

IoT based Smart Irrigation System using Raspberry Pi3

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Abstract – This propounds a design for automatic water supplying system in farmland using raspberry pi3, raspberry pi3, GSM model, relay boards and couple of sensors, motors.

Water is the important source in human life. Around 80% to 90% water is used in agriculture field. As due to day by day growth in globalization and population water consumption is also increases. There is challenge in front of every country to reduce the farm water consumption and provide fresh and healthy food. Today automation is one of the important role in human life. This system not only provides comfort but also reduce energy, increases efficiency and saves time. Our system provides constant growth of crops even there is change in temperature and humidity also we can protect the plant from surrounding animals using leaser system

Key Words: Raspberry Pi3, GSM Model, Sensors, Leaser

1. INTRODUCTION

Nowadays , some systems use technology to reduce the number of workers and to reduce the time required to water the plants .With such systems , the control is very limited and many of the resources are still wasted .Water is one of these resources which is used excessively. Mass irrigation is the method which is used to water the plant .This method represents massive losses since the amount of water given exceeds the plant's needs .The excess water gets discharged by the holes of the pots , or it percolate through the soil in the fields. In addition to the excess cost of water, labor is becoming more and more expensive.

1.1 PROPOSED SYSTEM

The proposed irrigation system makes the efficient use of water. Water is fed to the plant whenever there is need. There already exist irrigation systems which water plants on the basis of soil humidity, temperature and light. Whenever these parameters are required in big agricultural fields their productivity of crop matters.

The proposed irrigation system will be very efficient in areas like house gardens, office premises, building etc. where watering plants at regular interval matters. This system also presents a smart drip irrigation system to water plants using devices like Raspberry pi3, Arduino microcontrollers. ZigBee is used to control the system wirelessly. And also the user gets the status time to time.

1.2 OBJECTIVE

The objective of the project is to design a smart drip irrigation system to water plants with the use of devices like Raspberry pi3, Arduino microcontroller, ZigBee is used to control the system wirelessly while Python programming language is used for automation purpose. This system also contributes an efficient and fairly cheap automation irrigation system. System once installed has no maintenance cost and is easy to use. Environment parameters monitoring system based on wireless communication technology has been developed to control remotely, which realizes the measurement of temperature, soil parameters. Monitoring system based on wireless communication technology has been developed to control remotely, which realizes the measurement of temperature, soil parameters.

2. RELATED WORK

After the research in the agricultural field, researchers found that the yield of agriculture goes on decreasing day to day. Use of technology in the field of agriculture plays important role in increasing the production as well as in reducing the extra man power effort, water requirement and fertilizer requirement. The Raspberry pi3 is used to send various types of data like text messages and image through internet communication to the microcontroller process [1].Ms. Swapnali proposed a paper on smart irrigation system using IOT and Raspberry pi3. The smart irrigation system is suitable and cost effective for advance water resources for agricultural production [2]. Joaquin Gutierrez proposed a paper on Automated Irrigation System Using a Wireless Sensor Network and GPRS Module System has distributed wireless network of soil moisture and temperature sensors placed in root zone of plants Gateway unit handles sensor information, triggers actuator and transmits data to a web application. An algorithm was developed with threshold values of sensors that was programmed into a microcontroller based gateway to control water quantity. [3].Nikhil Agrawal proposed a paper on Smart Drip Irrigation System using Raspberry pi and Arduino. The command from the user are processed at raspberry pi using python programming language. Arduino microcontroller are used to receive the on or off command from Raspberry pi using ZigBee protocol. Star ZigBee topology serves as backbone for the communication between raspberry pi. Raspberry pi acts a central coordinator and end devices act as various routers.

3. DISCRPTION OF BLOCK DIAGRAM

The block diagram of the automation system is shown in fig.1. the main component of this diagram are Raspberry pi3 module, Wi-Fi connection, Sensors, Motors, Leaser system. etc.

