint of the plant highlights and the good ways from the inside point to every edge point to all the more precisely evaluate the plant highlights of the first picture.

Accordingly, the caught picture can likewise be reliable with the first plant picture. Since picture acknowledgment innovation for evaluating three dimensional highlights, for example, diagrams of blossoms, is troublesome, and the exactness of the measured worth can't be confirmed, the precision of the element search question is positively affected and in this manner can't be performed. Hence, this venture applied the Association Rule technique to those plant includes that can't be precisely measured. The strategy for partner likeness with the affiliation rule examination can viably improve the adaptation to non-critical failure and exactness of the general efficient plant search inquiry. This investigation intends to build up a plant search framework with high exactness and resilience, just as demonstrate that the Association Rule can efficaciously supplement the weaknesses of the powerlessness to measure parts and further improve the adaptation to internal failure and precision of the inquiry question system.The bit of leeway of this framework is that it permits clients to handily look through data of a plant without knowing the plant's name. Besides, the science educational plan can join the showing technique of request based learning with this present investigation's plant search framework to improve primary school understudies' plant perception capacity. Understudies would thus be able to seek after finding out about plants through a methodology dependent on self-perception. In this examination, the plant search was executed dependent on the plant highlights utilizing the methodology of Centroid-Contour separation notwithstanding the Fuzzy Function computation.

Be that as it may, the blossoms of the plant are hard to be measured with different highlights which may prompt one-sided resistances. That is the reason the examination has fused Association Rule investigation by physically gathering input on similitudes among the plant includes, and applied the Association Rule to recognize the likeness governs by types of plant as the supplemental count for the component comparability and increment the general resilience and precision of the framework search. Additionally, three distinct techniques were applied to distinguish three diverse precision rates in the investigation. The Association Rule investigation would not just viably improve the resistance and exactness of the framework yet in addition help clients to look through obscure plants dependent on the watched highlights of the focused on plants. After the highlights input, the framework would figure and screen out the Top 10 plants with the most elevated similitudes to show their names and related data. In this examination, a plant search inquiry framework was created to perform three unique investigations of closeness, to be specific the Fuzzy Function, the Association Rule, and the comparability from the consolidated Fuzzy Function and the Association Rule and performed for single element mistake conditions and n include blunder conditions.

2.Related Work:

Fanzhang and Xinhong Zhang [1] expressed that most of arrangement, quality assessment or reviewing of the pipe relieved tobacco leaves are worked by hand , which depends on the critical experience of specialists, and unavoidably restricted by personal,environmental and physical variables. The grouping and along these lines the quality assessment are in this way abstract and experientially based. In this paper, a programmed grouping technique for tobacco leaves bolstered the computerized picture

handling and along these lines the fluffy sets hypothesis is introduced. A reviewing framework bolstered picture handling strategies was produced for naturally evaluating vent restored tobacco leaves and investigating. This framework utilizes machine vision for the extraction and investigation of shading, size, shape and surface. Fluffy far reaching assessment gives an elevated level of trust in choosing bolstered the representative rationale . The neural system is utilized to gauge and conjecture the enrollment capacity of the highlights of tobacco leaves inside the fluffy sets.

Mohd Shahrimie Mohd Asaari, Shahrel A.Suandi and Bakhtiar Affendi Rosdi [2] proposed another methodology of multimodal finger biometrics upheld the combination of finger vein and finger geometry acknowledgment is introduced. In the proposed strategy, Band Limited Phase Only Correlation (BLPOC) is utilized to live the closeness of finger vein pictures. In contrast to past techniques, BLPOC is strong to occlusions,noise and rescaling factors; hence can upgrade the presentation of finger vein acknowledgment. Concerning finger geometry acknowledgment, a substitution kind of geometrical highlights called Width-Centroid Contour Distance (WCCD) is proposed. This WCCD consolidates the picture width with Centroid Contour Distance (CCD). As contrasted and the main kind of highlight, the combination of W and CCD can improve the exactness of finger geometry acknowledgment. At long last, they incorporated the finger vein and finger geometry acknowledgments by a score-level combination technique bolstered the weighted SUM rule. Exploratory assessment utilizing our own database which was gathered from 123 volunteers brought about a productive acknowledgment execution where the equivalent blunder rate (EER) was 1.78% with an all out handling time of 24.22 ms.

