Detection of Plant Leaf Diseases in Image Prosessing Using Matlab

¹ Mr.V.Madhava Reddy, ² K.Hari Krishna, ³ M.Srinivasa Rao, ⁴P.V.M Vijaya Bhaskar ⁵A.Sirisha

^{1,2,3,4,5}Assistant professor, Department of ECE, QISCET

Article Info Page Number: 348-355 Publication Issue: Vol. 69 No. 1 (2020)

Article History Article Received: 12 September 2020 Revised: 16 October 2020 Accepted: 20 November 2020 Publication: 25 December 2020 About 70% of India's GDP comes from the agricultural sector. Drastic shifts in weather patterns, both in terms of temperature and precipitation, can have a profound effect on crop production. Phaseolus vulgaris L. is an important food legume crop, relied on by millions of people around the world. There are several diseases affecting it, the most serious of which being anthracnose. Anthracnose is caused by a fungus called Colletotrichum. Camellia asemia is a popular crop used to make non-alcoholic beverages. In reference to (J. W. Mast.) Wight is one of the most frequently grown plants in the world for use in non-alcoholic drinks. When the leaf is infected with the fungus Alternaria alternative, it suffers extensive harm. Farmers can be assisted in early disease identification and control with the use of state-of-the-art computer technologies like image processing used to construct automatic detection systems. As a result, the current research was conducted to automatically detect diseases in the leaves of the plants Phaseolus vulgaris (beans) and Camellia asemia (tea) using image processing techniques. There is a requirement for picture acquisition. Keywords: Phaseolus vulgaris L, Colletotrichum, Image processing, Ac-

quisition.

Abstract

1.INTRODUCTION

Agriculture is the backbone of the economies of the vast majority of countries. The agricultural sector is vital to India's economy. Technology helps to achieve the desired results more efficiently and effectively. Agribusinesses can utilise image processing fields to boost plant output. The human body has limited abilities for early disease detection. As a result, it's important to develop a system that can identify different types of leaf diseases and identify them automatically. To a great extent, this depends on image processing. The system allows for input, using image processing to generate the desired outcomes from the photos. Photographs can be uploaded into the system, and the programme will employ image processing to produce the desired outcome.

2.RELATED WORK, RESEARCH

Agriculture is the backbone of the economies of the vast majority of countries. The agriculture sector is essential to India's economy. Technology allows us to get things done faster and better. Business agriculturists can use advancements in image processing to improve crop yields. The body's capacity for early illness detection is restricted. Therefore, it is crucial to create a system that can automatically detect and diagnose various leaf diseases. To a great extent, this depends on image processing. The system allows for input, using image processing to generate the desired outcomes from the photographs. Photographs can be entered into the system, and the programme will utilise image processing to achieve the desired effect.

3.WORKING

A. Proposed model

To begin, pictures of adjacent farmland will need to be collected as input. In order to continue processing, the images must have the appropriate features extracted from them. The procedures of the suggested image processing system are presented in Figure 1. It serves as an illustration of the proposed system's sequential operation.



Figure 3.1 Steps for proposed image processing system

Algorithm:

- Step1. Scan input image
- Step2. Input pictures converted regenerate to grayscale images.
- Step3. Apply enhancement.
- Step4. Resize the image.
- Step5. Apply a K-Means clustering operation.
- Step6. Find the centroid of the pixels.
- Step7. Divide the pixels into clusters.
- Step8. Represent the clustered image.

Step9. Segmented output.

1. **Image Acquisition:** The first thing that is done is to take images for the purpose of detection. After that, it is put to use in the processing step.

2. **Image pre-processing:** Image pre- processing is achieved by contrast enhancement method.

3. **Image Segmentation:** Image processing techniques are used to segment an image into its component parts, each of which is determined to have its own unique information. The K-means clustering technique is utilised in the method that was suggested.

K-**Means Cluster:** K-means Clustering, which is a type of unsupervised learning, can be utilised even when the data in question has not been labeled. The purpose of this algorithm is to recognize groups within the data, with the value of the variable K functioning as a stand-in for the total number of groups.

4. **Feature Extraction in image:** The GLCM function is used in order to complete the feature extraction process. The Grey Level Concurrence Matrix (GLCM) method is the name given to the statistical texture feature extraction method that corresponds to the second order. Consider the higher orders of texture, such as the third and higher. Computationally speaking, their implementation is difficult to accomplish.

