International Journal of Electrical and Electronics Research ISSN 2348-6988 (online)
Vol. 8, Issue 3, pp: (30-36), Month: July - September 2020, Available at: www.researchpublish.com

PESTICIDES PROVIDING ROBOT USING SPEEDED UP ROBUST FEATURES ALGORITHM

[1]V.KUMARAVEL, [2]T.RAKESH, [3]N.RAKESH, [4]R.SURESH, [5]N.SABARISH KUMAR

[1] ASSISTANT PROFESSOR, [2,3,4,5] U. G STUDENTS,

Department of Electronics and communication Engineering,

R.M.D Engineering College, Affiliated to Anna university, Chennai, India.

Email: [1] kumaravel.ece@rmd.ac.in, [2] rakeshthirumalai983@gmail.com, [3] n.rakesh6123@gmail.om, [4] jaisuresh95@gmail.com, [5] sabarishnandu16@gmail.com

Abstract: **Agriculture is the origins of human sustenance in this world. The detection of leaf disease is of most economic importance in the agricultural industry. In past days leaf disease detection was done by employing some people. Later with the improvement in the technology, people started using herbicides to take out the disease in the leaf. But to identify the leaf disease still physical power was used in many parts of the world. Later there came few methods to discover the leaf disease without human intervention but due to lack of their accuracy, they were incapable to reach to the public. Then image processing was used for this purpose. It can also be implemented to reduce the usage of chemicals. It detects the leaf disease by using image processing techniquesby using an algorithm called SPEEDED-UP ROBUST FEATURES (SURF). In this system, we use ARDUINO UNO (ATmega328P) microcontroller which acts as brain of the system, because the entire system program instruction stored in it. Here we have image processing via PC unit to know the leaf disease status of plants. So that the detection of leaf disease is done from image processing which send information about the leaf disease is detected or not to the controller through ZIGBEE and it turn ON the pump motor using relay. The mechanism of robot is done by using robotic chase with two dc motor driven by motor driver and the ultrasonic sensor used to avoid hitting of obstacle. All the instruction to drive the robot is done by using Bluetooth..**

Keywords: **SPEEDED-UP ROBUST FEATURES (SURF), *k*-nearest neighbors(KNN).**

1. INTRODUCTION

In India, nearly 60-70% people are farmers. Agricultural land in India was last measured to be 60.5% as of 2013. One basic threat affecting plant growth is the presence of weeds. Generally, a weed is a plant in an undesired place. These weeds consume water, sunlight, space etc. from those of the crops. Weeds not only affect the farm productivity but also can be harmful to livestock. Thus the removal of weeds becomes essential. In modern agriculture, these weeds can be either pulled out from the field or have chemicals sprayed on them. The latter method was found to be more efficient than the former. But these chemicals may be of harm to the actual crops. In order to minimize the volume of chemical sprayed, the practical solution will be spray only in the areas where weeds grow. But manual chemical spraying to particular areas consumes a lot of time and labor. The identification and classification of weeds are of major technical importance in the agricultural industry. Weeds are classified based by shape, color and size features.

The picture preparing is the instrument utilized for the identification.Color based division method is completed in the MATLAB segment. Two hues are for the most part utilized, red and yellow. The shading distinguished is red, at that point it is accepted that a fruitred then it is expected that a natural product is recognized and a message is sent to the proprietor.

EXSISTING METHOD:

