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DETECTION OF WEED IN AGRICULTURAL FILED USING IMAGE PROCESSING

Dr.H.DEVANNA[1],CHINNI VENKATA GAYATHRI[2], BOYA MANJU LATHA[3], UPPARA JYOTHILAKSHMI[4], SHAIK SANA SULTHANA[5], KAMARTHI HARITHA[6]

[1]Prof, Dept of ECE, St. johns college of Engineering and Technology, Yemmiganur, AP, India.

[2,3,4,5,6]UG Scholar, Dept of ECE, St. johns college of Engineering and Technology, Yemmiganur, AP,

ABSTRACT

Agriculture is a fundamental source of nourishment for humanity on this planet. In the present day, as a result of the increasing population, there is a need for agriculture to have a higher level of productivity in order to fulfill the needs. In ancient times, people used traditional techniques to enhance output, such as using cow dung as a natural fertilizer in agricultural areas. This led to a significant boost in output that was sufficient to fulfill the population's demands. However, subsequent individuals contemplated the idea of maximizing earnings by increasing the yield. Thus, a revolt known as the "Green Revolution" emerged. Subsequently, the use of lethal toxins as herbicides has escalated significantly over this time frame. While our efforts to increase production have been successful, we have overlooked the detrimental impact on the environment, which raises concerns about our ability to sustain ourselves on this magnificent planet. In this effort, we have used techniques to minimize herbicide consumption by selectively spraying them only in regions where weeds are present. This study presents the implementation of image processing techniques using MATLAB to identify and locate regions of weed growth in a picture captured from agricultural fields. With the global population expanding and available land and natural resources diminishing, experts are paying greater attention to precision agriculture. Image processing methodologies may be used to address this issue.

Keywords: Image processing, Agriculture, Color segmentation .

I. INTRODUCTION

In olden days weed detection was done by employing some men, especially for that purpose. They will detect the weed by checking each and every place of the field. Then they will pluck them out manually using their hands. Later with the advancement in the technology they started using the herbicides to remove the weeds. But to detect the weeds they are still using manual power inmany parts of the world. Later there came few methods to detect the weeds automatically but due to lack of their accuracy, they a re unable to reach to the people. Then they started using image processing for this purpose. In this proposed project our main aim is to detect the weed in the crop by using image processing. Then we will give the inputs of the weed areas to an automatic spray pesticide only in those areas. For this, we need to take a photograph of the field with good clarity to detect the weeds with more accuracy. Taking a photograph can be done by attaching a camera to a tractor or taking them manually. Then we will apply image processing to that image using MATLAB to detect the weed

II. LITERATURE SURVEY

A. J. Irías Tejeda, R. Castro Castro(2019) The Authors has proposed this project to focused on the creation of an image-processing algorithm to detect the existence of weeds in a specific site of crops. The initial step of image processing is the detection of green plants in order to eliminate all the soil in the image, reducing information that is not necessary. Then, it has focused on the vegetation by segmentation and eliminating unwanted information through medium and morphological filters.

Aichen Wanga,Wen Zhangb, Xinhua(2019) The author has proposed this review to summarize the advances of weed detection using ground-based machine vision and image processing techniques. Concretely, the four procedures, i.e., pre-processing, segmentation, feature extraction and classification, for weed detection were

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presented in detail. To separate vegetation from background,different color indices and classification approaches like color index-based, threshold- based and learning-based ones, were developed.

A. Camilo Andres Pulido-Rojas(2017) This work presents a machine vision system for weed detection in vegetable crops using outdoor images, avoiding lighting and sharpness problems during acquisition step. This development will be a module for a weed removal mobile robot with *camera obscura* (Latin for "dark room") for lighting controlled conditions. The purpose of this paper is to develop a useful algorithm to discriminate weed, using image filtering to extract color and area features, then, a process to label each object in the scene is implemented, finally, a classification based on area is proposed, including sensitivity, specificity, positive and negative predicted values in order to evaluate algorithm performance. First, Green plant detection algorithm is implemented to remove soil from image such that image information is reduced.The next steps of algorithm focus only on vegetation, then, median filtering removes noise as "salt and pepper" with advantage of preserving edges.

Ajinkya VrushaliI, Rani Meshram, V.B. Raskar(2017) In this system, the author has developed a method by which we can detect weed using Image processing. Due to the use of our system, we can detect and separate out weed affected area from the crop plants. The reason for developing such system is to identify and reuse weed affected area for more seeding. This specific area can be considered for further weed control operations, resulting in more production.

