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Agriculture Field Monitor and Auto Control Over Wireless Network IOT

G Ahmed Zeeshan, R Sundaraguru, Perumandla Ramya

Abstract *— Agribusiness assumes to be a significant job in creating nations. In India, most of the population depends upon the country development. Accordingly, the Project goes for impacting horticulture business to splendid using computerization and IOT deployment. Rather than checking the scenario through Web View application in any mobile phone. In this scenario paper, we are using three sensors. The Moisture sensor, estimates the Moisture level of particular plants. The Moisture level is under check continuously and passes data to the Arduino board. It controls the Water Pump ON and OFF according to the Moisture Level of water to the plant. Another primary part of this venture is Light power sensor. It detects the Light Intensity of it, and it sends the data to the microcontroller. Temperature and Moisture sensor procure the information which will be displayed on the LCD and information moves to web server using WIFI module. IoT gets the data and settle on real basic leadership processed by getting various qualities from sensors like soil Moisture, Temperature and light power, water quality and so on. This paper revolves basically around using less water, & limiting the manual work for agriculture, with the goal that we can save time and money.*

Index Term: Arduino, Agriculture, IoT, Relay, Soil Moisture

I. INTRODUCTION

The World is growing smartly with advanced implementations in different sectors as well as agriculture. Smart irrigation and agribusiness is the present trending business in the world to reduce the water usage in the fields and reduce manpower, easy works and quick access mode. To make smart irrigation and agribusiness, we attached advanced sensors along those wireless modules to implement same parameter as said above. Remote sensors or web of things is successfully utilized in the horticulture field for observing and controlling the diverse soil parameters of the land towards expanding the efficiency and sparing the electric power, water use and labor. Various sorts of sensors are utilized to distinguish different sign of soil level, yields and condition correspondence strategies are utilized in conveying the information gathered and transmitting the control signals. Smart or intelligent Agriculture system deals with some wireless sensors with auto water control, plough, seed releasing, control water level.

II. LITERATURE OVERVIEW

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The new situation of diminishing water, evaporating of waterways and tanks, flighty condition, present a pressing need of legitimate liquid usage. Sensing modules are used to observe to determination of different parameters of Harvesting [1]. Following investigate in the farming ground. Be that as it may, utilization of innovation in the field of agribusiness assumes a significant job in expanding the creation just as in lessening the labor. A portion of the examination endeavors are accomplished for the improvement of ranchers that give frameworks which utilize advancements accommodating for expanding the farming yield [2]. In previous researches done in irrigation system that is all implemented in the machinery in advance due to which only collecting data but no smart operation. The evolution of the irrigation system increased step by step, it reached the advance wireless Server and remote operated system [3]. In proposed system a minimal effort and effective wireless sensor arrange strategy to secure the soil Moisture, temperature from different areas of field and according to the need of harvest water engine is empowered [4], it proposes a thought regarding how robotic irrigation framework was created to enhance water use for farming purposes.

III. EXISTING SYSTEM

In India, horticulture is the need of the greater part of the Indian business, and it is one of the primary wellsprings of vocation. Farming likewise majorly affects financial system of the nation. Liquid utilization builds step on step that leads to prompts the issue water level shortage. On account of conventional irrigation framework agriculture system is a doing of operation in manual mode and water usage for that is immeasurable and there is no updating of weather conditions in the surrounded field. We don't know the condition of the soil, temperature, light intensity in that filed. Because of the traditional agriculture system water wastage is huge, time-consuming for completion of work is high and lot of cost is increasing day by day. To avoid all the limitations of this system we implemented a new system which improves all to make smart and simple and cost effective.

IV. PROPOSED SYSTEM

Enthusiastic irrigation frameworks offer an assortment of favorable circumstances over customary irrigation Frameworks. Brilliant irrigation frameworks can upgrade water levels dependent on things, for example, soil Moisture and climate expectations. Also, the savvy irrigation controlled gets nearby climate information that can enable it to decide when a landscape ought to be watered.

The chance to spare significantly has enhanced control & eco-accommodating even as at the same time keeping up a lavish and delightful landscape is only a couple of the focal points a brilliant irrigation framework gives. It makes a great expansion to any house. The proposed framework is portrays an IoT correspondence innovation & server management for exceptional framework and information interchange. This gives distant observing & robotic switching of agriculture. This advanced system measure the temperature level, light intensity level, soil moisture levels all data transferred to IoT and control automatically corresponding sensor.

V. METHODOLOGY

The proposed agricultural system is designed to solve to find an optimal solution to the water crisis. The design implements IoT technology using an android device, a main controlling unit (MCU), sensors to measure various parameters, and a water pump, which will be used to supply water to the farm. Soil moisture sensor senses the moisture data whether water content is there or not data gives to micro controller. Light sensor senses the light quantity, humidity sensor which acquires data, temperature which will give temp data all interfaced to micro controller. The status of the all sensors monitors in LCD and transfer the data over IoT server. Depend upon the soil moisture, status pump will automatically ON/OFF.