Hong A Xiang, Chen Gang, Li Jun-Li, Chi Zhe-Ru and Zhang Dan [3] said that bloom picture recovery is a significant advance for PC supported plant species acknowledgment. In this paper, they proposed an effective division strategy dependent on shading grouping and space information to extricate blossom areas from bloom pictures. For blossom recovery, we utilize the shading histogram of a bloom parts to unmistakable the shading highlights of blossom and two shape-based highlights sets, Centroid-Contour Distance (CCD) and Angle Code Histogram (ACH), to portray the structure highlights of a bloom form.

Rakesh Agrawal and Ramakrishnan Srikant [4] considered the issue of finding affiliation leads between things in a huge database of deals exchanges. They introduced two new calculations for taking care of the difficult that are in a general sense not quite the same as the known calculations. Exact assessment shows that these calculations beat the realized calculations by factors beginning from three for little issues to a significant request of greatness for monster issues. They additionally indicated how the easiest highlights of the 2 proposed calculations are regularly consolidated into a mixture calculation, called AprioriHybrid. Scale-up explore show that AprioriHybrid scales directly with the measure of exchanges. AprioriHybrid likewise has superb scale-up properties with base to the exchange size and in this manner the quantity of things inside the database Progress in scanner tag innovation has made it feasible for retail associations to assemble and store monstrous measures of deals information, referenced on the grounds that the bin information. A record in such information normally comprises of the exchange date and along these lines the things purchased inside the trans-activity. Fruitful associations considered such to be as significant bits of the showcasing framework. They are interested about establishing data driven showcasing forms, oversaw by database innovation, that empower advertisers to create and execute redid promoting projects and strategies [S].

Yan Guo, Minxi Wang, Xin Li [5] said that the point of this paper is to shape the versatile online business shopping increasingly helpful and keep away from data over-burden by a portable internet business proposal framework utilizing an improved Apriori

calculation. Structure/approach/philosophy - Combined with the qualities of the versatile web based business, an improved Apriori calculation was proposed and applied to the counsel framework. This paper makes items that are prescribed to shoppers significant by improving the information mining effectiveness. At last, a Taobao online boutique is utilized for instance to demonstrate the viability of an improved Apriori calculation inside the versatile internet business suggestion framework. The consequences of the examination trial clearlyb show that the portable online business suggestion framework bolstered an improved Apriori calculation improve the effectiveness of information mining to understand the solidarity of constant and proposal exactness.

Elakkia.M [6], the creator expressed that early recognition of patients with raised danger of creating diabetes mellitus is basic to the improved avoidance and by and large clinical administration of the patients. The fundamental mean to utilize affiliation rule mining to electronic clinical records (EMR) to ask sets of hazard factors and their relating subpopulations that speak to patients at especially high danger of creating diabetes. A typical inadequacy of those strategies is their failure to require diabetes hazard perpetual result viable . So as to make these procedures increasingly fitting, the framework needed to negligibly change them: Extend them to join data about constant result factors. In particular, the key commitments are as per the following. A clinical use of affiliation rule mining is to recognize sets of co-grim procedure (and the patient subpopulations who experience the ill effects of these strategy) that infer altogether expanded danger of diabetes.

Yongsoo Kim, Bong-Jin Yum [7] expressed that inside the past investigations of the prior, just buy information of clients were used in web based business recommender framework, while navigational and standard of conduct information were not used. Be that as it may, Kim, Yum, Song, and Kim (2005) built up a community separating condition upheld navigational and personal conduct standards of buyers in web based business locales. In this article, they enhanced Kim et al. (2005) strategies and further build up a totally extraordinary recommender framework**.**

3.Methodology:

3.1 Image Selection and Color Values Extraction:

Here, the betel leafs pictures are submitted to the framework as information. The leaf earthy colored spot sick leaves are taken in this module. Pictures are taken in controlled condition and put away in the JPEG design. These are submitted to the grouping forms just as spoil recognizable proof. The betel leaves pictures pixels hues are recovered with their red, green and blue parts esteems. They are utilized in pixel shading esteem similitude checking module.

3.2 Cluster Based On Area Size:

The betel leaves pictures measurements are recovered utilizing faint() from 'bmp' library and are spared in a vector. The base and greatest zone size are discovered and the thing that matters is separated by three to get extend size. At that point range1 is determined as least worth and 'least worth' in addition to 'run size'. At that point range2 is determined as 'least worth' in addition to 'go size' and 'least worth' in addition to 2 * 'extend size'. At that point range3 is determined as least worth and 'least worth' in addition to 3 * 'go size'. At that point the sizes fall inside these reaches are grouped in their particular bunches.

