

Smart Irrigation System for Agricultural Field Using Labview and IOT

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ABSTRACT: Objective of this project is to design a methodology to monitor and indicate the level of soil moisture that is continuously controlled in order to achieve maximum plant growth and simultaneously optimize the available irrigation resources on a monitoring software Lab VIEW and the sensor data can be seen on Internet. Water being an essential element for plant life, there is the necessity to avoid its undue usage. Irrigation is a dominant consumer of water. Fields should neither be over-irrigated nor under-irrigated. Hence there is a need to regulate water supply for irrigation purposes. The Arduino Uno can be programmed to analyse some signals from sensors such as moisture and rain. Using the data from the sensor, irrigation of the water to the plants can be controlled and monitored by using labview and the soil moisture levels are continuously displayed in the webpage using IoT module. This projects work can be enhanced to help the small-scale cultivators to increase the yield.

KEYWORDS: Labview, IoT, Arduino, Moisture sensor, Rain sensor.

I. INTRODUCTION

Sustainability of obtainable water resource in several regions of the world is currently a dominant issue. This drawback is quietly associated with poor water allocation, inefficient use, and lack of adequate and integrated water management. Automating farm or nursery irrigation permits farmers to use the correct quantity of water at the correct time, regardless of the provision of labour to show valves on and off. Additionally, farmer's mistreatment automation instrumentation is able to scale back runoff from over watering saturated soils, avoid irrigating at the incorrect time of day, which will improve crop performance by making certain adequate water and nutrients once required. Those valves are also simply automated by mistreatment controllers. Automating farm or nursery irrigation permits farmers to use the correct quantity of water at the correct time, no matter the provision of labour to show valves on and off.

II. RELATED WORK

Smart field system using labview and IoT by Nisha kushwaha and N.S.Beniwal. This paper involves establishing a contemporary design technique of monitoring and controlling the moisture level of soil using LabVIEW. Providing comprehensive tools that need to build any measurement or control application in dramatically less time, LabVIEW is the ideal development environment for innovation, discovery, and accelerated results. Combine the power of LabVIEW software with modular, reconfigurable hardware to overcome the ever-increasing complexity involved in delivering measurement and control systems on time and under budget. Measuring soil moisture is critical in agriculture to help farmers manipulate their irrigation systems more successfully. Embedded system for computerized irrigation of an agriculture subject gives an able solution to assist web page- precise irrigation control that permits producers to maximize their productivity whilst saving the water.

III. PROPOSED TECHNIQUE

This method involves establishing a design technique to monitor and control the moisture level of soil using LabVIEW and display the sensor values on the webpage using IoT technology. This project also includes rain sensor, which is very important in the process to avoid unnecessary power wastage

Software used

In this project we are using Laboratory Virtual Instrument Engineering Workbench (LabVIEW) is a system design platform and development environment for visual programming language from National instruments. LabVIEW integrates the creation of user interface into the development cycle. LabVIEW programs subroutines are termed virtual instruments. Each VI has three components such as Block diagram, Front panel and Connector panel.

Hardware Used

Arduino Uno: There square measure total of twenty pins (0-19) out of that half-dozen square measure analog inputs which might even be used as general purpose pins, a ceramic resonator of frequency 16MHz, AN USB association, an influence jack and a push. It contains everything required to support a microcontroller.

Rain Sensor: Rain Sensor module is an easy to use tool for detecting rain. It is also very precise for rainfall sensing. It can also be used as a switch when rain falls on the raining board and for measuring the intensity of rain falling on the sensor module

Moisture Sensor: Soil moisture level module is most sensitive to the close moisture level. It is mostly used to find the moisture level content of the soil.

Motor Pump: The output motor is connected with microcontroller, which is a motor pump for irrigation, and it consists of simple AC pump motor

Block Diagram

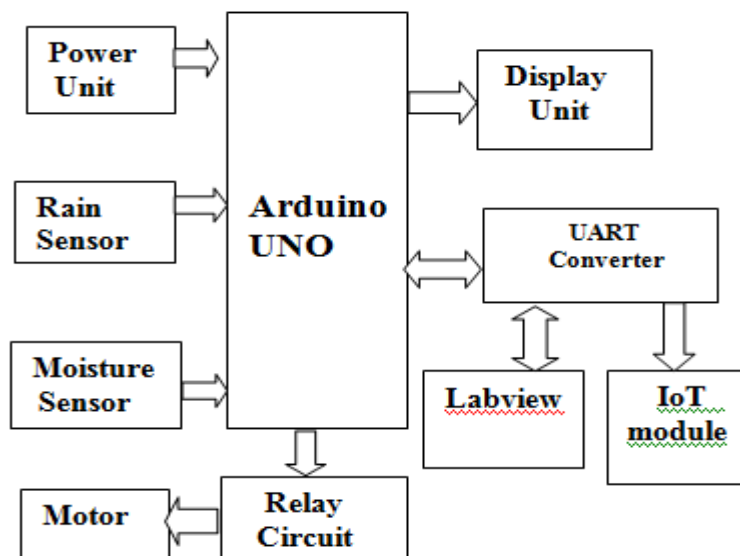


Fig 3 Block diagram of the proposed algorithm

Algorithm

The steps that the proposed system undergoes is given below.