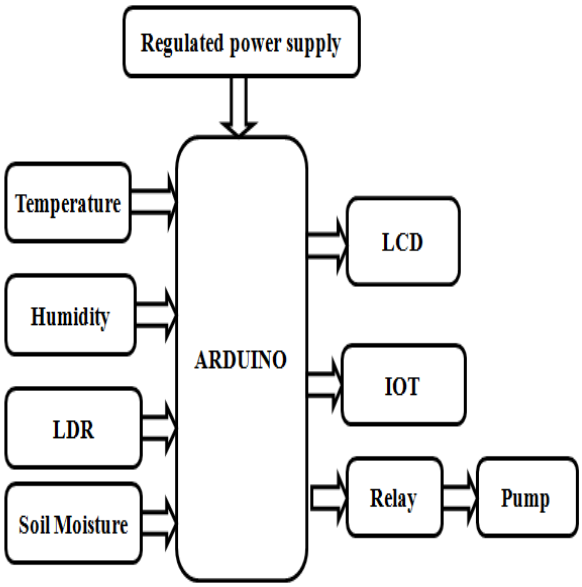

Fig. 1. Block diagram

VI. FUNCTIONAL DESCRIPTION

A. Regulated Power Supply

This is a small +5V controlled power supply circuit. All things are considered here, we utilized 7805 Voltage Regulator IC. 7805 is a +5 Volt controller IC from 78xx chips family. The circuit has inner current restricting and warm assurance limit.

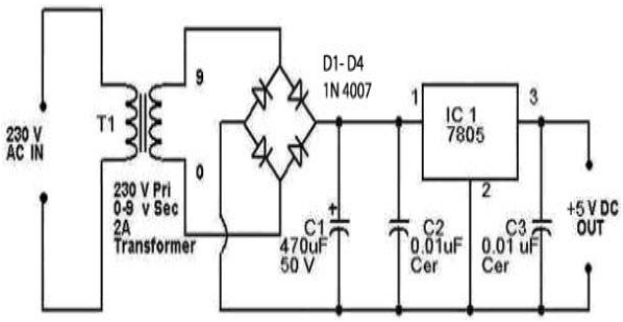

Fig. 2. Power supply

A 9V 2A step-down transformer is utilized to undercover 230V to 9V from mains. Here utilized a scaffold rectifier made by four 1N 4007 diode to convert AC-DC. 470uF 50v as C1 is utilized for separating. This circuit is exceptionally simple to manufacture. For good execution prescribed information voltage 8V-18V. In the event that over 400mA current is required at yield, at that point we utilized a warmth sink with the 7805 IC.

B. ARDUINO Microcontroller

To design to the proposed system we are using ARDUINO microcontroller to interface input and output modules and as a processing unit. Arduino uno is having 28 pins which are classified as analog and digital pins D0 to D13 are digital pins. All digital sensors will connect to digital port. A0 to A5 are analog port all analog sensors are connected to analog port. It is 8 bit micro controller and having 32KB memory for data and program memory. Operating frequency is 16MHz. ARDUINO development board we are using ATMEGA328 SMD IC.

Fig. 3. Arduino

C. LCD 16 × 2 Display

The proposed liquid crystal LCD display is viewed as the spotlight of this work normally shows a few information synchronously more than 16 sections and 2 columns. The fundamental capacity of the proposed LCD display is to demonstrate the data announced by the utilized Sensors as a few credits so as to explain the circumstance of the framework intermittently.

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The association plan is proposed to be interfacing with Arduino board as indicated by the graph demonstrated in Fig.4, which is set up by Frizzing program.

Fig. 4. 16*2 LCD module

D. DHT 11 Sensor

DHT11 acts as both temperature and humidity sensor. Its predicts the temperature and humidity of agriculture data given to the micro controller and then MC post the data into server as well as LCD module for status of parameter. DHT 11 is connected to digital pins of micro controller. Its operating voltage is 5 v.

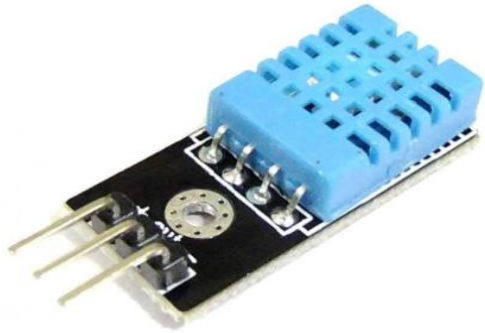

Fig. 5. DHT 11 Module

E. Soil Moisture sensor (YL-69)

Soil Moisture sensor plays vital role in smart irrigation system. It estimates the soil condition and inform to micro controller. Moisture sensor having two leads, these leads used to detect the water content. Depending upon the quantity of water, moisture sensor converts it into voltage. Moisture sensor inbuilt having comparator circuit which convert voltage into logic 0 and logic 1. Then that data is given to the micro controller, the controller take sufficient action after that.