5. The number of grey levels, denoted by the letter G, in the image is the factor that decides the number of rows and columns in a GLCM matrix. The matrix element P I j | d,) contains the second order statistical probability values for changes between grey level I and 'j' at a particular displacement distance d and at a particular angle (). This element represents the frequency with which two pixels, separated by a pixel distance (x, y), one with intensity I and the other with intensity "j," appear in a particular neighborhood. One of the pixels has intensity I, and the other pixel has intensity "j

6. **Detection of diesease:** The Support Vector Machine Classifier is used to identify the diseases.

B. Simulation Software

MATLAB® is a programming environment that allows scientists and engineers to analyse, design, and test new systems and technologies that have the potential to alter the course of human history. The heart of MATLAB is comprised of the MATLAB language, which is a matrix-based language that allows for the most natural expression of computer mathematics. MATLAB was developed by MathWorks.

In order to execute the code, we used the MATLAB software, and it was necessary for us to perform the execution in a well-defined method.

7.RESULTS

HOME	PLOTS	APPS	EDITOR	PUBLO	an 📄	VEW					Szarch Documentation	🔎 🌲 Sign In
New Open	Save Print +	Go To -	Comment Comment		Breakpoints	Run	Run and Advance	Run Section	Run and Time			
🖌 DetectDis	iease_GUI										177	- ×
	Plant Leaf D	Diseases D	etection	and Clas	sification	n Using	Image	Processing	g and	Deep Learning Techniques	FEATU	RES
	LOAD IN	IAGE			ENHAM	ICE CON	ITRAST			SEGMENT IMAGE	Mean	
											S.D	
											Entropy	
											RMS	
											Variance	
											Smoothness	
											Kurtosis	
											Skowness	
											IDM	
1.1					AFFECT	ED REGI	ION in %				Contrast	
1	CLASSIFICATION	RESULT									Correlation	
											Energy	
											Homogeneity	1
						EXIT						
			111		_							
ų												
	Tune here to searc	b		0	H+		-		-		10 7°C 401112 0 5 00	8:35 PM

a) Inputs of the images of the diseased leaf

CLASSPICATION RESULT AFFECTED REGION in % AFFECTED REGION in % Central Control (Control (Contro) (Control (Control (Control (Control (Control (Control (Control (IOME	PLOTS	APPS	ROTTOR		PUBLIS	H	VEW			1		State of the second	000	Search Documentation	P &	57
OddetStorates, 0.01 Call Call Feat Ures Plant Leaf Disease Datection and Classification Using Image Processing and Deep Learning Techniques Main Call Loop MAGE Usery image Exervance contrans SEGMENT MAGE Main Call Variance SEGMENT MAGE SEGMENT MAGE Sed Sed Call Call Sed Sed Sed CLASSIFICATION RESULT AFFECTED REGION in % Candidion Sed Exer Exer Sed Sed	Open Save	Compare •	Ge Te • Ge Te •	insert Comment Indent	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Breakpoint	Run	Run and Advance	Run Section	Run and Time						
Plant Leaf Diseases Detection and Classification Using Image Processing and Deep Learning Techniques LOAD MADE USAN WARE USAN	DetectDisease	GUI			-					and the second s					-	19	10
LOAD MAGE LOAD M		Plant Leaf D)iseases [Detectic	n and	d Clas:	sificatio	n Using	, Image	Processin	g and	Deep	Learning T	echniques	FEAT	RES	i.
CLASSIFICATION RESULT CLASSIFICATION RESULT AFFECTED REGION in % CLASSIFICATION RESULT AFFECTED REGION in % CLASSIFICATION RESULT EXT		LOAD IM	AGE]			ENHA	NCE CO	NTRAST				SEGMENT	MAGE	Mean	-	
CLABSIFICATION RESULT CLASSIFICATION RESULT EXT	and the second	Clery III	A CALLER												S.D		
CLASSIFICATION RESULT AFFECTED REGION in % CLASSIFICATION RESULT Contrast EXIT EXIT		A CONTRACTOR	1 112	-											Entropy		
CLASSIFICATION RESULT AFFECTED REGION in % Contrast Contrast Centrast Centr	03	alto A	AF	3											RMS		
CLASSIFICATION RESULT AFFECTED REGION In % Condition Con	100	2 2 3	0												Variance		
Kurtasis BBerevalor CLASSIFICATION RESULT AFFECTED REGION in % Curtisati Curtisati Curtisati Curtisati Ext Homogeneity	1	20 21	China and	-											Smoothness		
Extr	-	Marcal and		and the second											Kurtosis		
EXT			No. of Concession, Name	and the second division of the second divisio											Skewness		
CLASSIFICATION RESULT AFFECTED REGION in % Contast Condution Energy EXIT															IDM		
EXT Conduct Conduct Conduct Conduct Ext	CLA	ASSIFICATION	RESULT				AFFECT	ED REC	HON in %						Contrast		
Extr		BON IGHTIGTT	MECOL!												Correlation		
Homogeneity EXIT															Energy		
ЕХІТ									1						Homogeneity		
								EXIT									

