

Sensor Based Waste Water Monitoring and Pesticide Sprinkler for Agriculture Using IoT

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Abstract: The urban waste water sample is collected from various fields and monitored for agriculture it provides a solution for the quality of water by using different type of sensors and the obtained value is displayed in LCD display. The data is saved in the cloud, and the server is connected to the IoT. The estimation of water quality characteristics is paper's main goals. Comparing with the disease infected crop and good yield crop if pesticide is detected in the crop nozzle spraying turn on this method of remedial overcome these problems.

Keywords: Arduino IDE, WIFI module, Notepad++, Sensors, Anaconda prompt, Arduino Uno.

1. Introduction

Water is used in daily life activities like consumption, agriculture and household purpose, mainly the water gets infected with harmful chemicals with cause and effect living organism also several industries,[2]-[4]. The tracking of these water must be made continuously. The water to factor the presence of any organic wastes inside the water so that it will purpose a critical or possibly a minority troubles to the human moreover at the crop cultivation inside the agriculture. The pH start level from zero to fourteen on a pH the values beneath 7 suggest acidity, the values above 7 indicated alkalinity and a natural water has pH of seven. resources and also the analyzing of the water, Monitoring the water for agriculture with suitable pH value for cultivation and implemented pesticide sprinkler to beat the disease infected plants. The main focus is predicated on water purity level and crops infected with disease [1], [3].

2. Literature Survey

A. Survey Paper 1

Thilina Balasooriya IoT-Based Smart Watering System in the direction of Improving the Efficiency of Agricultural Irrigation Prototype demonstrates that using sensors and Wi-Fi enabled microcontrollers. And they particularly centered on water stage tracking for agriculture uses.

Rajani Kumari Sah, Smart Water Monitoring System for Real-Time Water Quality and Usage Monitoring, the utilization limits or water best is without delay notified to the purchase and authority through SMS and an alert message generated through the user.

B. Survey Paper 2

Melike Sardogan, Leaf infected disease Detection and classifications on CNN with LVQ technique, The detection of the disease in crop yield of tomato plant leaf disease model.

S. M. Jaisakthi Grafes, Leaf disease identification using artificial intelligence techniques The designed system keep noticed types of disease using image processing and machine learning [8]-[10].

3. Methodology

The proposed system as two steps:

1) Water monitoring system

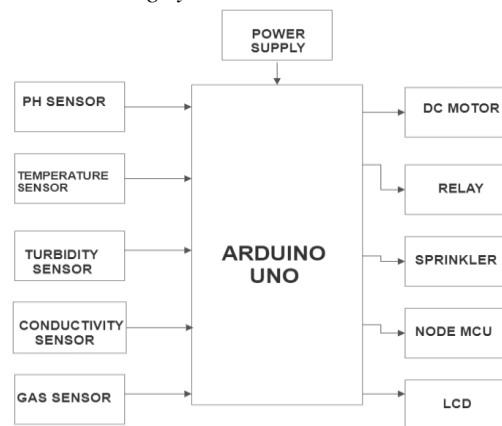


Fig. 1. Block diagram of model

Sensor below distinctive end result approximately water. Those degree for parameters is going to be displayed the use of LCD [2]-[4]. Those majorities of the information from the sensor are dispatched of the cloud for the employment approximately controller is the edge goes to be organized within the cloud. Message goes to be dispatched from cloud of the customers transportable if the really well worth exceeds the message to distributed user. Might be used by each the water top-notch tracking authorities in extra to person inside the clever water great Sensor parameters could be wont to find out the water degrees and may degree with the aid of using technique for putting devices, and the water sensor interface devices that storage, and records will be displayed and monitored.

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2) Sprinkler working

The spraying mechanism, specifically, includes an Arduino UNO microcontroller. It additionally includes a tank of 250ml capability to which a pump is connected. a splitter is connected to the present pump together with the 2 nozzles at the 2 opposite ends and thru this nozzle spraying is practiced. We used image processing technique using python software comparing of healthy plants and unhealthy plants was done. If the plant is detected with any pest pump activates automatically and starts to spray on the infected plant after 5seconds it'll shut down. If the plant is healthy, pump doesn't activate it'll remain in off condition [8]-[10]. During this method comparison process taken place to spot infected plants and pest infected disease name is additionally identified of their particular plant. It also includes a motor thrust circuit to control the pace of spraying and pesticide stage indicator circuit with buzzer, for detecting when the pesticide is empty.

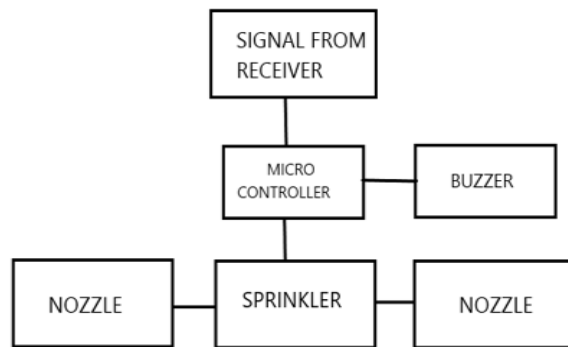


Fig. 2. Working of sprinkler

4. Requirements

A. Software Requirements

- Arduino IDE
- Notepad++
- Anaconda Prompt
- Languages: C and Python.

