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AUTOMATIC FIELD IRRIGATION SYSTEM

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Abstract - This project proposed an embedded system for automatic control of irrigation. This project has Android App for real-time sensing and control of an irrigation system. This system provides uniform and required level of water for the agricultural farm and it avoids water wastage. These paper have real time sensing and control of an irrigation system. When the condition of watering the agricultural farm is abnormal then the system automatically switches ON the motor. When the water level reaches normal level the motor automatically switch OFF. Also we can manually control the motor and flow of water through app. In this project we are interfacing microcontroller through temperature sensor, humidity sensor and also interfacing to GSM through MAX 232.In this we set specified values of temperature, humidity and the conditioned is uniformly monitored by Android App.

1. INTRODUCTION

As we know that India is a developing country and the major part of our GDP growth rate belongs to agriculture alone. So we can say that agriculture is the backbone of India and irrigation is called the lifeline. So, agriculture in India has been the most important priority in the economic development of country since the independence. Major part of our expenditure is spent on agriculture alone and inspite of that we not getting required output. In India, there is uneven biological diversity cause, some part experience droughts while some parts flood, so there is always scarcity of water available for the irrigation. Farmer in rural area severally affected by this condition. New technologies coming but they are too expensive for the common farmer. The project offers a cheaper and simpler solution to this problem by developing automated microclimate irrigation controllers with wireless capability assisted with low cost wireless sensor nodes. Like temperature sensor, humidity sensor which senses the level of moisture of the soil. The land or firm is divided into microclimatic regions equipped with smart specified sensors and integrated wirelessly into automated irrigation controller with wireless networking capability. The monitoring activity is closely related to data transmission and the most crucial thing in data transmission is how to transmit data from one place to another where the data received should be same to data sent. Data monitoring of irrigation is important because it will be used in the decision making process. This is one possible way of automatic irrigation, such as how to control setting of irrigation network, how to open or close the floodgates, and how much flow of water to be used so that it can conserve water usage later.

2. LITERATURE SURVEY

[1] ***Proposal of the irrigation system using low-cost Arduino system as part of a smart home*** *(SISY 2015 IEEE 13th International Symposium on Intelligent Systems and Informatics September 1719, 2015, Subotica, Serbia)*

Authors Stefan Koprda, Zoltan Balogh, Duan Hrub, Milan Turni developed Proposal of the irrigation system using low cost arduino system as part of a smart home[1]. The users of modern buildings require more and more comfort and for fulfilling habitation requirements they expect more achievements.The paper describes a creation design of automated control and remote management of irrigation system by the use of low-cost device Arduino and operating system Android. The irrigation system consists of several modules which can be divided into three parts: control part, regulatory part and server part. The design brings comfort, automation and mostly energy savings for intelligent systems.

[2] ***Automatic irrigation system on sensing soil moisture content*** *(INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS,*

INSTRUMENTATION AND CONTROL ENGINEERING Vol. 3, Issue 1, January 2015)

Authors Nagarajapandian , Ram Prasanth, Selva Kumar, Tamil Selvan developed Automatic irrigation system on sensing soil moisture content. In this project on "Automatic Irrigation System on Sensing Soil Moisture Content" is intended to create an automated irrigation mechanism which turns the pumping motor ON and OFF on detecting the dampness content of the earth. In the domain of farming, utilization of appropriate means of irrigation is significant. The benefit of employing these techniques is to decrease human interference and still make certain appropriate irrigation. This automated irrigation project brings into play an Arduino board ATmega328 micro-controller ,is programmed to collect the input signal of changeable dampness circumstances of the earth via dampness detecting system

[3] ***Irrigation Alert System for farmers based on External Intelligence and Field Sensors data*** *(International Journal of Innovative Technology and Exploring Engineering (IJITEE) ISSN: 2278-3075, Volume-8 Issue-8 June, 2019)*

