

# AUTOMATED IRRIGATION SYSTEM USING GSM AND WIRELESS SENSOR NETWORK

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**Abstract**—Agriculture may be the worldwide prime occupation of human being, 64% of total available land is occupied by the agriculture, and also it consumes eighty five percent of accessible freshwater. The machine works based on the algorithm developed for watering the crop. The board comes with an Ethernet interface and runs the straightforward data server. Hence coordinator collects the information over Sigsbee wireless communication protocol and allow user to watch the information from the internet browser. User can make the irrigation system off or on remotely. The machine supplies a web interface tithe user so the user can control and monitor the system remotely. Within this paper, Raspberry Pi can be used being an embedded Linux board that is designed in line with the arm 11microcontroller architecture. Embedded Linux board makes the communication with all of distributed sensor nodes put into the farm through Sigsbee protocol and itself behave as a coordinated node within the wireless sensor network. This paper presents an automation of farm irrigation system utilizing a wireless sensor network (WSN) and embedded Linux board. Each sensor node includes soil moisture and soil temperature sensor and something Sigsbee Antenna device for communication using the coordinator node. Raspberry Pi stores collected data within the database and analyzes the stored data. The machine will reduce water consumption and providing uniform water to the crop leads to growing yield.

**Index Terms**—Wireless sensor network; Raspberry Pi (Rip); Sigsbee; Embedded Linux. Web Design; Irrigation.

## I. INTRODUCTION

Irrigation is the method of watering our planet. The requirement water for the soil relies upon soil characteristics like soil moisture and soil temperature. Furthermore, it depends upon the crop which evolves inside the soil. From last decade, handful of existing system utilized by decreasing the agriculture water consumption, however, these systems involve some

limitations. This figure water consumption increases every year due to globalization and population growth. There's challenging in front of every single country to sustain the brand new food requirement and reducing the farm water consumption. These systems, watering is finished without analyzing our planet characteristics, which means that systems apply non uniform water for the soil results in less yields. Also systems needed more human intervention and time-consuming. And then we require modern technology to resolve this problem and support better irrigation management. For we've recommended system that's Web based automatic irrigation system using wireless sensor network and embedded Linux board. In this particular recommended system WSN is includes two nodes, coordinator node and Router/Finish device node. Each node mainly includes memory, processor plus an RF transceiver. The coordinator node is founded on Raspberry Pi (Rip) embedded Linux board and finished device is founded on Adriano UNOAtmega328 platform The wireless sensor network creates the systems of multiple items having capable of computation, communication and sensing. It provides a bridge involving the real physical world and virtual worlds and becoming a range of potential programs of Agriculture, home automation, science, civil infrastructure and security.. The part in the coordinator node in the method is to initiate the communication with distributed End device nodes with the Sigsbee wireless communication protocol and continuously collects our planet moisture and soil temperature data and store collected data inside the database. The database is created round the raspberry Pi board that's a MySQL database. Coordinate node evaluates the received data and decides water required for that soil. Once the examined data shows that water is required, the coordinator node sends commands to push controller make Irrigation on. Rupiahsan Ethernet interface plus it runs a simple data server. Therefore coordinator node allows data collection

over Sigsbee, and understanding monitoring and system control from web browser remotely.

