

IoT Based Plant Disease Detection and Smart Irrigation

Mrs. Anitha A¹, Mrs. Vani H², Umesh B³, Nagaraj C Y⁴, Nagalakshmi V⁵, Supritha A G⁶

Assistant Professor, Department of ECE¹

Students, Department of ECE^{2,3,4,5,6}

Rao Bahadur Y Mahabaleswarappa Engineering College, Bellary, Karnataka, India

Abstract: Green plants are imperative for the human environment. They form the basis for the sustainability and long term health of environmental systems. Thus, it is extremely essential to grow healthy plants. The plant disease could be cured if it is known in an advanced stage. In this paper, we have proposed a system using raspberry pi to detect healthy and unhealthy plants & alert the farmer by sending email. We have used tensor flow tools for numerical computation. It can be used in controlled environmental farms to detect the symptoms of disease whenever they appear on leaves of the plant. Water is the most essential contribution to upgrading agricultural productivity and therefore, expansion of the water system has been a key way to the improvement of farming in the nation. It is an important resource in human life. Around 80% to 90% of the water is used in agricultural fields. Due to gradual growth in globalization and population, water consumption is increasing. There is confront in front of every country to diminish the farm water consumption and provide fresh and healthy food. Currently, automation is one of the vital roles in human life. It not only provides comfort but also reduce energy, competence and time-saving. This propounds a design for an automated irrigation system for efficient water management and detection and prevention of diseases of plants from getting spread.

Keywords: Detect healthy and unhealthy plants, Alert the farmers by sending email, Soil moisture sensing

I. INTRODUCTION

India uses more fresh water than any other country in the world and more water overall than any other continent combined. The largest users of water are the household and industrial sectors, followed by the agriculture sector. Around 65 percent of the nation's entire water demand is met by groundwater, which also has a significant impact on the economic and social growth of the country. Building an automation system for a house or office is becoming more and more necessary. Automation lowers a significant amount of waste while using electricity and water efficiently. To combat both over-irrigation and under-irrigation, automated irrigation systems are required. Poor distribution or management of waste water and chemicals, which results in water pollution and over irrigation. In locations with significant evaporation, inadequate irrigation increases soil salinity and, as a result, causes an accumulation of harmful salts on the soil surface. Plant infections that occur during growth are yet another issue, since crops are lacking in nutrients and minerals as a result of unpredictable climate fluctuations. Diseases caused by deficiencies result from this, which lowers crop output. In addition to deficiencies, microorganisms including fungi, bacteria, viruses and mites can also harm plants. Due to the fact that they affect major farming, these born diseases are particularly harmful. It is crucial to take action to maintain the crops.

II. APPARATUS REQUIRED

SL.NO	APPARATUS	QUANTITY	TYPE	RATING
1	Raspberry Pi 3	01		
2	Soil Moisture Sensor	01		
3	Relay Module	01	Switching Device	5V 5V
4	Power Supply	01		9V 5V-3A
5	Monitor	01		

