

Performance of Automatic Smart Irrigation System Using GSM

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Abstract: Agribusiness recognizes an indispensable activity in making countries. In India, a colossal piece of masses relies upon nation's unforeseen turn of events. In like way the paper goes for affecting improvement business to mind blowing utilizing computerization and Global new turn of events. The proposed article illustrates the design and implementation of smart irrigation system with auto control and monitoring. In this proposed system we integrate the temperature, humidity, soil moisture sensors to monitor the agriculture parameters and monitor on LCD and send alerts. Depends on soil moisture sensor status irrigation pump ON/OFF automatically and send the alerts to authorized person and control the irrigation pump remotely for designing of smarter irrigation system.

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

I. INTRODUCTION

These days' ranchers are battling hard in the agrarian fields nonstop. They do their field work toward the beginning of the day area and inundate their territory amid evening time with discontinuous interims. The assignment of inundating fields is ending up very troublesome for the agriculturists because of absence of consistency in their work and carelessness on their part in light of the fact that occasionally they switch on the engine and afterward neglect to turn off, which may prompt wastage of water. So also, they even neglect to switch on the water system framework, which again prompts harm to the harvests. The WIU has likewise a GSM module to transmit the information to client by means of SMS individually. This portal allows the computerized actuation of water system when the limit estimations of soil dampness and temperature are come to. Water system is a counterfeit utilization of water to the dirt. A water system framework is a framework that conveys water to a region where water is required yet

not ordinarily displays in the required sums. For the most part, it is utilized for agribusiness purposes. Water system likewise has different uses in harvest generation, which incorporate ensuring plants against ice and aiding in anticipating soil thought. Interestingly, horticulture that depends just on direct precipitation is alluded to as downpour sustained or dry and cultivating.

II. LITERATURE OVERVIEW

Various researchers have proposed different models/theories from time to time for making irrigation system easier and more effective. Author in [1] proposed a smart irrigation approach system by using a moisture sensor. The moisture sensor checked the moisture/humidity level in the soil (results were displayed on LCD screen) and the farmers irrigated the field as per requirement. But this model had its own limitations, the farmers had to spend entire time on the field to check the moisture content and irrigate accordingly. This model though being smart didn't save the workload of farmers. Author in [2] discusses a microcontroller based remote irrigation system to help irrigation in some remote areas of the country. It had a microcontroller, moisture sensor, LCD display etc. The motor was turned ON/OFF on the basis of its set point value. High set point value resulted in ON condition and low set point value resulted in OFF condition. The model though provided a smart solution to irrigate land but still failed miserably because of its cost effectiveness. Author in [3] presents Irrigation system based on Artificial Neural Network Controller (ANNC) for increasing the overall productivity of the crops. The system was somewhat similar to a basic ON/OFF controller and because of its limitations it failed miserably. On the other hand approach based on ANN was much better and effective at the same time. Unlike conventional methods these controllers adapted to the changing conditions and do not require prior knowledge of the system. Author in [4] describes a very smart and efficient way of farming with the help of Internet of Things. The author introduced Wireless Sensor Network, Smart Actuation, ANN and Decision Support System in farming to increase the crop productivity and make irrigation system more efficient. The paper was partially made and the future implementations are yet to be done. In the paper, a wireless decision support system for smart irrigation was presented and the innovative integration of the low cost WSN architecture and the DSS led to its effectiveness in agriculture. Author in [5] suggests a Drip Irrigation system using microcontroller that proves to be kind of control system which controls and moderate all the activities of irrigation system. The current proposed model has its objective to reinvent the agriculture industry at a mass scale with minimum expenditure. Irrigation to large areas is easy through this and using the proposed system, one can save the workload to improve production and gain profit. Author in [6] discusses an irrigation system based on soil moisture content and was made efficiently with a flow sensor. Few features of the system were: monitoring of temperature and water usage, automatic irrigation system using closed loop etc. User was regularly notified about the value of all parameters on LCD display and can easily preset the moisture level. Future scope of this is to implement other sensors like soil electrical conductivity and pH making the process more advanced. Author [7] in presents a model to maximize the yield of crops by controlling the environmental parameters, smart sensor monitoring system was used and it provided the necessary information to the user. The advantage of wireless over wired sensor network was that it helped in deploying in any circumstances making it smart.

III. EXISTING SYSTEM

In existing model maximum no of the Indians business and it is one of the fundamental wellsprings of work. Creating in like manner essentially impacts financial system of the country. In existing system irrigation implemented manual mode of operation. Irrigation pumps ON/OFF will done by manual mode. There is no automation of pump control and sensor monitoring of irrigation. It's not easy and does not too smart system. To overcome the limitations of the system we integrating new approach for smart irrigation.