## II. PROPOSED SYSTEM

Within this suggested system we've used Raspberry Pi as the controller of coordinator node. Rip may be the small, inexpensive minicomputer. It'll allow transmitting soil parameter data from Finish device sensor node to coordinator node and controlling signal from coordinator node to push node. The wireless communication is dependent on Sigsbee protocol it uses 2.4 GHz wireless link. The net server was created on Rap for monitoring and controls the irrigation. Any products which have the capacity to gain access to the net service are going to be used here for monitoring the information like PC, laptop, smartphone etc. Style of automated irrigation, coordinator node manages the multiple Router/Finish device nodes. The machine includes three parts Coordinator node, Router/Finish device sensor node and server design. Coordinator node and Finish device sensor node is related by radio transceiver. It continuously collects the data send by sensor nodes via Sigsbee, and processing large amounts of data timely and readily available for customers to see. It's the core of the system. Sensor node used here to sense the earth parameters. It is designed using Adriano 1 microcontroller board based oatmeal 328. It contain the Sigsbee protocol based radio transceiver, power unit, soil moisture and soil temperature (DS1822) Sensors, and knowledge logger for temporary storage. It'll sense the earth parameter typically at one-minute intervals and send to the coordinator node through the ZigBee wireless communication protocol. ASigsbee protocol for wireless communication which is based around the underlying protocol IEEE 802.15.4, which defines the network physical layer, and controlling layer for media access, while Sigsbee protocol defines the network layer, application layer and specifications from the network security services. Within this suggested system we've designed the database based on MySQL which is a component of Rip. MySQL is the popular selection of database inside a web application. MySQL is the relational database management system (RDBMS). It's open source software. Database stores the earth parameter information send with a sensor node inside it as time passes. It offers the information to the net page for monitoring the system remotely. The high temperature sensor used here's DS1822 digital thermometer. Information is review single wire serial bus

in 2's complement format with 9 to 12 items of resolution. The module includes, recognition probe, and sensor board .It's getting triple output mode, digital, analog, and serial with exact blood pressure measurements. The sensor will identify the moisture from the soil surrounding it, i.e. lack of water content from the soil. If the contents are low the module output is going to be high otherwise the output will stay in neutral conditions. The DS1822 requires only one data line (and ground) for communication having a central microprocessor. Programs that may benefit from this feature include temperature monitoring systems inside buildings, equipment or machinery, and process monitoring and control. This moisture sensor has two probes accustomed to pass the present in to the soil, after which it reads that resistance between two probes to obtain the moisture level. More water contained in the earth helps make the soil conduct electricity easier indicate less resistance, while dry soil having less water conducts electricity poorly indicate more resistance. The Raspberry Pi may be the inexpensive credit size minicomputer which has lately gain popularity. The Raspberry is the cheapest low power arm 11 based microcontroller. The Adriano 1 may be the microcontroller board based onATmega328. Its 14 digital input/output pins, 6 analog inputs, 16MHz ceramic resonator, USB connection, a power jack. Adriano includes a microcontroller and Integrated Development Atmosphere (IDE). IDE can be used to create and upload computer code towards the microcontroller. It may be powered by USB cable or power jack of 5v. It consists of everything needed to aid the microcontroller.

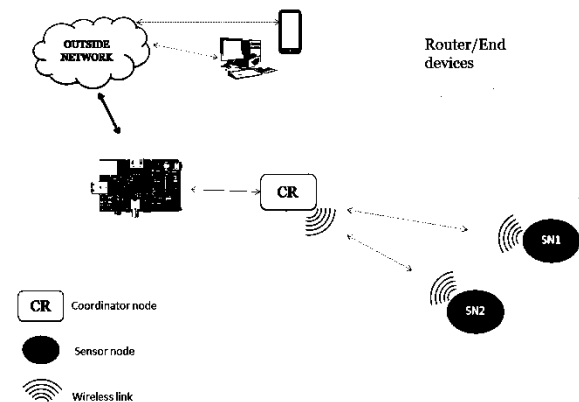


Fig.1. Architecture of the System

### III. CONCLUSION

The Sigsbee protocol is used here for wireless communication it'll create network easily and mixture of Adriano, Bee and sensor produce a low power affordable sensor node. The machine is watering towards the crop uniform by examining the earth parameters; it can help to reduce the freshwater consumption. By supplying the net interface and automation user can certainly monitor the machine also it will minimize a person's intervention. The Apache server crated on Raspberry Pi easily exhibiting the items in sensor data. This paper designs the automated wireless irrigation system using WSN and embedded Linux board. Within this we've used raspberry Pi being an embedded Linux board which allows collecting the sensor information from sensor node continuously, store it inside a database and supplying the web interface towards the user.

### REFERENCES

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