6	Battery	01	Panasonic Alkaline battery	9V
7	DC Motor	01		3V-6V

III. BLOCK DIAGRAM

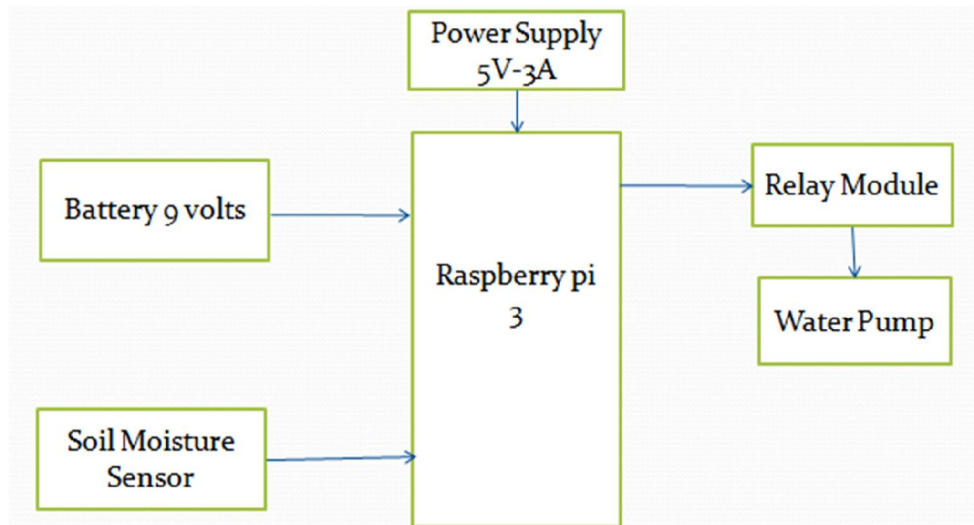


Fig 1: Block Diagram

IV. METHODOLOGY

Circuit is gets power from a 5V-3A power supply and it is connected to the Raspberry Pi 3. The Relay module is connected to the Raspberry Pi and it will help to switch the motor on and off when the moisture level is lower and higher. The motor is gets energy from a 9V battery and on the 32 GB memory card all the python code is dumped and all plant information is stored on the memory card. When the program script runs and an analysis option will pop up and we have to select the image stored on the SD card, the image will be scanned and information regarding the plant will be displayed and remedies related to the disease information will be sent to the mail.

