

Integration of IOT on Smart Irrigation System

Sneha.M^{#1}, Rubath .G^{#2}, Thahamina.S.R^{#3}, Thinotha.T^{#4}, Karthik.S^{#5}

Department of Computer Science and Engineering, Anna University.

SNS College of Technology(autonomous),

Sathy main road, Coimbatore-35

Tamil Nadu, India.

1snehamadevan@gmail.com

2rarerubath@gmail.com

3thahamina534@gmail.com

4thinotha70@gmail.com

5kkarthikraja@yahoo.com

Abstract-Internet of Things (IoT) is the internet networking of physical devices embedded with electronics, software, sensors and network connectivity. It enables objects to collect and exchange data by controlling it across existing network infrastructure. Agricultural sector makes a major use of water that plays an important role in the development of the country. Wastage of water is a serious issue in irrigation. The main aim of this project is to control the flow of water by monitoring the moisture content and helps in preventing dry run of motor and notifies the user over GSM to periodically provide fertilizers to the crops based on the soil's moisture content and there by effectively reduces the cost of irrigation.

Keywords-soil moisture sensor, network connectivity, irrigation

I.INTRODUCTION

The development of smart environmental technology creates a new way of research in the field of agriculture. Sensor technologies are much helpful in creating a smart environment, using this technique the process of irrigation is made simple and easy. This system mainly concentrates on the conservation of water resources by watering the crops whenever needed and it is possible through moisture sensors in the field. This paper focuses on efficient irrigation system which reduces the wastage of water in farming and it reduces maintenance cost which is suitable for high crop generation. This system intelligently adapts water flow and irrigation based on weather and moisture content of the land. The important parameters during irrigation are humidity, moisture and temperature which helps the farmer to apply the right amount of water at the right time and thereby prevents the dry run of motor by monitoring the variations in voltage level and helps in running the motor automatically depending on the level of water. It also notifies the user to avoid the crops from being infected by periodically providing fertilizers to the crops via GSM and provides an efficient farming technique at low cost.

II.RELATED WORKS

[1] ChandankumarSahu, PramiteeBehera, "A Low Cost Smart Irrigation Control System", IEEE Sponsored 2nd International Conference on Electronics and Communication

System (ICECS 2015).This paper proposes about automatic smart irrigation system using sensors in which the temperature and moisture value of the soil is monitored for effective farming process to increase production. [2] P.Uma

Mageswari,T.Ramya,K.Balaji,"Automated Irrigation System Using a Wireless Sensor Network and GPRS Module", vol. 3, no. 1, pp. 29-40, Oct 2015.It suggests about optimizing the usage of water in which a gateway sensor is used to handle sensor information.[3] Prof.J.G.Rana,Bhagyasree K.Chate "Smart Irrigation System using Raspberry Pi", International Research Journal of Engineering and technology(IRJET),Vol-03.May 2016.This paper suggests

Smart drip irrigation system to water plants with the use of devices like Raspberry-Pi and promotes efficient and fairly cheap automatic irrigation system.[4] Prof. Shika and Vibha, "Automated Irrigation System using Zigbee-GSM", International Journal Of Innovative Research in Science, Vol 5,May 2016.It provides a low cost automated Irrigation System and monitors the condition of the soil(temperature, humidity etc) and performs necessary actions remotely using GSM.[5] Pavithra, D. S., and M. S. Srinath. "GSM based Automatic Irrigation Control System for Efficient Use of Resources and Crop Planning by Using an Android Mobile." IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN (2014): 2278-1684.In this project the humidity and temperature of plants are precisely controlled and user is notified using android phones could control the irrigation system.[6] Mr.Yogesh, Mrs.Reena P.shinde, "Automated Environment monitoring and Control system for agro-based industries using Wireless sensor Networks", (E-ISSN:2321-9637)ACGT 2015