Agricultural sector is of greater importance in a country like India, the prime stakeholder of it being the farmer faces in numerous problems left unsolved. Among them are the issues related to "expert suggestion" for the farmer fraternity to overcome issues that prevail as a hindrance for their normal living. Among those issues the main aspect to be considered is the irrigation system. Since irrigation system plays the vital role this study focuses on the aspect of developing a framework that paves a way for external intelligence and field sensor data. This would in turn serve the purpose of providing support to the farmers on grounds of issues related to irrigation and enriching the farming. On one hand the researchers have contributed towards precision agriculture which is very cost effective, on the other hand in Indian perspective there are limited resources in hand which does evince of much of investment made in agriculture sector. Considering the avenues through which the farmers can avail through the governmental initiative, it will become a worthwhile effort to suggest with a platform for intelligence and field sensor data in irrigation system. This proposed platform will be enable to 1) Read data from field sensors and external Intelligence System which take farmers details such as crop type, soil type, sowing time etc., and irrigation partners data like crop type, no. of irrigation, duration details as input 2) Retrieve the weather forecast data based on the soil moisture content 3) Deliver the irrigation based alert to farmers through mobile device. The study enables the farmers to get external advisory services through which they can enhance rich harvest in the agricultural activities. The findings of the study would gauge the gap between the existing system and the proposed framework.

[4] ***Automated Irrigation System Using a Wireless Sensor Network and GPRS Module.***

An automated irrigation system was developed to optimize water use for agricultural crops. The system has a distributed wireless network of soil-moisture and temperature sensors placed in the root zone of the plants. In addition, a gateway unit handles sensor information, triggers actuators, and transmits data to a web application. An algorithm was developed with threshold values of temperature and soil moisture that was programmed into a microcontroller-based gateway to control water quantity. The system was powered by photovoltaic panels and had a duplex communication link based on a cellular-Internet interface that allowed for data inspection and irrigation scheduling to be programmed through a web page. The automated system was tested in a sage crop field for 136 days and water savings of up to 90% compared with traditional irrigation practices of the agricultural zone were achieved. Three replicas of the automated system have been used successfully in other places for 18 months. Because of its energy autonomy and low cost, the system has the potential to be useful in water limited geographically isolated areas

[5] ***REVIEW PAPER BASED ON AUTOMATIC IRRIGATION SYSTEM BASED ON RF MODULE***

In India, agriculture plays an important role for development in food production. In our country, agriculture are depends on the monsoons which is not sufficient source of water. So the irrigation is used in agriculture field. In Irrigation system, depending upon the soil type, water is provided to plant. In this paper, automatic irrigation system based on ARMs and RF module. All the system will be setup using ARM and RF module. The most important factor of this system is RF module which is used to send and receiving the message to the controller. This system used three nodes which communicate each other and irrigate paddy field automatically. The aim of our project is to modernizing agriculture technology by programming components and built the necessary component for the system. The system

is real time based and extracts the exact condition of paddy field. There is one central node used which to control other node. The main function of RF module is to pass the message to the node and operate the system.

3. PROPOSED SYSTEM DESIGN

3.1 OBJECTIVES

- This application is very simple to handle. Users dont need any proper guidance to use this application.
- There is wireless connectivity between hardware and software application. User can operate the hardware using android application wirelessly from any place.
- This application reduces the time and physical work of farmer

3.2 PROBLEM STATEMENT

To implement an embedded system with help of application that can provide automatic water supply to yield

3.3 PROJECT OVERVIEW

We proposed system on the basis of wireless connectivity and sensors using android application. The main aim of this project is to provide automatic water to the plants which helps in saving money and water. The entire system is controlled using micro controller which is programmed as giving the interrupt signal to the water pump. Moisture sensor and some more sensor which detect the water level in well are connected to internal ports of micro controller via comparator, Whenever there is a change of the surroundings these sensors senses the change in moisture and water level and gives an interrupt signal to the microcontroller and thus the sprinkler is activated. A proper usage of irrigation system is very important because the main reason is the shortage of land reserved water due to lack of rain, unplanned use of water as a result large amounts of water goes waste. For this reason, we use this automatic plant watering system, and this system is very useful in all climatic conditions. The proposed system will simple to use so that user can easy interact with application.