IV. PROPOSED SYSTEM

The main goal of the proposed work is to improve the available technologies in agriculture and to make it easier for the farmers. This system will be useful for the farmers and other people who are dealing with agriculture. Various sensors are in place to detect the factors like temperature, humidity content of the soil. The sensor for temperature senses the environmental temperature level. The opportunity to save basically has improved control and eco-fulfilling even as simultaneously keeping up an extravagant and radiant scene are just two or three the central habitats an astounding irrigation structure gives. It makes a remarkable improvement to any house. The proposed structure outlines a GSM correspondence movement and message the board for incredible system and information trade. This gives removed review and robotized exchanging of agribusiness. This pushed system checks the temperature level, soil clamminess level and all information moved to GSM and controlling automatically the differentiating sensor...

V. METHODOLOGY

The GSM Based programmed water system framework is an undertaking in which we get refresh status of the activity did in the farming. Proposed working model is depends on the actuators. Soil moisture sensor used to measure the moisture content and displays the status in LCD and GSM module. Temperature sensor LM35 used to measure the temperature, humidity is used to humidity level all the sensor status everything is updated into LCD module and GSM. Depends on the soil status pump automatically ON/OFF and SMS alerts will be send authorized person.

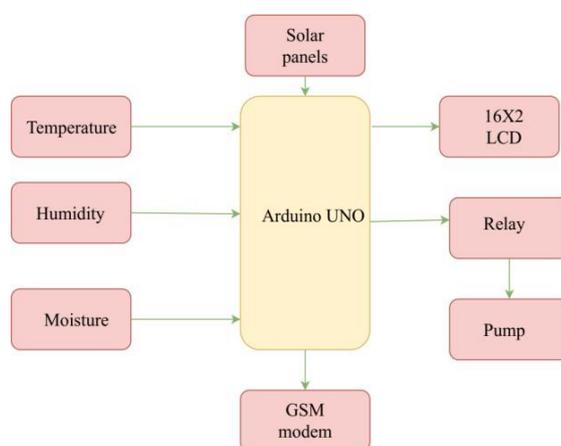


Fig. 1. Block Diagram

VI. FUNCTIONAL MODULES

A. Solar Panel

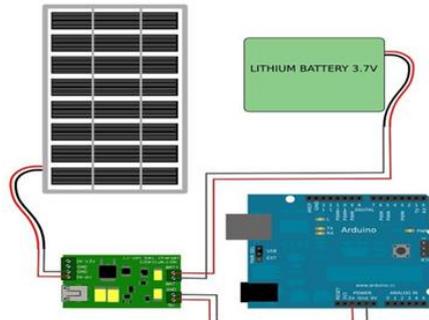


Fig. 2. Solar Panel

Solar panel are used to generated the power supply which are having PV cells called photo voltaic cells. Light converted into voltage. We are using 12V solar panel which store the energy in 12V battery. From that battery we use the power for

project execution.

B. Charging Circuit

RPS module helps to provide the required voltage for this proposed model. Normally this system is converts 230V ac voltage to the required 5V dc voltage for system operation.

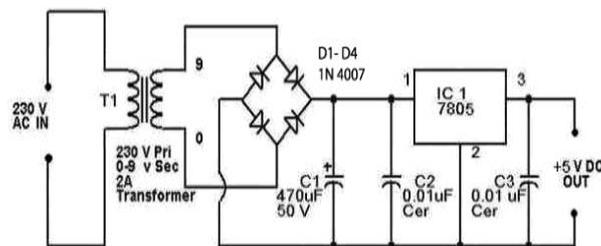


Fig. 3. power supply.

Regulated power supply consisting of step down transformer, bridge rectifier, capacitor filter and voltage regulator which provides constant 5 voltage to Arduino micro controller.

C. ARDUINO Microcontroller

Microcontroller will place the important role of operation. This Arduino collect the data from all sensors and control and monitor the module using Arduino program. ATMEGA328 is the IC name used for ARDUNO. Having 32KB ROM and 2KB RAM



Fig. 4. Arduino

D. LCD 16 × 2 Display

LCD modules which display the status of the proposed system. We used 16*2 LCD module which have 16 character in row and 2 rows overall 32 characters will be place in this module. All the irrigation parameters like temperature, humidity, pump status all will be status in this module.



Fig. 5. 16*2 LCD Module

E. DHT 11 Sensor

Temperature sensor used for measuring of the temperature. This sensor used for Coal mine temperature monitor. Normally used for heat measurement of the weather and auto represents into GSM and LCD. Humidity sensor helps to monitor the humidity content and data will be displays in LCD and GSM module. This humidity also is one the important parameter to detect the alerts weather reporting depends on the weather we will take some decision.