.This paper suggests in developing an automation irrigation system for agro-based industries using wireless sensor Network which analyses the data and automatically controls the irrigation process.[7] K.Prathyusha, M.Chaitanya Suman,"Design of Embedded Systems for the automation of drip irrigation"volume1,issue2,2012.It represents the embedded system for the automation of drip irrigation in which the humidity and temperature of the plants are precisely monitored and controlled.[8] Purnima, S. R. N., and PhD Reddy. "Design of remote monitoring and control system with automatic irrigation system using GSM Bluetooth."International Journal of Computer Applications (0975-888) Volume (2012).It proposes an economical and generic automatic irrigation system based on wireless sensors with GSM and helps in remote monitoring and irrigation system control.[9] G.Merlin Suba,Y M Jagadeesh.S.Karthik and E Raj Sampath,"Smart Irrigation System Through Wireless Sensor Networks",ARPN journal of Engineering and Applied Sciences,vol.10,September 2015.This project controls water supply automatically in water crisis areas through motion sensor and covers the application of sensor based irrigation system through a wireless sensor network.[10] Mr.D.Yasar Arfath,P.Manimaran "An Intelligent Smart Irrigation System Using WSN and GPRS Module",International Journal of Applied Engineering Research ISSN 0973-4562,Vol 11,November 2016.This paper suggests a low cost automated Irrigation System using a wireless sensor network and a GPRS Module. It also provides manual monitoring of the field and provides an efficient irrigation system.

III.EXISTING SYSTEM

The existing system creates a need for high maintenance and labor work thereby increasing the cost of irrigation. The soil moisture sensor are used for measuring the moisture content of the soil which is integrated to a comparator and soil conditioning circuit, The comparator circuit compares the input voltages and identifies the highest voltage and sends it to the soil conditioning circuit where the signals are amplified. These digital signals are sent to Raspberry Pi which controls the entire mechanism. Raspberry Pi model B+ incorporates a number of enhancements and new features such as improved power consumption, increased connectivity and greater IO. The Raspberry Pi is connected to the comparator and soil conditioning circuit which optimizes the voltage in it. The Raspberry Pi cannot drive the relay directly since it has only zero volt or 3.3V, but it requires 12V to drive the electromagnetic relay and so we need a

driver circuit. The driver circuit takes the low-level input and gives the required amplitude to run the relay, which automatically controls the ON and OFF function of the motor.LDR is used for automatic control of light in the existing system and the growth of the plant is monitored using a web cam. Thus the existing system provides a automatic irrigation system for the agricultural lands.

IV.PROPOSED SYSTEM

The proposed system insists in using PIC Microcontroller which reduces the cost of the project due to its wide availability of free development tools. Reprogrammable memory capabilities etc. It controls the entire mechanism of the project efficiently and automates the entire work by controlling the flow of water to the crops by monitoring the moisture content, humidity and temperature using soil moisture sensor, humidity sensor and temperature sensor. All these sensors are integrated to the PIC Microcontroller and prevents dry run of the motor by monitoring the change on voltage and the water level. A RTC is used to set the time by which the system is periodically checked to remind the user about providing fertilizers to the crops. Initially all the parameters such as duration, the time when the crops must be given fertilizers are set so that the user could easily get notified. Its helps in preventing the crops from getting affected by insects or pests. This system notifies the user over GSM to periodically provide fertilizers to the crops based on the soil's moisture content and there by effectively reduces the cost of irrigation.

Sensors measure the amount of water present in the soil (i.e)the moisture content. Knowing the moisture content of the fields, the farmers could use less water to grow a crop; it also helps in increasing the yield and the quality of the crop by efficient management of soil moisture sensor during different growth stages of the crop.

Preventing dry run of motor is one of the most important monitoring functions in an irrigation process. Dry run refers to the fact, where there is no liquid in the pump in which the suction of the pipe is closed. Monitoring dry run helps in preventing the motor from getting damaged.