3.3 Cluster Based On Pixel Color Values Similarity:

The betel leaves pictures hues are recovered and are spared in a vector. At that point a picture is contrasted and other picture pixels' red, green and blue part esteems. Whenever coordinated, at that point the variable is augmented. At that point the all out closeness check is put away. This rationale rehashed for all the pictures. At that point the closeness percent fell inside 33% are gathered in one bunch, inside 66% are assembled as next group and the staying as third bunch.

3.4 Cluster Based On Brightness Values Count:

The betel leaves pictures splendor esteems are recovered and are spared in a vector. At that point a picture is contrasted and other picture pixels' brilliance esteems. Whenever coordinated, at that point the variable is increased. At that point the all out closeness tally is put away. This rationale rehashed for all the pictures. At that point the comparability percent fell inside 33% are gathered in one bunch, inside 66% are assembled as next group and the staying as third group.

3.5 Cluster Based On Leaf Shape:

The betel leaves pictures separation aggregate from midpoint to all the edge pixles are determined and are spared in a vector. At that point a picture is contrasted and other picture separation all out qualities. The interesting separation esteems are utilized for grouping the pictures with shape as highlight.

3.6 Rot Area Calculation:

The betel leaves pictures grayscale values are determined and are spared in a vector. At that point a picture is contrasted and more white region pixels and dark region pixels. At that point the percent of white territory is found with absolute dark region pixels to discover the spoil percent of the leaf picture.

4.Experimental Results:

The following figure 1 show the clustering of leaf images based on the dataset provided as input. Through this, grouping is done to identify the leaf with similar behaviors.

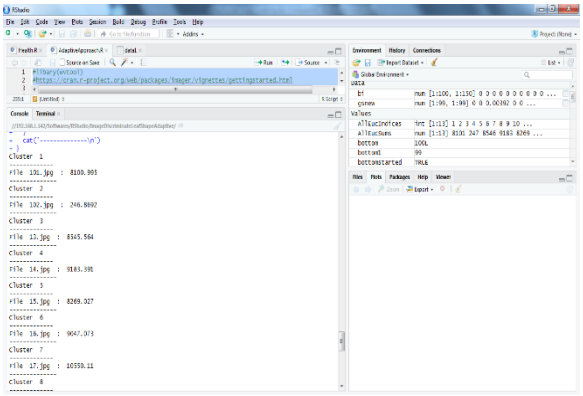

Figure1. Clustering of Leafs

The following Figure 2 represnts the results of the rot percentage identified in each image taken as an input.

Figure 2. Identification of Rot Percentage

5.Conclusion:

This task built up a plant search framework that applied a few highlights and bunch them utilizing versatile methodology. the essential strategy utilized was the centroid-contour separation to evaluate a few highlights and blend the fuzzy function hypothesis; the subsequent technique utilized was similitude bolstered region, splendor esteems, and pixel shading likenesses. the strategy with high proficiency are frequently applied for other hunt inquiry frameworks other than plants and might be handily applied to different frameworks with the idea of evaluating highlight likenesses for applications.

It is accepted that almost all the framework destinations that are arranged at the beginnings of the product advancement are net with and thusly the execution procedure of the venture is finished. an endeavor run of the framework has been made and is giving acceptable outcomes the methods for preparing is clear and normal request. the strategy for getting ready plans been overlooked which could be considered for additional alteration of the apparatus . in future, this venture may discover the closeness utilizing decays present inside the leaves.

6.References:

[1] F. Zhang and X. Zhang, ‘‘Classification and quality evaluation of tobacco leaves based on image processing and fuzzy comprehensive evaluation,’’ Sensors, vol. 11, no. 3, pp. 2369–2384, Feb. 2011.

[2]M.S.M. Asaari, S.A.Suandi, and B.A.Rosdi, ‘‘Fusion of band limited phaseonlycorrelationandwidthcentroidcontourdistanceforfingerbased biometrics,’’ Expert Syst. Appl., vol. 41, no. 7, pp. 3367–3382, Jun. 2014.

[3] A.-X. Hong, G. Chen, J.-L. Li, Z.-R. Chi, and D. Zhang, ‘‘A flower image retrieval method based on ROI feature,’’ J. Zhejiang Univ.-Sci. A, vol. 5, no. 7, pp. 764–772, Jul. 2004.

[4]R.AgarwalandR.Srikant,‘‘Fastalgorithmsforminingassociationrules,’’ in Proc. 20th Int. Conf. Very Large Data Bases (VLDB), Sep. 1994, pp. 487–499.

