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Automatic Drip Irrigation System

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Abstract – *These days, adopting an optimized irrigation system has become a necessity due to the deficiency of the world water resources. Besides, many researchers have treated this issue to improve the irrigation system by integrating the novel technologies from the information and communication field with the agricultural practices. The Wireless Sensor and Actuators Networks (WSANs) present a best example of this fusion. We are proposing architecture model for a drip irrigation system using the WSANs. Our system includes the soil moisture, temperature to monitor the irrigation operations.* Specifically, we consider the case where a system detects water level and alerts to user and maintain system working anytime.

Keywords: WSN, Drip Irrigation, Raspberry pi

1. INTRODUCTION

In India agriculture is one of the main sources of living and it mostly depends on the rain. And it also has a major effect on Indian economy. A large quantity of water is used for agricultural field and therefore 85% of available fresh water resources are used for yielding agricultural crops. This is due to the major growth in population due to this tremendous growth in population there is large demand for food. Agriculture is the main source for food production. Advancement in technology we need to implement a technique by which there can be restricted consumption of water.

Drip irrigation is a form of irrigation that saves water and fertilizer by allowing water to drip slowly to the roots of many of different plants, either onto the soil surface or directly onto the foundation zone, through a network of valves, pipes, tubing, and emitters. Slender tubes delivers water directly to the base of the plant which can helps to make efficient use of water.

In drip irrigation system the drips are placed close to the surface of the ground where the water reaches to the root zone of the crop. The sensors are placed at the root foundation level of the plants which will sense the moisture, temperature and pressure. Sensors will send data to the server and the data will be compared with the predefined values which already stored in database and the analysis will be performed. Consistent with that analysis the system will take the desired action automatically.

The main objective of the system is: a) Efficient and reliable use of water resources in agriculture. b) Handles the irrigation system automatically.

1.1. Problem Statement

Irrigation of plants is overwhelming activity, to be done in within time, it needs many numbers of human resources. Generally all the steps were performed by humans. These days some system use the technology to reduce the number of workers or the time required to water the plant. With such a system, the control is very limited and many resources will still waste. Water is one of these resources that are used excessively. Mass irrigation is one of the method to water the plant but this method will represent the massive losses since the amount of water given is in excess of plant's needs. In some part of India the water consumption is taxed.

In addition to excess cost of water, the lack of human power labor is becoming more and more expensive. As a result if no efforts is is invested in optimizing there will be more money involved in same process, Technology is probably a solution to reduce costs and prevent loss of resources.

2. LITERATURE SURVEY

After the deep research in the agricultural field, researchers found that the income of agriculture goes on decreasing day by day. Use of advanced technology within the field of agriculture plays very important role in increasing the agricultural production moreover as in reducing the additional human power efforts, water demand and fertiliser demand. A number of the researchers tried for betterment of farmers and provides the systems that use technologies that are useful for increasing the agricultural yield. Some of such researches carried out in the field of agriculture are summarized below.

In [1], author said, in present drip irrigation system water is provided to root zone of plants drop by drop .It saves huge amount of water. The objective of the system is to a) Save valuable water resources b) Handles the system manually and automatically c) Detects the water level d) Builds such system which can improve crop productivity e) Learns choice way of irrigation based on different parameter. Present irrigation system Surface irrigation is also referred as flood irrigation. It states that the water distribution is uncontrolled and because it is inherently inefficient as well as not reliable. The disadvantage of fuzzy logic is that it gives same importance to all factors that are to be combined.

In [2], author said, smart drip irrigation system proves to be a helpful system because it automates and regulates the watering without any manual efforts. Sending the emails to the system can be automated but manual sending of the emails has control over the system regarding whether or not to run the system depending upon the weather conditions. In this system, solenoid valves and relay board is used.It can be controlled remotely which opens the opportunities to control the flow of water as well as the electrical flow. The limitation of this design model is that the failure of any particular part is not informed and must be tested manually.

In [3], author said, the benefits of using wireless sensors are having the reduced wiring and piping prices. Wireless system is easy for installation and maintenance in massive areas.

In [4], author said, digital camera is interfaced to Raspberry Pi via Wi- Fi module. Here the raspberry Pi takes pictures wirelessly using Mobile camera. Then image processing will be done by Raspberry Pi to identify soil colour samples. According to soil samples the Pi will transmit the information to user on the android app regarding the soil and seeds / crops which can be used on this kind of soil.

In [5], author said, the developed system is simple and price effective than most alternate systems present in the market. It measures totally different environmental conditions. It includes measurement of atmospheric temperature and soil temperature etc. Data transmission is finished by wireless module for communication purpose. Therefore it can be used in open fields as well as within greenhouse. The range of wireless module is up to 25m with / without different obstacles like trees, wall, magnet, cupboard, benches, etc. Sensors can be placed anywhere in the field. If there is need of relocation then it can be done simply. System is also tested for different temperatures and it's found that all the sensors work with minimum deviation in output. The use of drip irrigation, water is provided directly to the roots of the crop. So wastage of water is decreased and water resources are optimized to obtain higher quality of crops.