A GSM connection is used for notifying the farmer about the time when the fertilizers are to be provided to the crops periodically.GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces. It helps in notifying the farmer for effective farming.

V. MODULE DESCRIPTION

A. Moisture Sensing module

The soil moisture sensor, humidity sensor and temperature sensor is used to measure the moisture content of the soil. All these sensors are integrated to the PIC Microcontroller. It gives resistance variation at the output to detect the moisture content of the soil by which the required amount of water for each crop is identified.

B. Controller Module

PIC Microcontroller has different features to manage the entire mechanism. All the components are integrated to the PIC Microcontroller which controls the entire mechanism.

C. Dry Run Detection Module

A current sensor is connected to the motor to identify the variations in load and voltage. It helps in preventing dry run of motor depending on the voltage level.

D. Notification Module

It notifies the user to provide fertilizers to the crops depending on the moisture content using soil moisture sensors and uses RTC to set the time intervals to provide fertilizers periodically. The farmer is notified at the right time over GSM for proper irrigation.

motor thus making the process of irrigation more simple and efficient. An application can be developed in future to control the entire irrigation process to make it more simple and efficient.

REFERENCE

- [1]Prof .J.G.Rana, Bhagyasree K.Chate “Smart Irrigation System using Raspberry Pi”,International Research Journal of Engineering and technology(IRJET),Vol-03.May 2016.
- [2]Angel.C.Asha.S “Developing a Smart Environment in Agricultural Irrigation Technique”, International journal of Ambient Systems and Applications(IJASA)Vol-3,September 2015.
- [3] Pavithra, D. S., and M. S. Srinath. "GSM based Automatic Irrigation Control System for Efficient Use of Resources and Crop Planning by Using an Android Mobile." IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN (2014): 2278-1684
- [4]G.Merlin Suba,Y M Jagadeesh.S.Karthik and E Raj Sampath,”Smart Irrigation System Through Wireless Sensor Networks”,ARPN journal of Engineering and Applied Sciences,vol.10,September 2015
- [5]Mr.D Ya Yasar Arfath,P.Manimaran “An Intelligent Smart Irrigation System Using WSN and GPRS Module”,International Journal of Applied Engineering Research ISSN 0973-4562,Vol 11,November 2016
- [6]P.UmaMageswari,T.Ramya,K.Balaji,“Automated Irrigation System Using WSN and GPRS Module”,vol 3, pp. 29–40, Oct 2015
- [7]ChandankumarSahu, PramiteeBehera, “A Low Cost Smart Irrigation Control System”, IEEE Sponsored 2nd International Conference on Electronics and Communication System (ICECS 2015)

VI.SYSTEM DESIGN

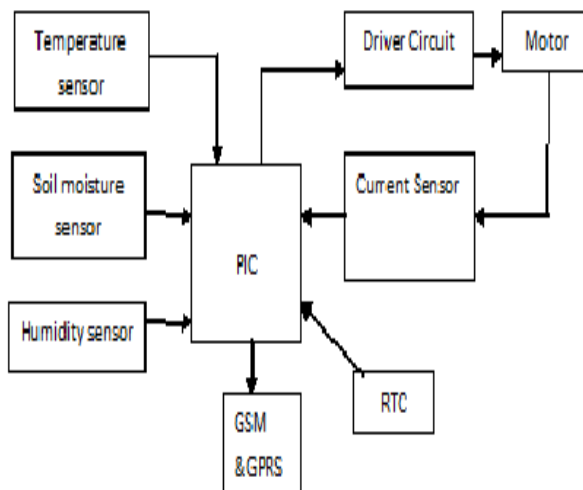


Fig 1:Proposed System Design

VII.CONCLUSION AND FUTURE ENHANCEMENT

This paper represents the irrigation system through sensors and microcontroller which controls and monitors all the activities. It proposes a model to optimize the expenditure and helps in providing a better irrigation at a large area of crops with less water consumption thereby preventing dry run of