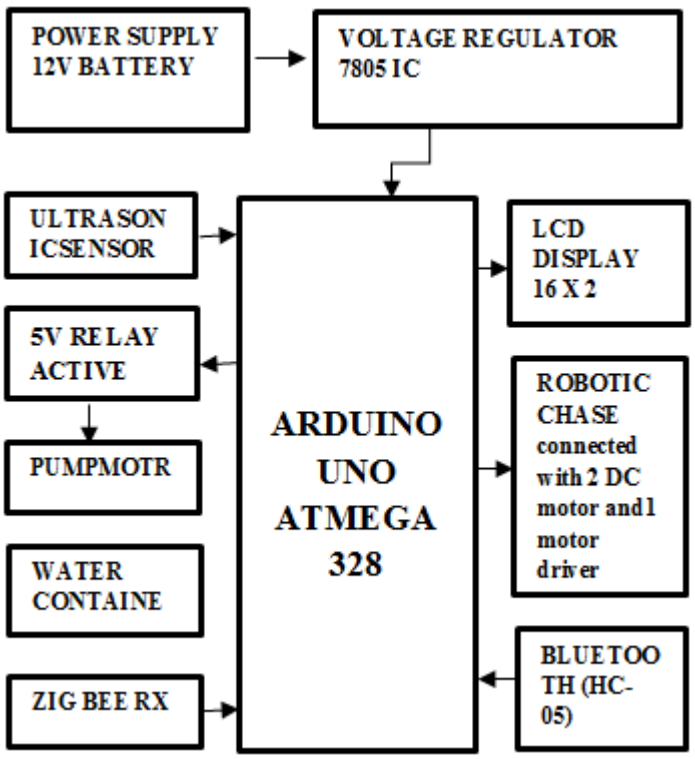
In existing system, leaf disease attack to plant is

prevented manually. Requirements of man power are comparatively more. Prevention of leaf disease from weeds attack has done manually. More time consumption and also Man power required more.

PROPOSED METHOD:

In this proposed system, leaf disease detection is done using image processing. Implementing Pesticide spray to prevent from leaf disease. There are five main steps used for the detection of plant leaf diseases. The processing scheme consists of image acquisition through digital camera, image pre-processing includes image enhancement, image segmentation where the affected and useful area are segmented, feature extraction and classification. Lastly the presence of diseases on the plant leaf will be identified and the pesticide will be sprayed by the robot.

RECEIVER SECTION:



ARDUINO UNO:

In this system, we use ARDUINO UNO (ATmega328P) microcontroller which acts as brain of the system, because the entire system program instruction stored in it**.**

ULTRASONICSENSOR:

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves.

An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object‘s proximity.

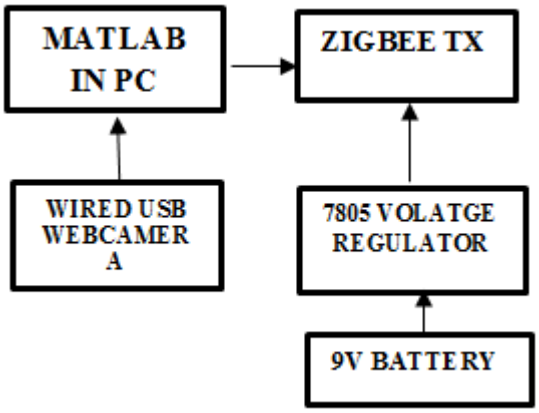
BLUETOOTH (HC-05):

Bluetooth is a wireless technology standard for exchanging data between fixed and mobile devices over short distances using short- wavelength UHF radio waves in the industrial, scientific and medical radio bands, from 2.400 to 2.485 GHz, and building personal area networks (PANs). It was originally conceived as a wireless alternative to RS-232 data cables.

RELAY:

Relays are the primary protection as well as switching devices in most of the control processes or equipment. All the relays respond to one or more electrical quantities like voltage or current such that they open or close the contacts or circuits. A relay is a switching device as it works to isolate or change the state of an electric circuit from one state to another.

TRANSMITTER SECTION:



WIRED USB WEBCAMERA:

A USB webcam is a camera that connects to a computer, usually through plugging it in to a USB port on the machine.

MATLAB:

MATLAB is used in vast area, including signal and image processing, communications, control design, test and measurement, financial modeling and analysis, and computational.

ALGORITHM USED IN MATLAB:

- **SURF** Speeded up Robust Features (detect Image (leaf) Features)
- **KNN** –k-Nearest Neighbor (used for Classification).