3.4 DEVELOPMENT METHODOLOGY

Android is a mobile operating system developed by Google, based on the Linux kernel and designed primarily for touch screen mobile devices such as smart phones and tablets. Android's user interface is mainly based on direct manipulation, using touch gestures that loosely correspond to realworld actions, such as swiping, tapping and pinching, to manipulate on-screen objects,along with a virtual keyboard for text input. In addition to touch screen devices, Google has further developed Android TV for televisions, Android Auto for cars, and android wear for wrist watches, each with a specialized user interface. Variants of Android are also used on notebooks, game consoles, digital cameras, and other electronics.

We are providing more efficient system by using android operating system and wireless connectivity. We are using android application for user friendly environment which will create connectivity between hardware and application so the irrigation system can operate wirelessly.

The Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

Float Sensor is an electrical ON/OFF Switch, which operates automatically when liquid level goes up or down with respect to specified level. The Signal thus available from the Float Sensor can be utilized for control of a Motor Pump or an allied electrical element like Solenoid, Lamps, and Relays etc.

3.4 SYSTEM ARCHITECTURE

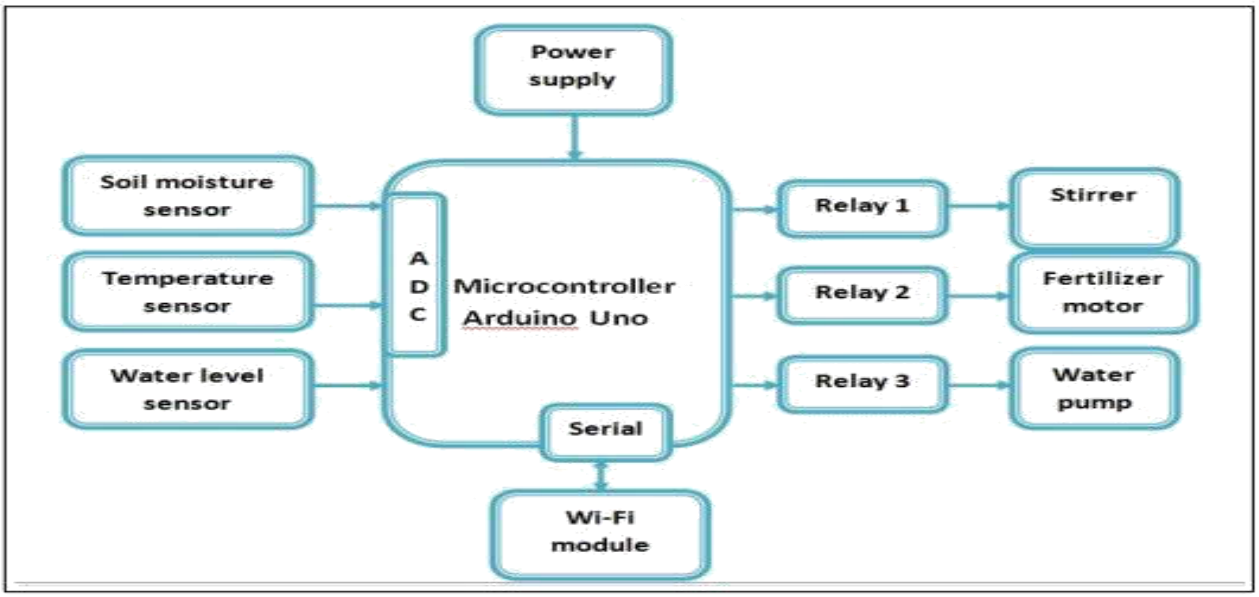

Fig -1 : Proposed System Architecture

3.5 SYSTEM WORKING

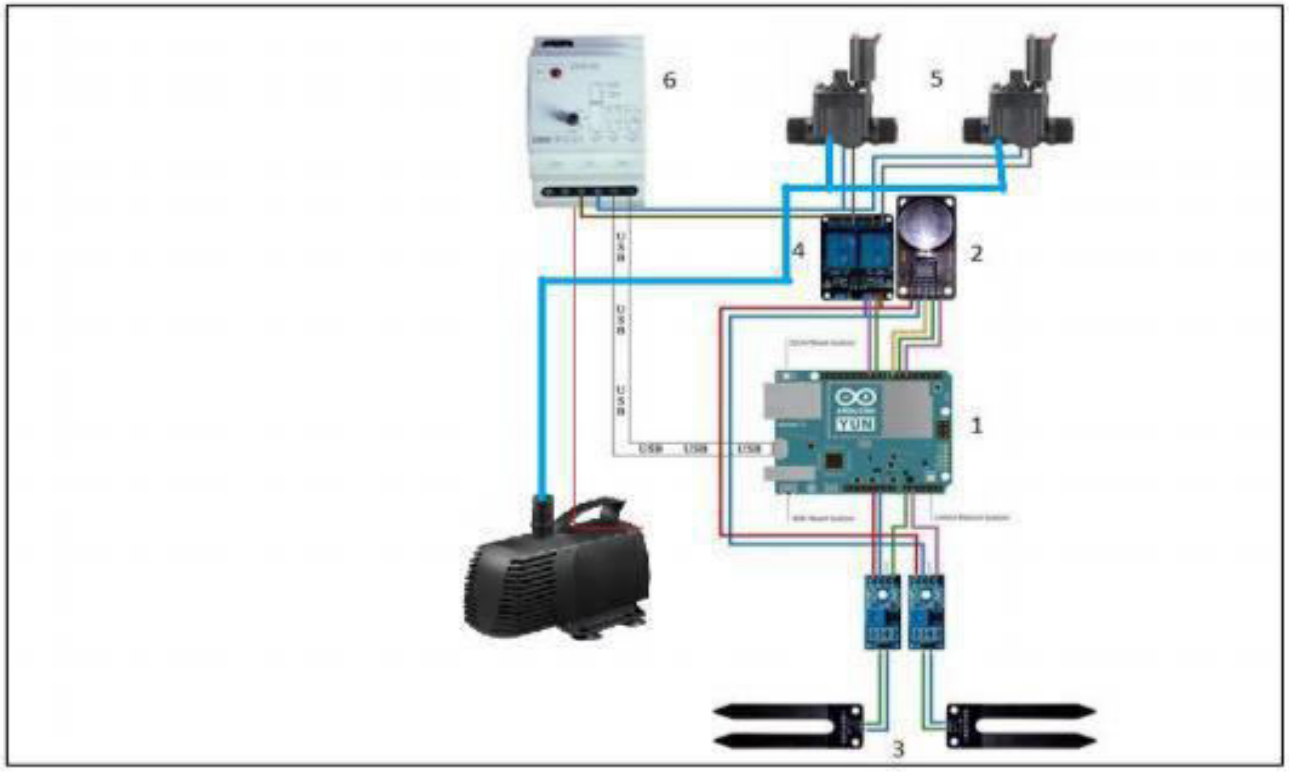

Fig -2 : Proposed System Working

4. RESULTS AND DISCUSSION