3.1. BLOCK DIAGRAM

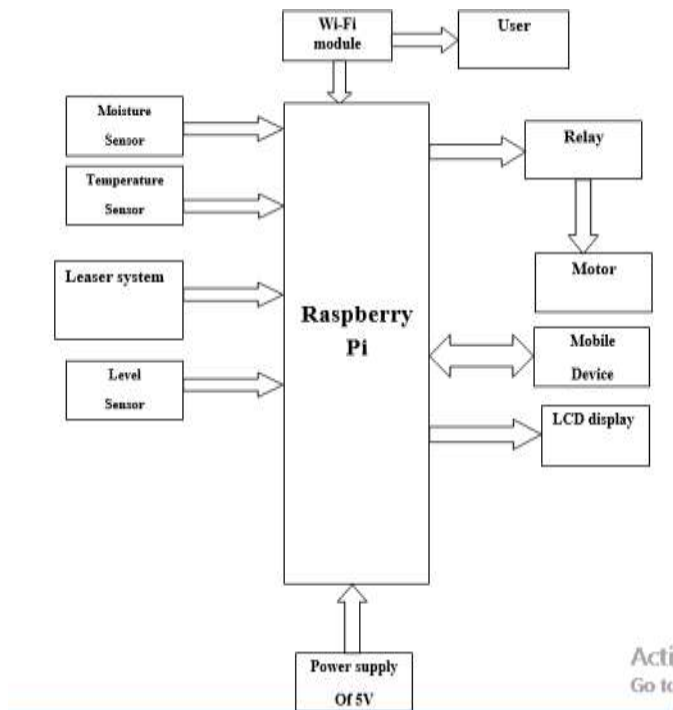


Fig -1: Irrigation control System

The above figure shows that main block diagram of smart irrigation system. In that main model is a Raspberry pi3 model, Relays, Sensors, Leaser. In this system three Sensors are such as moisture sensor, Temperature sensor, leaser sensor are connected to the Raspberry pi3 model also Wi-Fi connection is connected to the model. The connection of Raspberry pi is given to the Relay

3.2 COMPONENT OF SYSTEM

3.2.1 RASPBERRY PI

Raspberry pi is a small sized single board computer which is capable of doing the entire job that an average desktop computer does like spread sheet, Word processing, Internet, Programming, Games etc. it contain 1GB RAM, 2 USB, ARM V8 Processing and Ethernet port, HDMI & RCA ports for display, 3.5mm Audio jack, SD card slot General purpose I/O pins, runs on 5v.

3.1.2 SENSORS

A sensor is a device, module, or subsystem whose purpose is to detect events or changes its environment and send the information to other electronic, frequently a computer processor.

[1] Soil moisture sensor- used to measure the moisture content of soil.

[2] Temperature sensor- used to detect the temperature of the soil.

[3] Level sensor- used to measure the water level in water tank.

3.1.3 DC MOTOR

DC motor in simple words is a device that converts direct current (electrical energy) into mechanical energy.

3.1.4 RELAY

A relay is an electrically operated switch. Relays are used where it is necessary to control a circuit by a separate low-power signal. A relay with calibrated operating characteristics and sometimes multiple operating coils are used to protect electrical circuits from overload. As shown in above figure raspberry pi is connected to the devices via relay. Here relay can be operated as switch to on or off the devices.

4. SOFTWARE REQUIRMENT

4.1 DIP TRACE

It is an EDA/CAD software for creating schematic diagram and printed circuit board the developers provide a multi-lingual interface and tutorials. Dip-Trace has 4 modules: schematic capture editor, PCB layout editor with built-in shape-based auto router and 3D-preview & export, component editor, and patter editor.

4.2 PYTHON (PY-CHARM)

It is a very useful programing language that has an easy to read syntax, and allows programmers to use fewer lines of code than would be possible in languages such as assembly, C, or Java. The Python programing language actually started as a scripting language for Linux.