B. Hardware Requirements

- Arduino UNO
- pH sensor
- Temperature
- Humidity sensor
- Conductivity sensor
- Gas sensor
- LCD display
- Buzzer
- DC pump
- Sprinkler
- Node MCU
- Power supply
- Relay

5. Implementation

In this project solution are obtained using software and

hardware components to achieving the results of Sensor based waste water monitoring and pesticide sprinkler. Different kinds of waste water sample are collected and check the collected water quality parameters with the assistance of array of sensors.[5]-[7]. If the pre-defined value matches in software, then water quality level is displayed on led screen indicating the water quality level. From this project we get to quality of water and that we can identify foreign body particles and unwanted toxic substance and its condition. Arduino IDE 1.8.18 freely available software, which is employed to write down and browse a code for Arduino to run and execute the software, supported the serial monitoring output.



Fig. 3. Proposed model

We used image processing technique using python software comparing of healthy plants and unhealthy plants was done. If the plant is detected with any pest water pump turns on automatically and starts to spray on the infected plant after 5seconds it will turn off. If the plant is healthy, water pump doesn't turn on it will remain in off condition. In this method comparison process taken place to identify infected plants and pest infected disease name is also identified of their particular plant [8]-[11].



Fig. 4. Pre-defined healthy and unhealthy plant with pest infected

6. System Outcomes

The samples are collected and monitored with the help of

sensor water level is monitored and displayed on LCD.

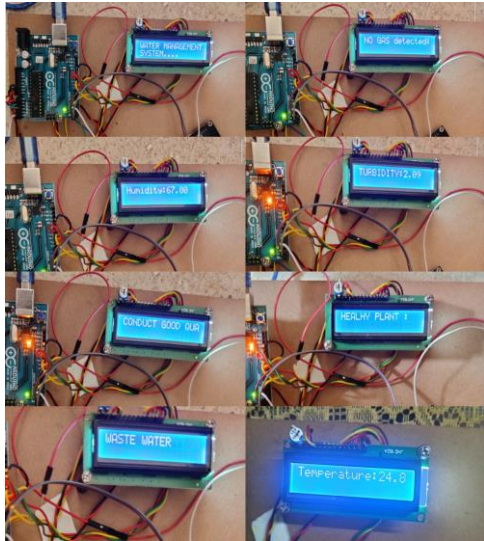


Fig. 5. LCD display with measurements

Healthy and unhealthy Plant comparison technique:

- Step 1: Add command on prompt window.
- Step 2: Select plant for comparison process technique.
- Step 3: Identification of plant with pest infected condition.
- Step 4: Identification of plant with healthy condition.

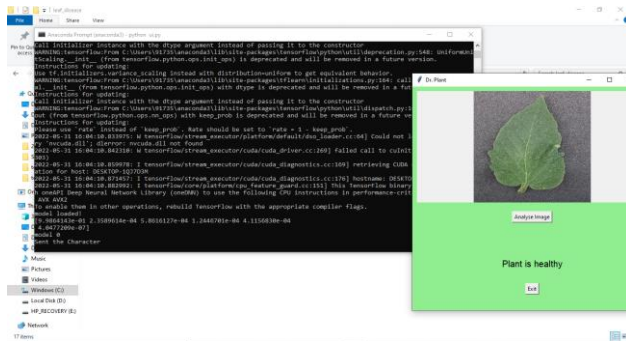


Fig. 6. Healthy plant

Step 5: If the plant is in infected condition dc pumps turns ON.

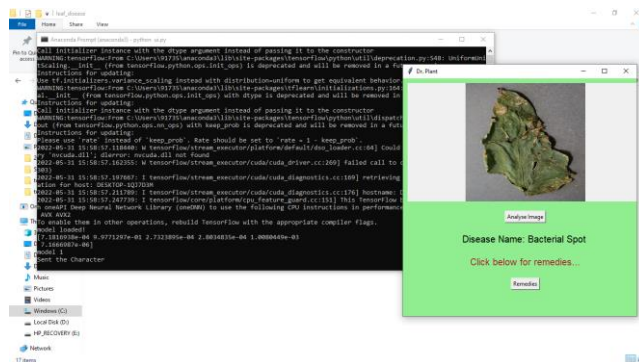


Fig. 7. Unhealthy plant

Step 6: Results are measured according to table.

Table 1
Sensor measurements

Sensors	Minimum value	Maximum value
pH sensor	<7 (Acidity water)	>7 (Good water)
Gas sensor	0	20
Temperature sensor	24	27
Turbidity sensor	1	10

Advantages of proposed model:

- A low-cost system is developed.
- Waste water can monitor and used for agriculture activity.
- User friendly to operate once the system is developed properly.
- Good yields crops can be obtained in this method and continuous monitoring the healthy and unhealthy plant condition.

Future enhancement:

- Filtration process can be implemented to model along with storage of water can be done from the various activity.
- New types of method like sedimentation and automatic filtrations can be implemented.
- Camera can be used and implemented to capture the real time objects which are infected with disease and artificial intelligence technique can be used.

7. Conclusion

- From our project we can implement waste water monitoring using arrays of sensor those value will be displayed in LCD.
- The value of water will be checked the PH of the water level purities which is used for the agriculture purpose.
- The obtained data of water parameter will be updated to cloud and same data will be sent to user through an app with a caution message.
- Also, we implemented a concept of pesticide sprinkler for the waste water monitoring which helps the plants identify whether the plant is infected with the diseases.
- If the diseases are identified in the given leaf the dc pumps turn ON, if the diseases are not developed the plant will be in good condition.

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