- Step 1: Start the process.
- Step 2: Initial power is supplied to Microcontroller and other peripheral modules.
- Step 3: Check the moisture level and also for the rain sensor.
- Step 4: If the level will be more than a fixed threshold, no need to irrigation, the pump will be off.
- Step 5: If moisture level is less than a fixed threshold value and no rain, automatically it starts irrigation through motor pump.
- Step 6: Initialization of pump and displaying data on LabVIEW interface and Web server
- Step 7: After the process is completed, it moves to original state and returns to the step 3.
- Step 8: Stop the process

Implementation in Labview

The block diagram of the smart field system in the LabVIEW panel is shown. It describes the diagram being used for the implementation of the logic which will allow the system to work.

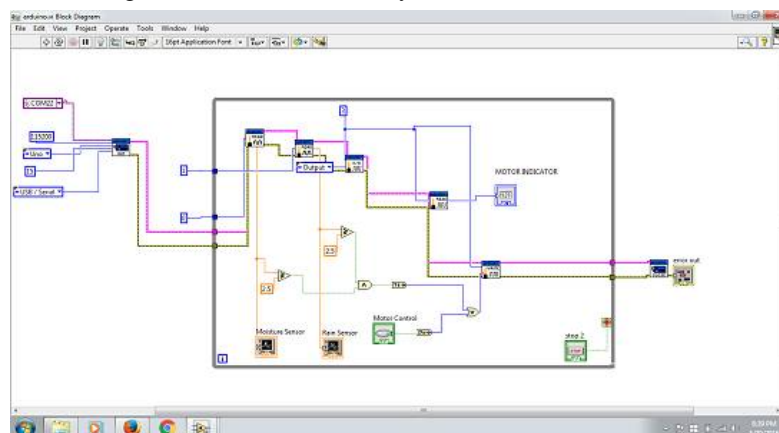
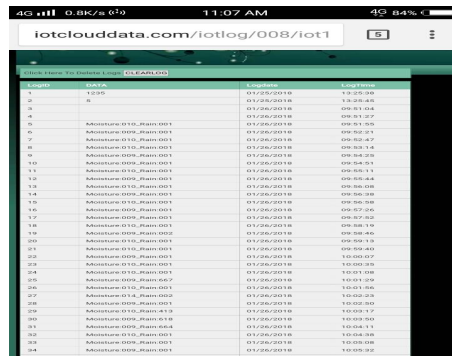


Fig 4 Block diagram implementation of LabVIEW

The front panel of LabVIEW Interface for smart field system is shown. It will give graphical analysis of the rain sensor and moisture sensor whenever the hardware module of system is connected to software.

IV. RESULTS AND DISCUSSION

With the level of moisture content the irrigation is monitored and controlled with LabVIEW software and the sensor data is continuously displayed on webpage with the help of IoT module. Webpage displaying the moisture sensor and rain sensor values in the internet is shown in figure given below.



ID	Name	Value	Time
1	Temp	30.2	01/28/2018
2	Hum	65.5	01/28/2018
3	Mo	15.2	01/28/2018
4	Moisture 01_01_Rain-001	15.2	01/28/2018
5	Moisture 02_01_Rain-001	15.2	01/28/2018
6	Moisture 03_01_Rain-001	15.2	01/28/2018
7	Moisture 04_01_Rain-001	15.2	01/28/2018
8	Moisture 05_01_Rain-001	15.2	01/28/2018
9	Moisture 06_01_Rain-001	15.2	01/28/2018
10	Moisture 07_01_Rain-001	15.2	01/28/2018
11	Moisture 08_01_Rain-001	15.2	01/28/2018
12	Moisture 09_01_Rain-001	15.2	01/28/2018
13	Moisture 10_01_Rain-001	15.2	01/28/2018
14	Moisture 11_01_Rain-001	15.2	01/28/2018
15	Moisture 12_01_Rain-001	15.2	01/28/2018
16	Moisture 13_01_Rain-001	15.2	01/28/2018
17	Moisture 14_01_Rain-001	15.2	01/28/2018
18	Moisture 15_01_Rain-001	15.2	01/28/2018
19	Moisture 16_01_Rain-001	15.2	01/28/2018
20	Moisture 17_01_Rain-001	15.2	01/28/2018
21	Moisture 18_01_Rain-001	15.2	01/28/2018
22	Moisture 19_01_Rain-001	15.2	01/28/2018
23	Moisture 20_01_Rain-001	15.2	01/28/2018
24	Moisture 21_01_Rain-001	15.2	01/28/2018
25	Moisture 22_01_Rain-001	15.2	01/28/2018
26	Moisture 23_01_Rain-001	15.2	01/28/2018
27	Moisture 24_01_Rain-001	15.2	01/28/2018
28	Moisture 25_01_Rain-001	15.2	01/28/2018
29	Moisture 26_01_Rain-001	15.2	01/28/2018
30	Moisture 27_01_Rain-001	15.2	01/28/2018
31	Moisture 28_01_Rain-001	15.2	01/28/2018
32	Moisture 29_01_Rain-001	15.2	01/28/2018
33	Moisture 30_01_Rain-001	15.2	01/28/2018
34	Moisture 31_01_Rain-001	15.2	01/28/2018
35	Moisture 32_01_Rain-001	15.2	01/28/2018

Fig 6 Web page displaying sensor values

V. CONCLUSION

Measuring soil moisture is critical in agriculture to help farmers manipulate their irrigation systems more precisely. In agriculture computerized irrigation gives an able solution to assist web page- precise irrigation control that permits producers to maximize their productivity with saving the water.

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