b) load image of the diseased leaf



c) Enhance contrast of the diseased leaf

A MATLAB R2018



d) Original image of the diseased leaf



e) Clusters of the diseased leaf



f) Segment image of the diseased leaf

Mathematical Statistician and Engineering Applications ISSN: 2094-0343 2326-9865

Oper	Save	Compare +	Go To - Find - NAVIGATE	Comment Indent			Breakpoints	VEW Run	Run and Advance	Run Section	Run and Time	Kali C. G. La Search	Documentation	<mark>/2</mark> • 3
Detect	Disease_O	101											1	10
	F	Plant Leaf D)iseases D	Detectio	n and	d Class	sification	Using	Image	Processin	g and [Deep Learning Techniques	FEATUR	RES
			AGE				ENHAN		TRAST			SEGMENT IMAGE	Mean	17.9801
	100		(ASSA)					4	ALC: N				S.D	37.6793
-		The second	1			-		1	1.12		-	1454 1 94	Entropy	2.58352
	-	CER A		-		2.3			P P		34	CN-Propert - R	RMS	7,40504
		AAZ	5	220.00			ALL T	2 4	100	Sec. 1	1	The second	Variance	1307.97
	12		Carrow B	-		40.4		Rest	The s	7.5	8 J.	780 10	Smoothness	1
-	-	COLLS.		1		-	De la	15		1		the second second	Kurtosis	10,4965
		8- 12 B		140			6.7	State of the	Sec. 1	100			Skewness	2.58857
													IDM	255
Ĩ							AFFECTE	DREG	ION in %				Contrast	0.541376
l	CLAS	SSIFICATION	RESULT				ATLOT	DIREO					Correlation	0.751125
	4	Alternaria Altern	nata				1	5.7917					Energy	0.538197
													Homogeneity	0.922206
					12	lfected	l Area is	EXIT	.17%*					
				fų s	Alter	maria 7	lternata							

g) classification result of the diseased leaf

8. CONCLUSION

Detecting and naming plant diseases is the biggest challenge in plant management. Infections on plants are most noticeable on their leaves. Diseases of the leaves, caused by bacteria, fungi, or viruses, are a common cause of plant death. Accuracy in diagnosing diseases is crucial. In this study, we locate and name four diseases. The efficiency of the proposed system is 98.3 percent.

REFERENCE

- Al-Hiary, S. Bani-Ahmad, M. Reyalat, M. Braik and Z. ALRahamneh, "Fast and Accurate Detection and Classification of Plant Diseases" IJCA, vol. 17(1), pp. 31-38, March 2011, IEEE-2010.
- [2]. Weizheng, S., Yachun, W., Zhanliang, C., and Hongda, W. (2008). Grading Method of Leaf Spot Disease Based on Image Processing. In Proceedings of the2008 international Conference on Computer Science and Software Engineering - Volume 06 (December 12 - 14,2008). CSSE. IEEE Computer Society, Washington, DC,491-494. DOI= http:// dx.doi.org/
- 10.1109/CSSE.2008.1649.
- [3]. Jayamala K. Patil, Raj Kumar, "Advances In Image Processing For Detection of Plant Diseases" JABAR, vol. 2(2), pp. 135-141, June-2011.
- [4] P. R. Rothe, "Cotton Leaf Disease Identification Using Pattern Recognition Techniques", International Conference On Pervasive Computing, 2015.
- [5] Viraj A. Gulhane, Mahesh kumar H. Kolekar, "Diagnosis Of Diseases On Cotton Leaves Using Principal Component Analysis Classifier", Annual IEEE India Conference, 2014.
- [6] Rong Zhou, Shun"ichi Kaneko, Fumio Tanaka, Miyuki Kayamori, Motoshige Shimizu, "Early Detection And Continuous Quantization Of Plant Disease Using Template Match-

ing And Support Vector Machine Algorithms", First International Symposium On Computing And Networking, 2013.