Bo Liu & Ryan Bruch(2020) This article provides a mini-review of all the different emerging and popular weed detection techniques for selective spraying, and summarizes the trends in this area in the past several years. Weed detection also helps provide a means of reducing or eliminating herbicide use, mitigating agricultural environmental and health impact, and improving sustainability.Recent Findings Deep learning-based techniques are replacing traditional machine learning techniques to detect weeds in real time with the development of new models and increasing computational power.

III. PROPOSED SYSTEM

In olden days weed detection was done by employing some men, especially for weed removal purpose. They will detect the weeds by checking each and every plant field. Then they will pluck them out manually using their hands or spades. In proposed system the weeds can be detected by image processing techniques. The main aim of the project is to identify weed affected area for more seeding. Since there are different issues with respect to the developed yields on the field, a standout amongst the majority is about weeds which go as a hindrance in the development of the harvests. Weeds may break down the life and nature of the yields if it is not controlled legitimately in time. This proposed thought centers around to reduce the work and also the time needed to identify weeds and expel the same. During this process they will consider Edge detection and colour segmentation process. They will analyze each and every crop with their intensity colour, Intensity, edge, Size etc., are been obtained as output. The colour of the edges and veins of the crop and weed are white after segmentation process and edge detection, whereas the rest of the image is totally black in colour. After the process of Edge detection and Colour segmentation it has undergone the process of Filtering. The Filtering can be a type of process in which each and every crop can be identified and their gain value, tradeoff's, edge, frequency of crop and weed can be identified and their threshold values can obtained

IV. SOFTWARE REQUIREMENTS:

MATLAB

MATLAB (an abbreviation of "matrix laboratory") is a proprietary multi-paradigm programming language developed by

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MathWorks. MATLAB allows matrix manipulations, plotting of functions and data, implementation of algorithms, creation of user interfaces, and interfacing with programs written in other languages. Although MATLAB is intended primarily for numeric computing, an optional toolbox uses the MuPAD symbolic engine allowing access to symbolic computing abilities. An additional package, Simulink, adds graphical multi-domain simulation and model-based design for dynamic and embedded systems.MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. Typical uses include: Data analysis, exploration, and visualization.
Hardware Specification: Compatibility: Compatible with all Windows PCs

V. IMPLEMENTATION

The weed can be detected by taking several images. During this process they will consider Edge detection and colour segmentation process. They will analyze each and every crop with their intensity colour, Intensity, edge, Size etc., are been obtained as output. The colour of the edges and veins of the crop and weed are white after segmentation process and edge detection, whereas the rest of the image is totally black in colour. After the process of Edge detection and Colour segmentation it has undergone the process of Filtering. The Filtering can be a type of process in which each and every crop can be identified and their gain value, tradeoff's, edge, frequency of crop and weed can be identified and their threshold values can obtained. If the weed have high edge frequency on comparison with the crop. Then their edge frequency is high. In this paper a crop is considered, which a narrow leaf crop is and their edge frequency is less when compared with weed.An image which contains only the weed is taken to calculate the edge frequency. By using _for loop‘ in the program the number of edges are calculated. A single block containing the weed is considered and the number of edges is found to be 900 approximately. The number of original planted crop image is taken and the frequency is calculated as 100. From the edge frequency calculated the threshold value is considered to be 500 and 400 x 500 is the size of the image. From the experimental results, the weed block is detected when the edge frequency is more than that of the threshold value. With the help of for loops all the pixels in that block are converted into white pixels. The image which is white in colour are represented as the weed blocks and the remaining part of the image block are dark in colour.

Working

This Algorithm prepares an image for further advanced processing and is consists of Loading the image from source, color segmentation, and edge detection. Color segmentation is the method used to separate the crop (which also include weed) from the background. The method helps in separating all the visually distinguishable colors from one another The algorithm used for colour image segmentation is K-Means Clustering, It is an unsupervised algorithm and it is used to segment the interest area from the background. In an image, an edge is a curve that follows a pathof rapid change in image intensity.The desired image after color segmentation consists of green color (the crop and the weed) and the remaining part of image black, making the image feasible to the step in the process, edge detection. In an image, an edge is a curve that follows a path of rapid change in image intensity. Edges are often associated with the boundaries of objects in a scene. Edge detection is used to identify the edges in an image. To detect edges properly we have to convert the color segmented image into the gray scale image. The Canny edge detector is an edge detection operator that uses a multi-stage algorithm to detect a wide range of edges in images. The image after both color segmentation

