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Web Based Intelligent Irrigation and Security System Using Internet of Things

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ABSTRACT: India is land of agricultural business and monsoon dependent. Indian economy is based on agricultural production. Uncertainty in monsoon rainfall both in place and time, degraded quality of soil, draught situations in some places, migration of people from village to town in search work, no advancement in irrigation and water storage techniques, etc. are reasons for decrease in agricultural production.
The combination of conventional methodology with latest technologies as Internet of Things and Wireless Sensor Networks can lead toagriculturalmodernization**.** With help of technology we can artificially supply water in agricultural landby sensing the water requirement of soil using moisture sensor. Similarly, we can prevent intrusion of birds, animals by providing security to grown crops. This paper aims to provide automated water supply and security in agriculture land.

KEYWORDS: Internet of Things(IoT), Wireless Sensor Network (WSN), sensors, security.

I. INTRODUCTION

Agribusiness assuming a concern in the economy of most countries, agrarian generation has been encountering the consistent change of its procedures and methods. Progresses in implanted gadgets, nearby remote availability, and endeavours in creating correspondence conventions and equipment for interconnecting systems to IP (Internet Protocol) based Internet has prepared for the wide scale design of IoT (Internet-of-Things) network. The goal of this venture is to enhance items quality, and in addition keeping up an economical horticulture, by gathering continuous information from the earth. In this way, there is the requirement for upgrading the assets utilized in the agrarian procedures, mostly in the water system framework. For each product the water required is diverse agreeing there development. The water gave by pump is insufficient to give the measure of water required by the plants for a sound development. Thus, According to the yield give water by checking the dampness level of the harvest. As of now, farming expends around 70% of the crisp water. This rate can be diminished performing proficient water administration with regards to water system. This venture applies the water effectively, in the opportune place, at the perfect time and in the appropriate sum. It brings wide advantages, for example, water investment funds; cash reserve funds and additionally the change of harvest quality.

Agriculture provides worthwhile business and livelihood for majority of community and offers significantly to the nationwide income. Adaptation to climate change is inevitability for all agricultural producers. In India, 83% of farmers accepted agriculture as their main business. 79% of farmers earn a main income from their farming occupation for their house hold and 60% of farmer like farming as their main occupation and overall 73% of farmers have mobile. So, for an accurate result of farming, we wish to use IOT technology in agriculture soil monitoring. We have concentrated a system based on IOT technology for monitoring soil data and get the information about farm related data from anywhere in the world. It is difficult for farmers to analyse data manually related to soil and crops. It is hectic work for farmers to analyse data related to soil condition. So, IOT technology can be used in agricultural environment to collect and store data. The basic concept of this paper is based on soil monitoring using IOT technology for fast decision and by using this concept we can make use of resources in better way in low cost system so that small to small farmer can manage their farm from anywhere in the world. Adaptation to climate change is inevitability for all agricultural producers; this technology has to be appropriate for the local circumstances.This device can be controlled and monitored from remote location and it can be implemented in agricultural field's i.e.grown crop security, soil moisture,

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motor on/off operation, water level in tank, etc. In this paper, mentioned sensors and electronic devices are integrated using python scripts.

II. RELATED WORK

In [1] authors provide examples that will show the simplicity in designing and constructing such a system and other advantages of using fuzzy logic in the feedback control problem. Improved things improve the fuzzy logic for things which are not in digital output like on/off. The objective of this [3] paper is to integrate the implementation of high resolution WSN data and cloud infrastructure for remote monitoring and control and WSN concept which is implemented for irrigation infrastructure. [3] Paper implemented WSN in PA which will optimize the usage of water, fertilizer and also maximize the yield of the crops. Improved the precision agriculture is done by using water level soil measure sensor for appropriate crop.Paper [4] derived a device where mentioned sensors and electronic devices are integrated using python scripts. Based on attempted test cases, authors were able to achieve success in 84.8% test cases. IOT concept is implemented using Raspberry Pi and python, which is used to access security level. Authors [5]presented system for uni-crop. The irrigation times and amounts of irrigation water applied by the system is suitable for uni-form crop production using soil moisture sensor. Soil moisture and PH sensors are used for water level and nutrition level of soil respectively which can help to improve the crop quality. Authors [6], done their research work rural area. Authors proposed a system to mitigate the agricultural needs of the rural communities for the domains of crop farming, weather forecasting, wildlife management, forestry, livestock farming, market identification and rural financing. The proposed irrigation system in paper [7] not only prevents the moisture stress of trees and scarification but also provides an efficient use of fresh water resource. Drip irrigation system is improved by using solenoid to maintain the water level for crop. In [8], authors have proposed irrigation as well other functions in green house environment. Due to real-time automatic data acquisition of green-house environment parameters and biological information, the farmer achieve good economic benefits, and the great significance to the development of modernagricultural information-based and intelligent. Real Time concept is implemented using fast access to the remote sensors devices. Authors [9] proposed to use irrigation time table which can be fetched and mapped from agriculture university or government web site as per soil and crop type. It gives maximum profit from minimum cost. This [10] paper proposes and evaluates a cloud-based Wireless Sensor and Actuator Network (WSAN) communication system. This solution monitors and controls a set of sensors and actuators, respectively, to assess plants water needs. WSAN communication system is improved by using cloud server to monitor and control the main module.