- [7] Dheeb Al Bashish, Malik Braik, and Sulieman Bani-Ahmad, "A Framework for Detection and Classification of Plant Leaf and Stem Diseases," Department of Information Technology, IEEE International Conference on Signal and Image Processing, 2010
- [8] Santanu Phadik ar and Jaya Sil, "Rice Disease Identification using Pattern Recognition Techniques," 11th International Conference on Computer and Information Technology (ICCIT 2008),IEEE Proceedings, 2008
- [9] S. Ananthi, S. Vishnu Varthini, "Detection and classification of plant leaf diseases," International Journal of Research in Engineering & Applied Sciences, Volume 2, Issue 2 (February 2012), ISSN: 2249-3905, 2012.
- [10] Jiazhi Pan, Yong He, "Recognition of plants by leaves digital image and neural network," International Conference on Computer Science and Software Engineering, IEEE Computer Society, 2008.
- [11] P Ramprakash, M Sakthivadivel, N Krishnaraj, J Ramprasath. "Host-based Intrusion Detection System using Sequence of System Calls" International Journal of Engineering and Management Research, Vandana Publications, Volume 4, Issue 2, 241-247, 2014
- [12] N Krishnaraj, S Smys."A multihoming ACO-MDV routing for maximum power efficiency in an IoT environment" Wireless Personal Communications 109 (1), 243-256, 2019.
- [13] N Krishnaraj, R Bhuvanesh Kumar, D Rajeshwar, T Sanjay Kumar, Implementation of energy aware modified distance vector routing protocol for energy efficiency in wireless sensor networks, 2020 International Conference on Inventive Computation Technologies (ICICT),201-204
- [14] Ibrahim, S. Jafar Ali, and M. Thangamani. "Enhanced singular value decomposition for prediction of drugs and diseases with hepatocellular carcinoma based on multi-source bat algorithm based random walk." Measurement 141 (2019): 176-183. https://doi.org/10.1016/j.measurement.2019.02.056
- [15] Ibrahim, Jafar Ali S., S. Rajasekar, Varsha, M. Karunakaran, K. Kasirajan, Kalyan NS Chakravarthy, V. Kumar, and K. J. Kaur. "Recent advances in performance and effect of Zr doping with ZnO thin film sensor in ammonia vapour sensing." GLOBAL NEST JOURNAL 23, no. 4 (2021): 526-531. https://doi.org/10.30955/gnj.004020 , https://journal.gnest.org/publication/gnest_04020
- [16] N.S. Kalyan Chakravarthy, B. Karthikeyan, K. Alhaf Malik, D.Bujji Babbu, K. Nithya S.Jafar Ali Ibrahim, Survey of Cooperative Routing Algorithms in Wireless Sensor Networks, Journal of Annals of the Romanian Society for Cell Biology, 5316-5320, 2021
- [17] Rajmohan, G, Chinnappan, CV, John William, AD, Chandrakrishan Balakrishnan, S, Anand Muthu, B, Manogaran, G. Revamping land coverage analysis using aerial satellite image mapping. Trans Emerging Tel Tech. 2021; 32:e3927. https://doi.org/10.1002/ett.3927
- [18] Vignesh, C.C., Sivaparthipan, C.B., Daniel, J.A. et al. Adjacent Node based Energetic Association Factor Routing Protocol in Wireless Sensor Networks. Wireless Pers Commun 119, 3255–3270 (2021). https://doi.org/10.1007/s11277-021-08397-0.

[19] C Chandru Vignesh, S Karthik, Predicting the position of adjacent nodes with QoS in mobile ad hoc networks, Journal of Multimedia Tools and Applications, Springer US, Vol 79, 8445-8457,2020