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and edge detection is left with the edges and veins of both the crop and the weed in white and the remaining part completely Black. The operations like color segmentation, edge detection make the image ready for the next operation called filtering. The filter here is used for recognizing regions in which edges appear with a frequency in a specific range (weed frequency range). Here the image after the edge detection in above step as input. Thresholding is a type of image segmentation, where we change the pixels of an image to make the image easier to analyze. In thresholding, we convert an image from color or grayscale into a binary image, i.e., one that is simply black and white.Otsu thresholding algorithm is used.

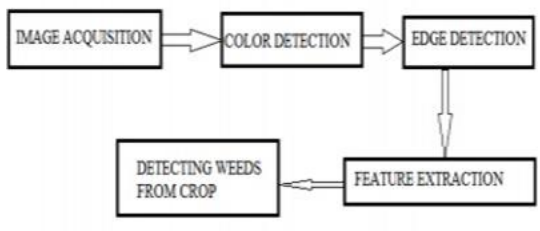

Fig. 1 Block Diagram

VI. OUTPUT SCREENSHOTS

Fig.2 Crops and Weeds

Fig.3 Grey scale image

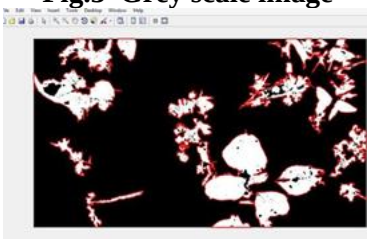

Fig.4 Weeds detected

VII. CONCLUSION

Our technique utilizes image processing to accurately identify the presence of marijuana. Our technique enables us to identify and segregate areas of crops that have been impacted by weeds. The purpose of establishing this method is to accurately detect and repurpose areas that have been impacted by weeds for the purpose of planting new seeds. This particular region may be designated for further weed management interventions, leading to increased productivity. Weeds are detected in photos using an image processing method that analyzes form, color, texture, and size characteristics. Previous research has extensively shown the exceptional precision when considering diverse additional factors such as texture, genes, and so on. The identification of weeds is a crucial aspect in their eradication and control. To prevent harm to the crop plants, it is necessary to use a suitable algorithm for detecting weeds. The suggested system incorporates basic edge detection methods.

Future Work

The identification of weeds is a crucial aspect in their eradication and management. If weeds are not properly handled in a timely manner, they may negatively impact the growth and quality of crops. The image processing approach is used to identify and eliminate the weeds that grow among the crops. The purpose of establishing this method is to accurately detect and repurpose areas that have been impacted by weeds for the purpose of planting new seeds. In future endeavors, the Herbicide Sprayer unit will be equipped with detailed data on the occurrence of weed in certain regions. This suggested concept focuses on minimizing the effort and time required to locate and remove weeds.

REFERENCES

[1] Weed Detection for Selective Spraying(Springer) Bo Liu & Ryan Bruch,Springer

ISSN PRINT 2319 1775 Online 2320 7876

 UGC CARE Listed (Group -I) Journal Volume 11, Iss 05, 2022

[2] Crop and weed detection using image processing and deep learning techniques (diva portal)Lina Chaaro Laura Martínez Antón

[3] Algorithm of Weed Detection in Crops by computation vision(IEEE)A. J. Irías Tejeda, R. Castro Castro

[4] A review on weed detection using ground-based machine vision and image processing(Elsevier) Aichen Wanga,Wen Zhangb, Xinhua

[5] A Review on Weed Detection Using Image Processing(Indian Journal of Science and Technology) Lavanya N.R., Niharika S.Deepika C.H

[6] Detection of Weed and Wheat Using Image Processing(IEEE)sarmad Hameed,Imran Amin

[7] Weed Detection in Farm using Parallel Image Processing(IEEE)S.Umamaheswari,R.Arjun

[8] Image Processing For Weed Detection (IJETMAS)R.Anirudh Reddy ,G.Laasya, T.Sowmya

[9] Weed Detection Using Image Processing (IRJET) Ajinkya VrushaliI, Rani Meshram, V.B. Raskar

[10] Machine vision system for weed detection using image filtering in vegetables crop(Revista Facultad de Ingeniería)A.Camilo Andres Pulido-Rojas