SURF:

They allow for fast computation of box type convolution filters. The entry of an integral image $I_{\sum}(x)$ at a location $x = (x,y)^T$ represents the sum of all pixels in the input image I within a rectangular region formed by the origin and x.

$$I_{\Sigma}(\mathbf{x}) = \sum_{i=0}^{i\leq x}\sum_{j=0}^{j\leq y} I(i,j)$$

Surf uses the Hessian matrix because of its good performance in computation time and accuracy. Rather than using a different measure for selecting the location and the scale (Hessian-Laplace detector), surf relies on the **determinant of the Hessian matrix** for both. Given a pixel, the Hessian of this pixel is something like.

$$H(f(x,y)) = \begin{bmatrix} \frac{\partial^2 f}{\partial x^2} & \frac{\partial^2 f}{\partial x \partial y} \\ \frac{\partial^2 f}{\partial x \partial y} & \frac{\partial^2 f}{\partial y^2} \end{bmatrix}$$

IMAGE PROCESSING STEPS:

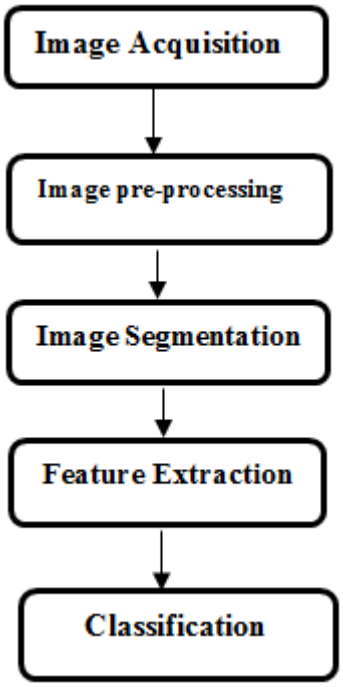


IMAGE ACQUISITION:

Image acquisition involves capturing the images with the help of digital camera.

IMAGE PRE- PROCESSING:

Image Pre- processing is carried out to improve the quality of the image and remove the unwanted noise in image followed by clipping and smoothing of the image.The image enhancement is carried out to increase the contrast. The RGB images are converted into grey images using colour conversion by the following formula: F(x) = 0.2989*R + 0.5870*B + 0.114*B.....

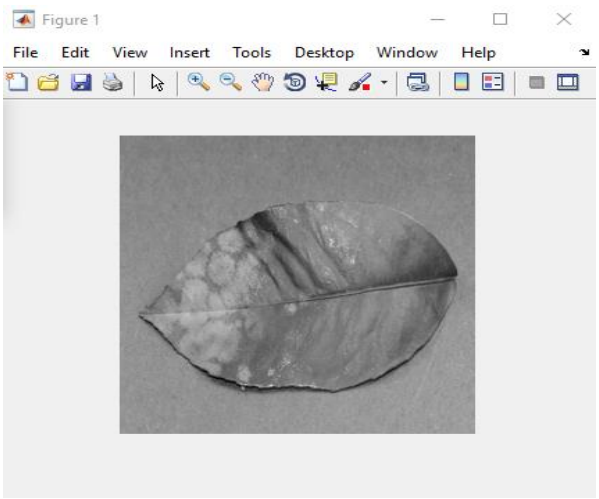


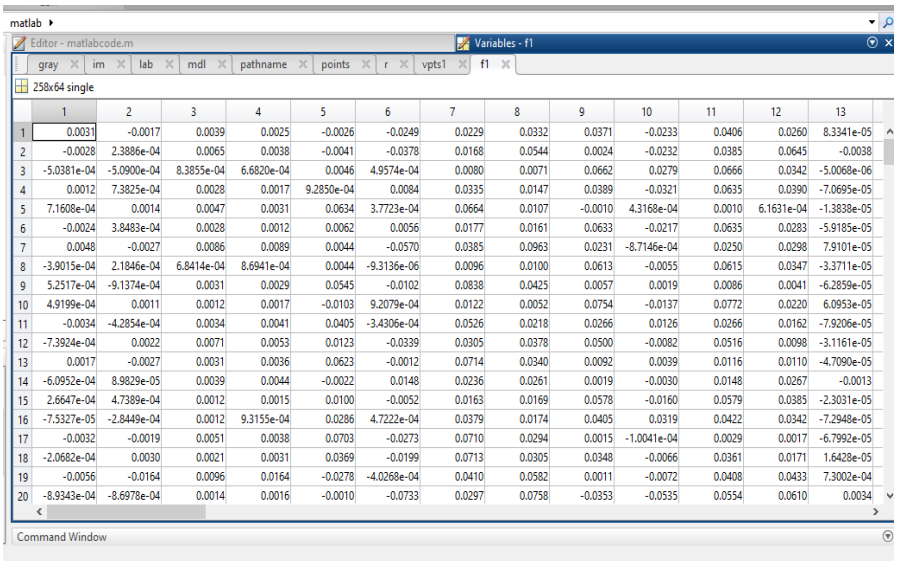
IMAGE SEGMENTATION:

This method is used for the conversion of digital image into various segments having some similarity. Image segmentation helps in the detection of objects and boundary line of the image. In our study K- mean clustering is done for classification of objects based on a set of features into K number of classes. The classification is done by minimizing sum of squares of distance between data objects and corresponding cluster.

FEATURE EXTRACTION:

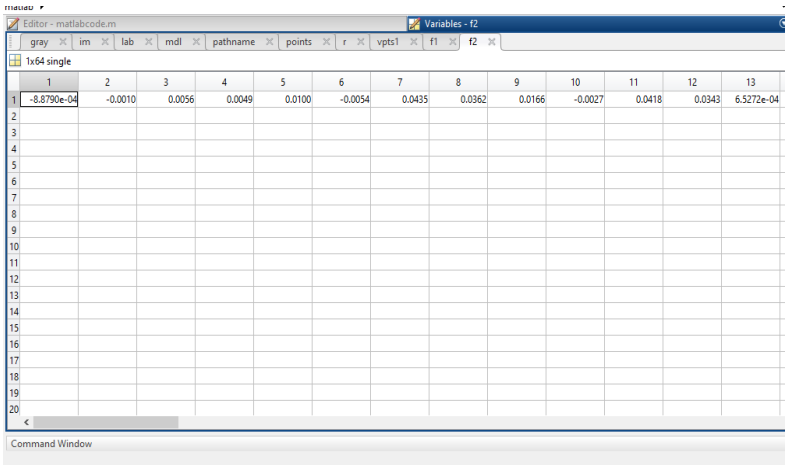
In feature extraction method features such as color, texture, morphology and structure are used in plant disease detection. Color co-occurrence method is used in which the texture and color of the image are considered. The methods used in color co-occurrence are firstly the RGB image of the leaves are converted into HIS color space representation.

For generation of color co-occurrence matrix each pixel map is applied which results into three color co-occurrence matrix one for each of H, S, I.



Features Extraction (gray,points)

After extracting the features of the leaf image and then it also calculates the mean values of RGB (Red,Green,Blue). The combination of RGB is nothing but the each pixel value of the leaf image.