The proposed guided analytics system keeps the output as the basis of data submitted by farmers, the values of field sensors and weather prediction data. External Intelligent System takes farmers data such as sowing time, crop type, location details, crop details, expected harvesting time, etc., Irrigation partners data which includes crop type, soil parameters and irrigation period(time) and duration. The output of External Intelligent system is monitored continuously, based on the output of EIS, field sensors and weather prediction data is taken and necessary alerts regarding irrigation sent to the appropriate farmers to save the natural resource.

7. SUMMERY AND CONCLUSION

With this project, we achieved successful results by testing out the questions asked at the beginning of the paper. The purpose of the smart irrigation system for large or small scale and make it smarter and more effective.

Different sensors (Soil Moisture, Light, Temperature, level, rain, flow) with different another device |(water pump, Battery, LCD, Solenoid valve) have been used to make this project. Using Arduino proved profitable, it is able to serve numbers of different sensors, at the same time and the markets offer various type and sizes of sensors. Arduino boards are another device. Furthermore, two woody tables and three sheets of foam have been used in the project.

Several of design criteria had used in this system. The sensors used was perfect in detecting and sending signals to Arduino, to control the water pump and to open the solenoid valve, it has been tasted indoor as it is on the farm.

The purpose of screen monitor is to show the flow for each line, which shows if there is any passing of water in pipes. Also, if it is raining the system will not work in order to save the water.

The mobile application is to control the system remotely. Which allow a user to monitor the whole system and if there is any problem or passing of water user can switch off the system through this application.

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