III. PROPOSED SYSTEM

A. *ARCHITECTURE:*

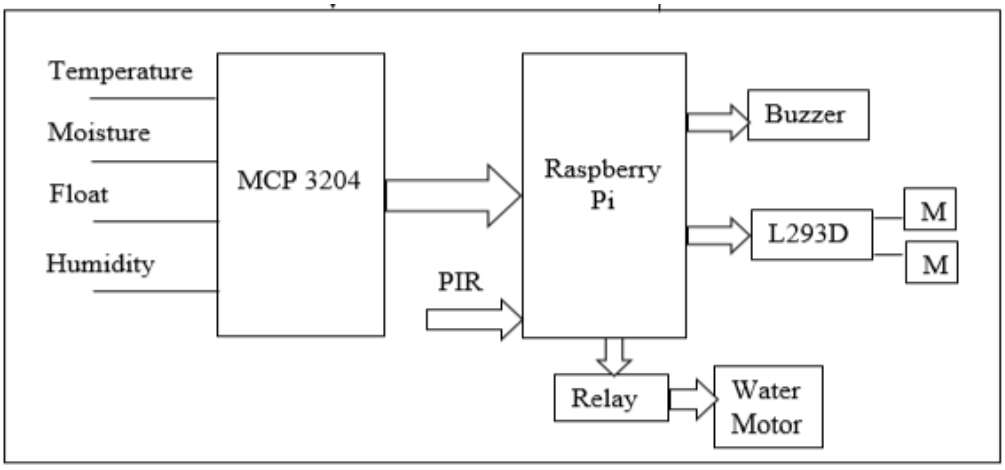

Fig.1.Proposed system architecture

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In proposed architecture, soil moisture sensor will measure the water level in soil to avoid the unwanted wastage of water. If moisture is less than threshold then float sensor will check for the water level indication in tank. Float Sensor is an electrical ON/OFF Switch, which operates automatically when water level goes up or down with respect to determined level. Temperature sensor is used to check temperature of environment. And humidity sensor is used to check humidity of environment; this is helpful to monitor the damage of pipe as well as theft of water. Security is maintained with help of PIR sensor and buzzer. PIR sensor detects the motion of object and activates buzzer in case of intrusion of birds, monkey etc. The MCP 3204 is an Analog-to-Digital Converter (ADC). DC motor is used toindicate the flowof watertothe crop.Also monitor and control the real time tracking and switching of all their electrical devices through an android based mobile app as well as the web application. The data collected from sensors is stored in MySQL database as well as these values are reflected on web application. The system is connected to this application using internet connectivity for communication. The model has an option of controlling devices by either sending tap-to-toggle system.

B. ***SYSTEM FLOW:***

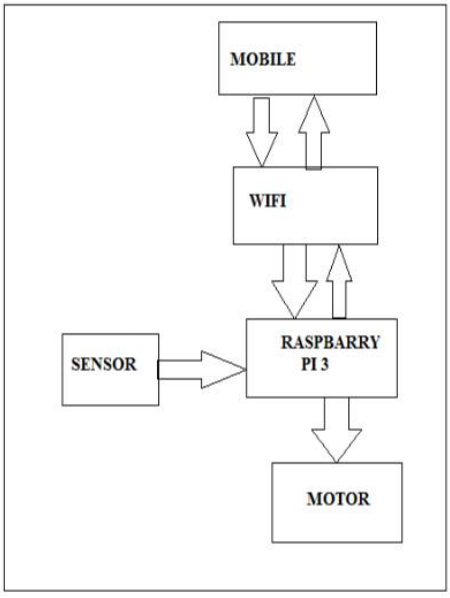

Fig.1.System flow

All the sensors are connected to raspberry pi. The real time sensed information will be stored in MySQL database which is on raspberry pi. The program running on raspbianos will do comparison of sensed data and threshold value. On the basis of comparison raspberry pi will command water motor on/off. This real time data will fetched by web page to display on users mobile who is connected to raspberry pi using wireless network.

IV. CONCLUSION AND FUTURE WORK

In this paper, we present automated irrigation and security system to increase agriculture production. Existing systems do not consider availability of water in irrigation system as well as do not have provision for security of grown crops. Our proposed system considers water level in water tank as well soil moisture level for automated irrigation. And for security we have provision of buzzer which operate on the basis of PIR sensor object detection. Proposed system can be added with already existing irrigation system, small farmers can afford it, user friendly, better decision making system for farmer, increase productivity and food production and results to minimize water conservation. In India, government is making new policies for the development of farmers. The data collected from agriculture can be

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analyzed to help policy makers. The usage of sensors for soil quality check in farms can help the agriculture welfare department to advice farmers which crop should be cultivated in that soil.

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