5. FLOW-CHART

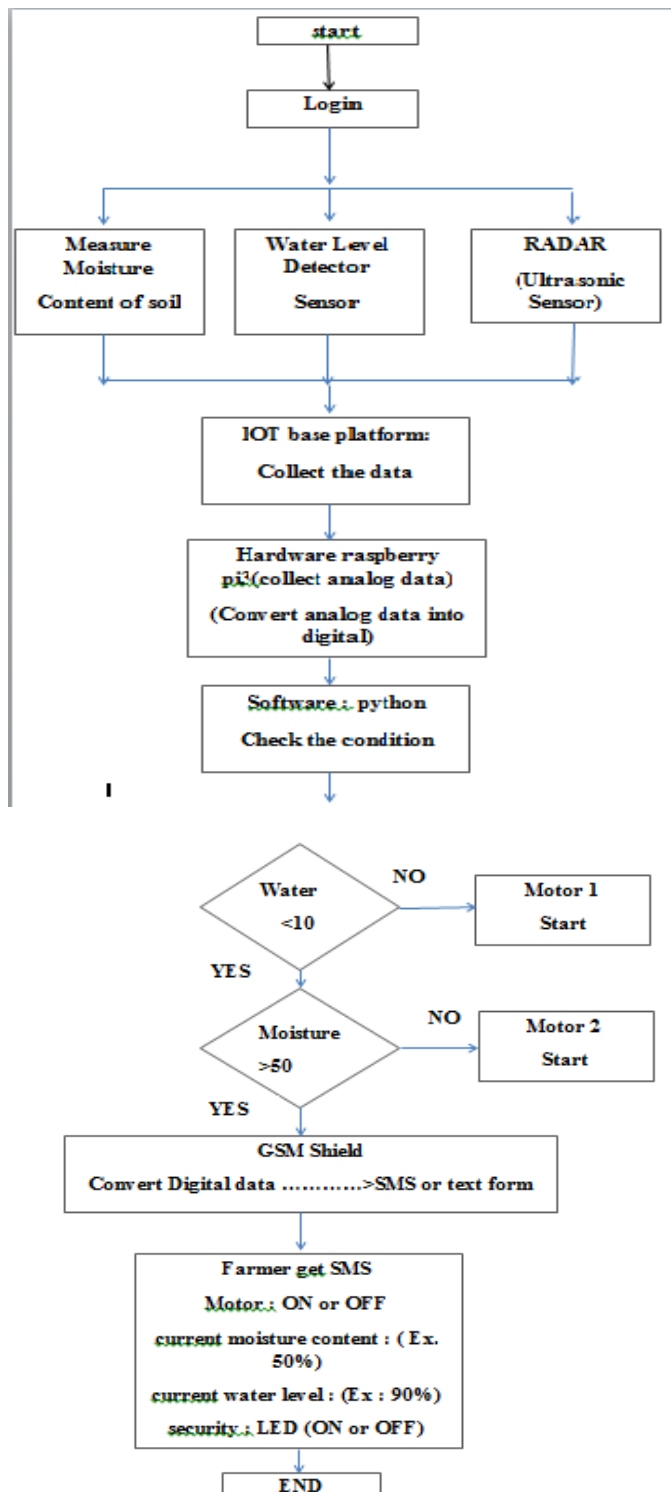


Fig-2: Irrigation system flow chart.

6. ADVANTAGES

- [1] Save water and time.
- [2] Improves plant growth.

- [3] Moisture within the root zone can be maintained at field capacity.
- [4] Labour cost is less than other irrigation methods.
- [5] Consumption of water as well as electricity is reduced to an significant amount.

7. FUTUER-SCOPE

- [1] Poly-house farming is also smart irrigation technique.
- [2] This system is used to improve the poly-house farming.
- [3] It is the new model for poly-house.
- [4] We can make our poly-house smart, safe and give more production per drop of water.
- [5] The boosting of the gun with further essential nutrients.

8. CONCLUSION

In the present era, people use various irrigation techniques through manual control, in which a person has to irrigate a land at regular time intervals. This process seem to consume more water and results in water wastage. Moreover in some land area where there is inadequate rainfall or watering plants, irrigation becomes difficult. Hence we require an automated system that will precisely monitor and control the water requirement in the land. Installing smart irrigation system in smart land saves time and ensures efficient use of water. This Raspberry pi which promises many features for growing plants perfectly.

9. REFERENCES

- [1] Ms. Swapnali B. Pawar, Prof Priti Rajput, Prof. Asif Shaikh "Smart Irrigation System Using IOT And Raspberry Pi" International Research Journal of Engineering and Technology Volume: 05 issue: 08 Aug 2018.
- [2] S.N.Ishak, N.N.N.Abd Malik, N.M Abdul Latiff, N.Effiyana Ghazali, M.A Baharudin "Smart Home Garden Irrigation System Using Raspberry Pi" IEEE 13th Malaysia International Conference on communications(MICC),28-30 Nov.2017
- [3] Ahmed Imteaj, Tanveer Rahman, Muhammad Kamrul Hossain and Saika Zaman "IOT based Autonomous Percipient Irrigation System Using Raspberry Pi" International Journal of Current Engineering And Technology.