[5] Y. Guo, M. Wang, and X. Li, ‘‘Application of an improved Apriori algorithm in a mobile e-commerce recommendation system,’’ Ind. Manage. Data Syst., vol. 117, no. 2, pp. 287–303, 2017.

[6] G. J. Simon, P. J. Caraballo, T. M. Therneau, S. S. Cha, M. R. Castro, and P. W. Li, ‘‘Extending association rule summarization techniques to assess risk of diabetes mellitus,’’ IEEE Trans. Knowl. Data Eng., vol. 27, no. 1, pp. 130–141, Jan. 2015.

[7] Y. S. Kim and B.-J. Yum, ‘‘Recommender system based on click stream data using association rule mining,’’ Expert Syst. Appl., vol. 38, no. 10, pp. 13320–13327, Sep. 2011.

[8]. Zhang, J.; Sokhansanj, S.; Wu, S.; Fang, R.; Yang, W.; Winter, P. A trainable grading system for tobacco leaves. Comput. Electron. Agric.1997, 16, 231–244.

[9]. Zhang, J.; Sokhansanj, S.; Wu,S.; Fang, R.; Yang, W.; Winter, P.Atransformation techniquefrom RGB signals to the Munsell system for color analysis of tobacco leaves. Comput. Electron. Agric. 1998, 19, 155–166.

[10]. Garcia, M.; Barreiro, P.; Ruiz, A.M.; Alonso, R.; Judez, L. Development of a virtual expert for color classification of tobacco leaves. Proc. Sens. Decis. Support Syst. Agric. Food Ind. Environ. 1998, 1, 105–117.

[11] Zhang, F.; Fang, R.; Cai, J. Study of getting tobacco leaf weight based on neural network. Trans. Chin. Soc. Agric. Mach. 2000, 31, 61–64.

[12] Das, M., Manmatha, R., Riseman, E.M., 1998. Indexing Flowers by Color Names Using Domain Knowledge- Driven Segmentation. Proceedings of the Fourth IEEE Workshop on Applications of Computer Vision, p.94-99.

[13] Flickner, M., Sawhney, H., Niblack, W., Ashley, J., Huang, Q., Dom, B., Gorkani, M., Hafner, J., Lee, D., Petkovic, D., Steele, D., Yanker, P., 1995. Query by image and video content: the QBIC system. Computer, 28(9):23-32.

[14] Pentland, A., Picard, P., Sclaroff, S., 19s96. Photobook: Content-based Manipulation of Image Databases. In-ternational Journal of Computer Vision,18(3):233- 254.

[15] Smeulders, A.W.M., Worring, M., Santini, S., Gupta, A., Jain, R., 2000. Content-based image retrieval at the end of the early years. IEEE Trans. on Pattern Analysis and Machine Intelligence, 22(12):1349-1380.

[16] Swain, M.J., Ballard, D.H., 1991. Color indexing. International Journal of Computer Vision, 7(1):11-32.

Authors

Dr.M.Jagadeesan an eminent scholar, teacher and researcher has more than 20 years of experience in technical education in India. He worked in MPNMJ Engineering College,and presently working in Kongu Engineering College,Perunduari,Erode,Tamil Nadu. He has received Best Staff Award for excellence in education the year 2018 by KEC. He has also plays a pivotal role as in Board of studies.

Dr.P.A.Selvaraj an eminent scholar, teacher and researcher has more than 20 years of experience in technical education in India.He worked in KSR institutions,and presently working in Kongu Engineering College,Perunduari,Erode,Tamil Nadu. He has received Best Academic Appreciation Award for excellence in

education the year 2003 by KEC. He has also received Best Placement Cordinator Award for excellence in Placement activities for the year 2008.

Ms.T,Mythili, received her B.Sc lnformation Technology degree in kongu Arts and Science from Bharathiyar University, Erode, India in 2018.I am pursuing my MCA degree in Kongu Engineering from the Anna University, Erode, India . Area of interested on Data Mining and Basic Algorithm.

Mr.R.Ragavendran have completed her UnderGraduate at Anna University in the field of Computer Technology and pursuing her Master degree under Anna University, Tamilnadu, India in the field of computer applications. His areas of expertise includes Big Data, Data mining and basic algorithms. His research is mainly to extend the data scope of learning analysis, to achieve automatic coding, and to understand Public reflective thinking through the way of visualization.

Mr.D.Guna received B.Sc Computer Science in Government Arts College from Bharathiar University, Karur, India in 2018. I am doing the Master's degree in Computer Applications in Kongu Engineering College Perundurai, Erode, Tamilnadu, India. Areas of interested includes Data mining and basic algorithms.