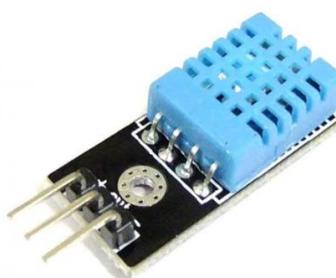


Fig. 6. Humidity and Temperature Module

F. Moisture Ssensor

Soil Moisture actuator helps to monitor the moisture content in the earth. This is indication for the water level or moisture content measurement. Depends on the moisture content its state gives to arduino micro controller microcontroller automatically on and off the irrigation pump for water. Alert the of the pump ON or OFF send to GSM modem for alerts.

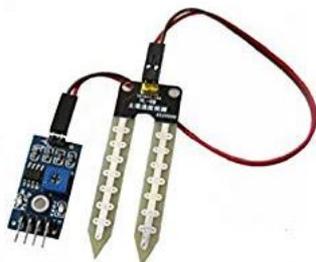


Fig. 7. Soil Moisture sensor

G. Relay

Relay acts as switch, which interfaces the load and micro controller. It's a electromagnet relay to control the 230 v load of irrigation pump. Relay operating voltage is 5v which operate easily using micro controller ARDUINO and easily control 230v load depends on the micro controller input. If relay on them pump will be on if relay off pump will be off. So indirectly micro controller controls pump with the help of realy so called its switch.



Fig. 8. Relay Module

H. GSM MODULE

The global system for mobile services is a wireless network which works basically with the help of radio waves. In this setup of intelligent medicine box the external device of GSM module is connected through a serial cable or USB cable. A SIM card is inserted in the module in order to get connected with the other networks. As our system requires instant messaging, the GSM module which handles many transactions in short time through SMS helps out. There is no need of internet connectivity to send or receive large number of messages on our server, instead SMS is sent with the help of signals provided by the network operator.



Fig. 9. GSM modem.

I. Water Pump

Electrical pump which is operated through 230v AC supply. This pump having two sections inlet and out let through inlet is suck the water and using outlet it push the water out using Inside once induction motor.



Fig. 10. Water pump

J. Software

Software is the important parameter to make the device automation. The editor, compilation is done by using ARDUINO IDE software. Embedded c program used to design this proposed system.

VII. RESULT AND DISCUSSION

We designed and implemented Agriculture irrigation system. Integrated all sensors and output modules dht11, moisture sensor, GSM. We got results successfully.

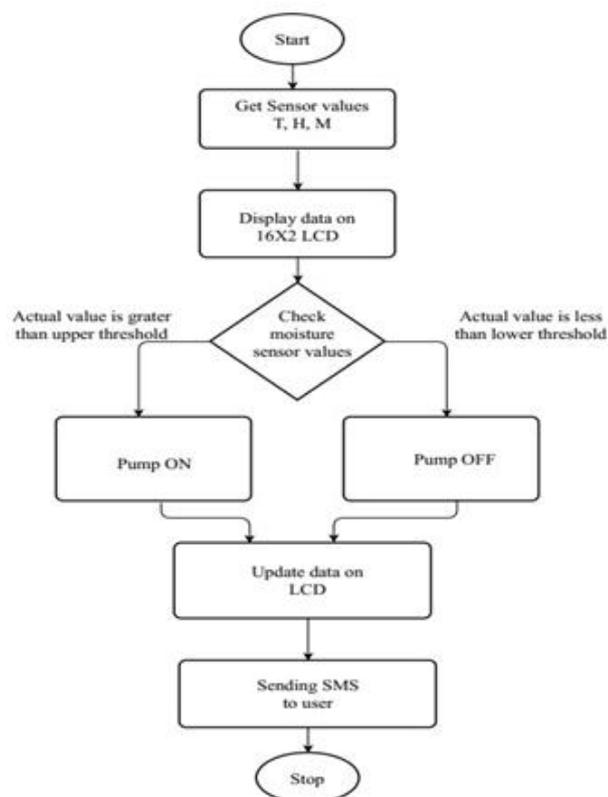


Fig. 11. Output Hardware setup

VIII. CONCLUSION

We designed and get automatic implemented smart automatic GSM irrigation system using output module HSM,LCD,pump and all the input actuators DHT11, soil sensor. We programmed and executed using ARDUINO ide software. Automatically irrigation pump will be control ON/OFF with the help of the moisture sensor. The smart irrigation system is designed with low power sensor circuit resemles smart irrigation system. The wireless communication transfer is made the irrigation system use friendly, easy to access and control the irrigation pump.

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