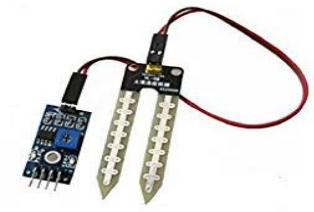

Fig. 6. Soil Moisture sensor

F. Relay

A relay is Electromagnetic device used as switch and interfacing module between load and micro controller. In our system we used 5V relay to switch load pump motor on and off. We will take 230v for pump from externally. Operating mode of relay is normally closed. i.e., when input high relay become short circuit and input low relay become open circuit.

Fig. 7. Relay Module

G. LDR Sensor

Light Dependent Resister observes light intensity. LDR module is light quality converted to electrical quantity. That generated voltage give to the micro controller analog pins. Controller triggers the output devices. Roles of the LDR module in the project which detecta light quantity as low or high depends on that, we conclude that weather condition is day or night

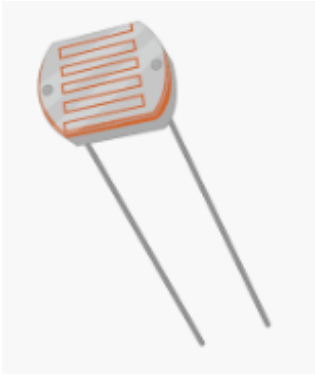

Fig. 8. LDR module

H. Water Pump

A pump is an Electrical gadget which converts electrical energy into mechanical energy used to pump the water from well. Inside the pump we use electrical induction motor which operating voltage is 230V.

The role of electrical cooler pump in this proposed model is that when it triggered by microcontroller automatically pump will be turn on means that water will be dispensed into the agriculture field.

Fig. 9. Water pump

I. WI-FI Module

To transfer the data from different places Wireless communication is mandatory. One of the advanced wireless communications is done by using IOT Internet of things. The concept of IOT is done with the Help of Wireless Hardware Module Called ESP8266. It is operated by wireless frequency of 5GHz. It's having transmitter and receiver to send and receive the data through wirelessly. Operating voltage of modem is 3.3V and consuming current is 100 mA. It's having 8 pins in that 2 GPIO pins. It has 512KB flash memory for data storage. The main role of IOT module in the project is that micro controller sends data to ESP8266 module. It sends the humidity, temperature, and light parameter data to local server which is created by ESP8266. User can access the data when he opens same server at receiving end.

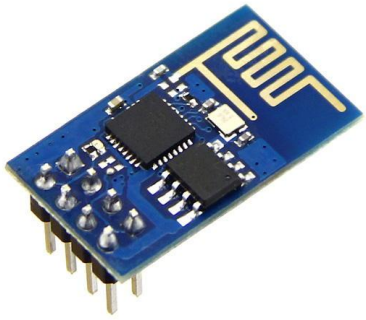

Fig. 10. ESP Module

J. Software

Embedded system deals both Software and Hardware. Software is very important module to develop programming code. To implement proposed methodology we used ARDUINO IDE Software for Embedded c language editing, compiling and dumping. Simulation is very important tool to design project virtually, before hardware implementation. We used proteus Software to simulation of complete project. Express SCH software used to design schematic diagram of project.

VII. RESULT AND DISCUSSION

We successfully interfaced all input and output modules to microcontroller. Controller performed and executed results as per the requirement. We obtained Soil parameter in LCD and IOT module. Observed auto controlling of irrigation pump depends on moisture sensor.

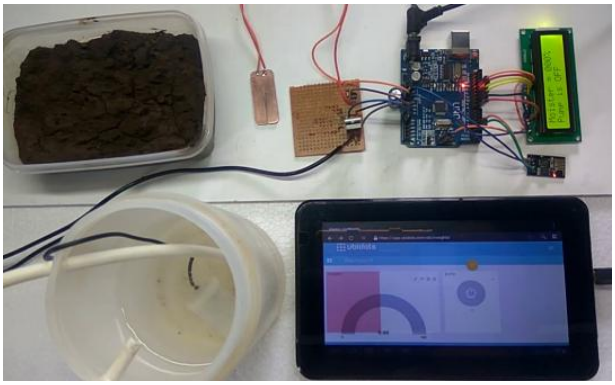

Fig. 11. Output Result.

VIII. CONCLUSION AND FUTURE WORK

In the proposed Agriculture Field Monitor and Auto Control over Wireless Network IoT "was designed with all the input sensors Soil Moisture, Light Sensor, DHT11 and all output modules like relay, LCD, WATER PUMP, IOT. All modules are interfaced to microcontroller ARDUINO and performed implemented well using ARDUINO IDE Software. Intelligent smart irrigation system is implemented successfully with low cost, fast access, automated. In future study of this project, we add another wireless module like GSM modem will get automatic pump ON/OFF alerts directly to authorize persons. We use very high concentration sensors for very fast and low power consumptions.

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