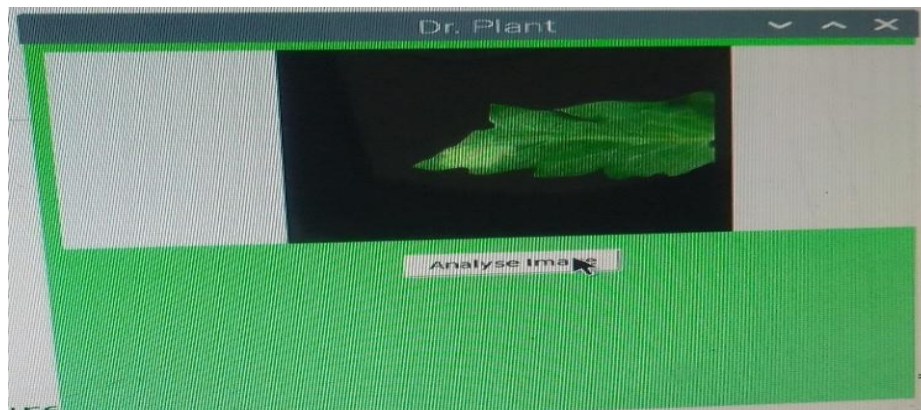


Fig 2. Image displaying analyses option

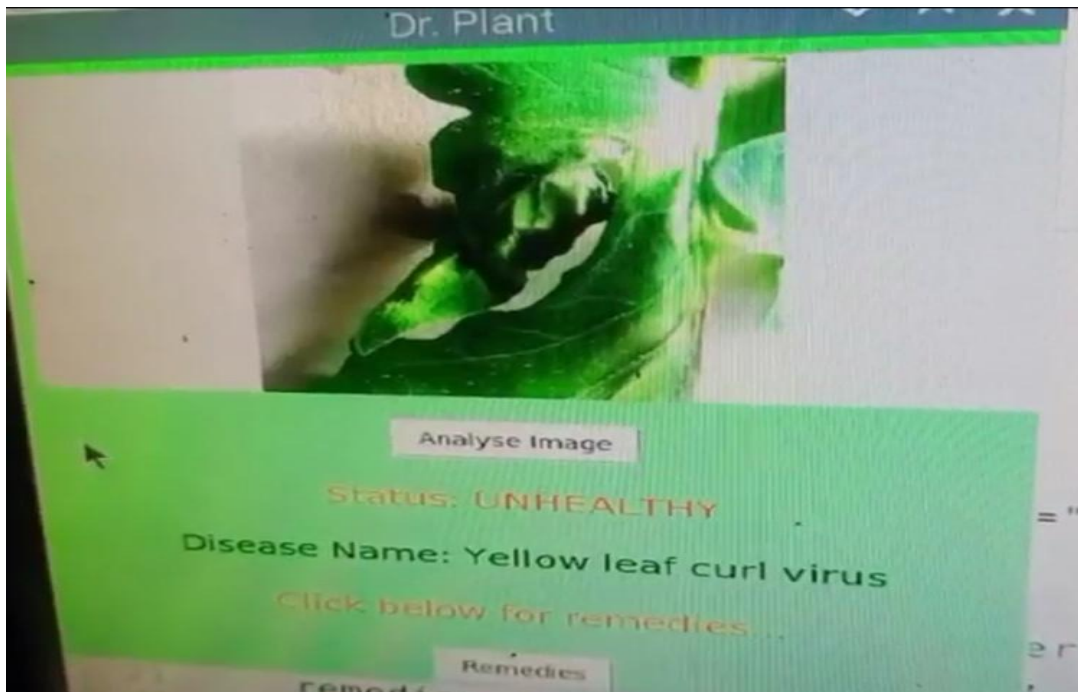


Fig 3. Figure displaying analyses result

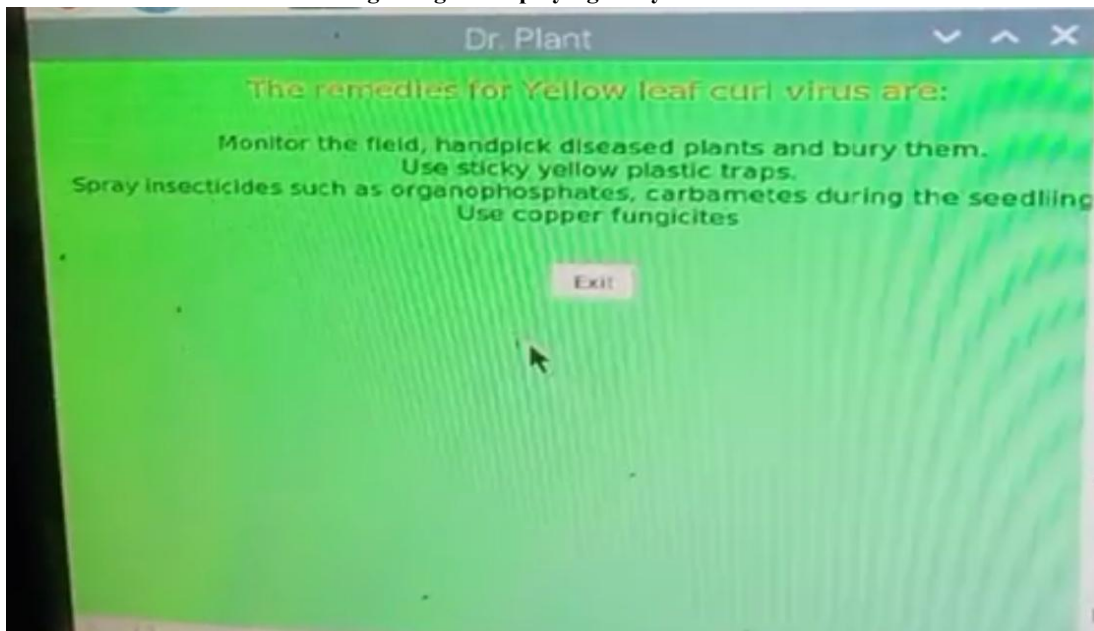


Fig 4. Figure showing Remedies for plant disease

V. ADVANTAGES

- Save money on water bills and time.
- Effortless.
- Automatic watering system.
- It is easy to detect the disease.
- Protect the water resources for future generations.

VI. APPLICATIONS

- Gardening System
- Farm Fields
- Precious Farming
- Smart Green House

VII. CONCLUSION

This project deals with identifying the disease affecting plants by scanning the leaves. This is achieved through the Convolutional Neural Network Algorithm. If the leaf is affected by disease, then the information is shared through the email. Smart irrigation helps the farmers to find a solution without coming towards the field with proper watering and plants will have better yield.

Finally, our proposed system works on two major constraints such as water supply and diseases associated with the field of agriculture. In the future, we are planning to advance our work to detect insects and pests' growth in favourable condition in the field of agriculture.

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