Sensor Based Water Management For Irrigation System Using Iot

Geetha.V, Marshiana.D, Ramadevi.R, Meenadevi.R

Abstract: India is a developing country with Agriculture as the major source. Still now they are using traditional methods of farming which yields less when compared with other developed countries. Modern methods are implemented to reduce the work and risk factors arising during farming. The system provides modern tools to enhance the work load of the farmers. Implementation of Global System for Mobile Communication (GSM) along with sensors, PIC16F877 microcontroller and transmitting the data using IOT plays a major role in soil irrigation.

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Introduction

Utilization of current advanced technological techniques is widely used in agricultural field. One such is the wireless medium transmission like Global System for Mobile communication (GSM). By using IOT (Internet Of Things), the information can be obtained from anywhere at any time without computer and human interaction can be obtained. An irrigation system which is automated by using controllable parameter such as soil moisture, water level, and ph value are designed, as they are the important factors to be controlled in PA(Precision Agriculture).Though India is developing in country in all fields, it is necessary To introduce some modernized technology in the field of agriculture with power utilization. Lacking information exits regarding soil structure and climatic conditions for crop production. Still traditional methods are used for farming that result in low yielding of crops and fruits. Implementation of modern techniques and automation has improved the yield. GSM technology is an automatic system that helps to know the conditions of the soil for irrigation. Sensors are used to gives information about soil moisture, ph value and water level of the field and update data time to time. Controlling of all these operations will be done by a smart device or computer connected to internet and the operations will be performed by interfacing sensors, actuators with microcontroller and Internet of Things (IOT). Sensors like rain sensor, ph sensor, water level sensor and soil moisture sensor helps to identify the specific condition of fields like water level of the field, ph value of the crops, etc. Wireless mobile sensor network conserve the usage of limited battery of sensor to increase the life of network for long and redundant sensors can change their positions to increase overall network lifetime of GSM. Pravina B. Chikankar, et. al.,(2016). Proposed a Wireless Sensing Technology is widely used everywhere in the current scientific world. WSN helps to upgrade the technology. In the research field of WSN the power efficient time was a major issue. This problem was overcome by using ZigBee technology. This paper is designed to find the ph value and soil moisture of the field using ZigBee technology.

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- *Geetha.V, Marshiana.D, Ramadevi.R, Meenadevi.R*
- *Sathyabama Institute of science and Technology*

Jobish John, et. al.,(2016). designed a methodology for the agricultural field to check the condition of soil so that crops grow efficiently. This paper presents the design of shortest path tree based data collection WSN to sense the soil moisture in the field. Chetan Dwarkani M, et. al.,(2016). proposed a novel methodology for smart farming by linking a smart sensing system and smart irrigator system through Wireless Communication Technology. System It focused on the measurement of physical parameters such as soil moisture content, nutrient content that plays a vital role in farming activities. Prachi Patil, et, al.,(2015). The paper is used to monitor soil moisture and of the farm as well as controlling the soil moisture by monitoring the level of water in the water source using Global communication for Mobile(GSM). Soledad Escolar, et, al.,(2011). Proposed a methodology consisting of a set of well-defined phases that cover the complete life cycle of WSN application for agricultural monitoring. Juan Francisco Villa, et, al.,(2011). Designed an automated irrigation system was developed to optimize water use for agricultural crops. The system has a distributed WSN of soil moisture and temperature sensors placed in the root zone of the plant. In addition, a gateway unit handles sensor information, triggers actuators and transmits data to web page. Meonghun Lee, et, al.,(2014). The businesses that support farming have long needed to stay side by side of moisture levels and other important information that affects crops. An IOT enabled sensor can accurately detect water levels in distant fields, under all types of condition. Peter Namisko, et, al.,(2013). With a great potential for improving decision making in agriculture. The main aim of this paper was to investigate farmers, awareness, usage and perception of e-agriculture in TransNIzoia county. Pratap Tokekar, et, al.,(2016). Introduced a system of coordinating an unmanned aerial vehicle and an unmanned group vehicle for a precision agriculture. This allows the system to conserve the short battery life of a typical UAV. The goal is to minimize the total time spent in measuring and travelling. Yong-Duk Kim, et, al.,(2011). Designed new sensor network architecture with autonomous robots based on beacon mode and implemented real time monitoring system under real test-based environment. Based on this conclusion can be made that there exist significant commonalities but no methodology that specifies the best practices that should be used in the general crop independent cases.

Methodology

The specified hardware device consists of different components like sensors, PIC16F877A microcontroller,

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GSM, IOT and LCD. WSN (Wireless mobile sensor) will provide suitable means for the farmers in the development of agriculture and also will help them to invest more and gain more profit. In agriculture field sensor, WSN senses the soil moisture, humidity which is essential to maintain the fertility of soil. Sensing information by sensor is transmitted to ADC. An ADC converts it from analog to digital then transmitted the digital data to LCD and IOT. This is inbuilt in PIC microcontroller 16F877A. The sensed data sends the data to PIC 16F877A microcontroller and information display on the LCD of IOT as well as PC. When running value crosses the threshold value then automatic irrigation starts. Soil moisture sensor network is a wireless network which is designed to communicate with the soil. IOT is a wireless communication device that is a system of interrelated computing devices, mechanical and digital machines, object, animals or people that are provided with unique identifiers and have the ability to transfer data automatically over a network. GSM is used in monitoring the condition of soil and to control the energy consumption. IOT play a vital role based WSN for agricultural energy monitoring system in real time. Optimization and modeling of transmission schemes also increase the network lifetime.
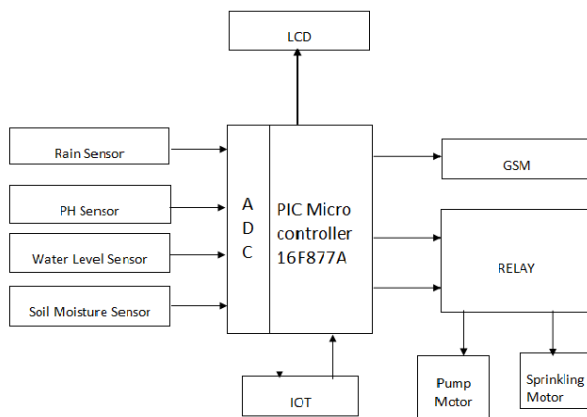
Block diagram

Table 4.1 component specification

S.NO	DEVICES	SPECIFICATION
1.	IOT	Sim 800A(Call, Msg, GPRS)
2.	Micro - Controller (PIC16F877A)	ADC, PWM, I^2C, SPI,RISC
3.	Display	16*2 LCD Display
4.	Sensors	PH, water level, soil moisture, rain sensors
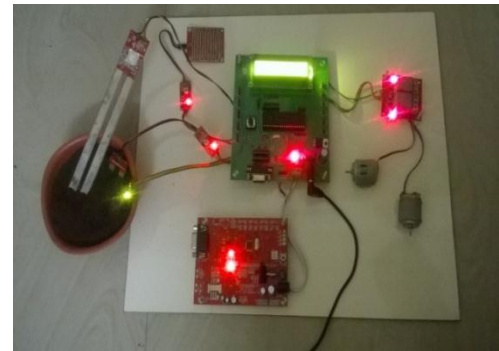
Hardware output diagram of detecting sensors with sand

Conclusion:

This system provides a optimised model in transmission of information for the farmers to yield crops and more reliable with less cost. The water management can be identified using IOT which provides energy consumption

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