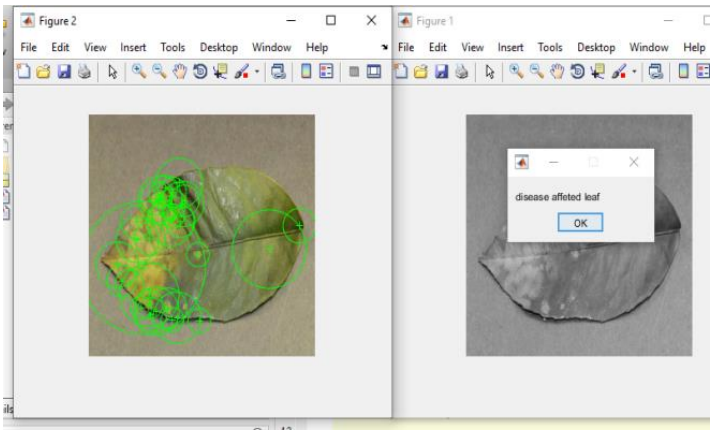


Mean Values of RGB points

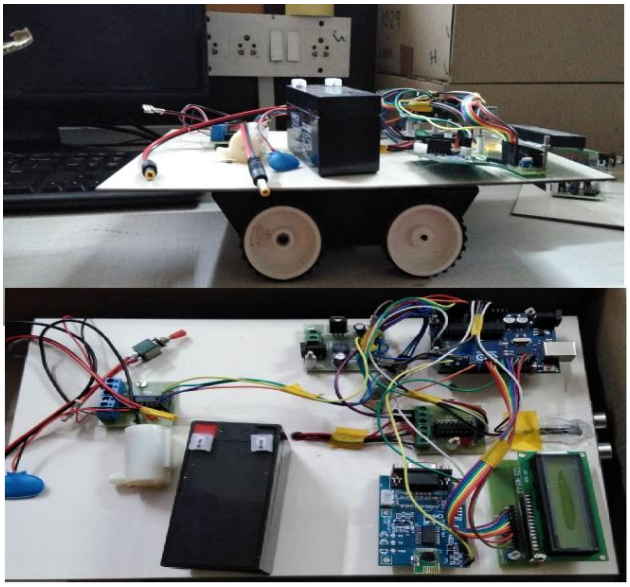
CLASSIFICATION:

The input layer analyzes the diseased region while the output layer specifies the disease outcome of the affected region. A hidden layer occurs in between the input and output layer which provides connecting link between the input and output images. It is applied to obtain least error in the classification of disease of the affected region.

FINAL OUTPUT OF IMAGE PROCESSING:



HARDWARE SET UP OF THE PESTICIDE SPRAYING ROBOT:



2. CONCLUSION AND FUTURE ENHANCEMENT

For this Project , we have achieve the difference between leaf and weed. By using SPEEDED-UP ROBUST FEATURES (SURF) algorithm we can detect weed. Due to the use of our system, we can detect and separate out weed affected area from the leaf . The obtained results are then analyzed, from these results ,weeds are identified after it is analyzed which is controlled by the Arduino. Arduino gave the signal to motor to actuate the system and it will spray the herbicides on weed. By doing so we can reduce the usage of labour work, thus saving the time.

Hence this is prototype module it works as a prototype level only, it may detect one or two leaves only through mat lab, the further development is updated in future and in future it may work on real time scenario.

REFERENCES

[1] Ismail, W., Ishak, W. and Abdul Rahman, K. (2010). Software Development for Real-time Weed Colour Analysis. Pertanika J. Sci. Technol., 18(2): 243-253

[2] Sabanci, K. and Aydin, C. (2013). Real-time Precise Spraying Robot for Weed Control. International Conference of Ecosystems (ICE), 1-5 June, 2013 Tirana, Albania, PP. 356-359

[3] Aitkenhead, M. J., Dalgetty, I. A., Mullins, C. E., McDonald, A. J. and Strachan, N. J. (2003). Weed and Crop Discrimination Using Image Analysis and Artificial Intelligence Methods. Comput. Electron. Agric., 39: 157–171

[4] Jatin Choudhary, Sutapa Nayak (2016) ―A Survey on Weed Detection Using Image Processing in Agriculture‖ Volume: 4 ISSN:2347-2693.

[5] Ajinkya Paikekari, Vrushali Ghule, Rani Meshram and V.B. Raskar (2016) ―Weed detection using Image processing ― Volume : 3 ISSN: 2395 0072.

[6] Nidhi Agarwal, Ritula Thakur (2016) ―Agricultural Robot: Intelligent Robot for Farming‖ IARJSET Vol. 3.

[7] Astrand, B. and Baerveldt, A. (2002). An Agricultural Mobile Robot with Vision-Based Perception for Mechanical Weed Control. Auton. Robot, 13: 21–35.

[8] Irshad Ahmad, Abdul Muhamin Naeem, Muhammad Islam, and Shahid Nawaz, (2007) ―Weed Classification for Selective Herbicide‖, Applications proceedings of world academy of science, engineering and technology volume.

[9] Trooien, T. P. and Heermann, D. F. (1992). Measurement and Simulation of Potato Leaf Area Using Image Processing. Model development. Trans. ASAE, 35(5): 1709-1712.

[10] Sabanci, K. and Aydin, C. (2013). Real-time Precise Spraying Robot for Weed Control. International Conference of Ecosystems (ICE), 1-5 June, 2013 Tirana, Albania, PP. 356-359.