3. PROPOSED SYSTEM

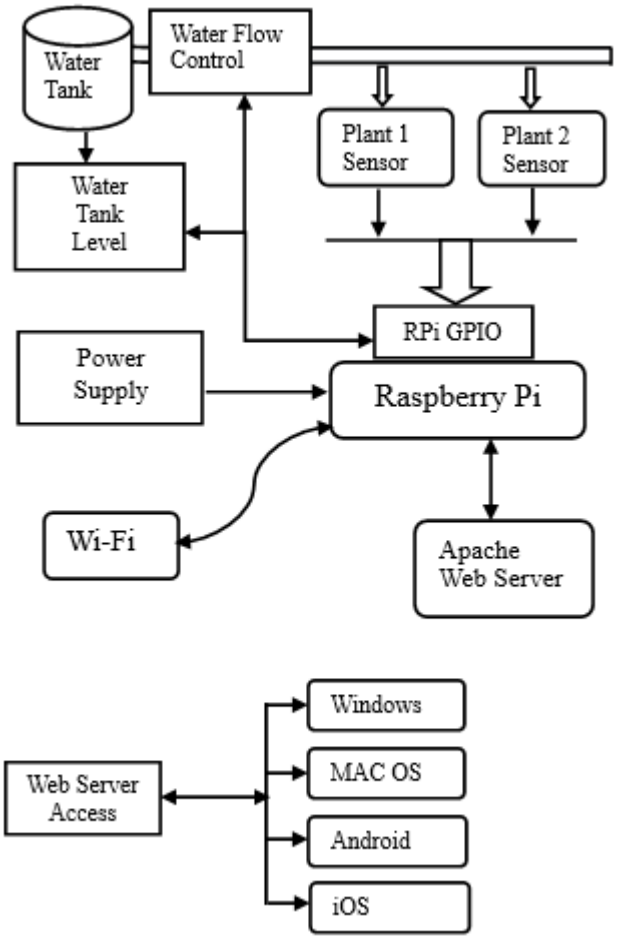

Fig-1: Architecture of Automatic Drip Irrigation

In this system moisture sensor, temperature sensor are used to measure soil moisture and temperature respectively which are placed deployed in soil. In our system we will check soil moisture, temperature of soil then we will check water tank level. Our propose system is to detect water level. If the water level of tank goes down then water is supplied in the tank. According to this value system will decide how much amount of water is present in the tank if it less than limit and it will automatically fills tank.

Then sensor collects soil moisture and send it to Raspberry Pi. Then Raspberry Pi will do processing and compare it with predefined values. If the current sensed value does not matches with predefined value then it will turn on the system and water will be drip to every root of plant. Pi will transmit the status to user on the regarding the soil moisture and tank water level and system status whether it is on or off particular instance.

Power supply is supplied to the Raspberry Pi. This series of small, low powered computers provides a cheap and relatively simple base for electronics projects everything from a tiny web server to an actual spaceship.

4. FUTURE SCOPE

In future days we try cover larger area to implement this system. And design of smart drip irrigation system using which we can even apply food nutrients to the root of plant and crop by air mixed with very less water. It will prove more reliable with better monitoring and processing.

5. CONCLUSION

We concludes that preservation of water sources and minimizing wastage of it done by this effective system which will helps for better productivity of corps. In this present world of increasing population, the huge demand of food can be fulfil with this state of the art process. By implementing such system using WSN and advance technology we can improve agricultural growth and Indian economy.

6. REFERENCES

[1] Koushik Anand, Dr. C. Jayakumar, Mohana Muthu, Sridhar Amirneni, "Automatic Drip Irrigation System Using Fuzzy Logic And Mobile Technology", IEEE International Conference on Technological Innovations in ICT for Agriculture and Rural Development, 2015.

[2] Nikhil Agrawal, Smita Singhal, "Smart Drip Irrigation System using Raspberry pi and Arduino", International Conference on Computing, Communication and Automation, 2015.

[3] Aniket H. Hade, Dr. M.K. Sengupta, "Automatic control of drip irrigation system & monitoring of soil base wireless", IOSR Journal of Agriculture and Veterinary Science, 2014.

[4] Suprabha Jadhav, Shailesh Hambarde, "Automated Irrigation System using Wireless Sensor Network and Raspberry Pi", International Journal of Science and Research, 2014.

[5] Nilesh R. Patel, Swarup S. Mathurkar, "Microcontroller Based Drip Irrigation System Using Smart Sensor", Annual IEEE India Conference, 2013.