

DESIGNING AND IMPLEMENTING AN ARDUINO BASED LOW COST AUTOMATED WATER IRRIGATION SYSTEM FOR HOME GARDENS

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ABSTRACT

In this paper we present a prototype for automated water irrigation system for home gardens. Prototype includes Arduino Uno board (ATmega382p), Liquid Crystal Display(LCD) display, moisture sensors, solenoid valve, flow sensor and pipe lines. Moisture sensors array embed in garden (in soil) will sense the water level continuously. When water level goes low the solenoid valve attached to the pipe line system will automatically turn on and let flow the water to the garden via pipe line network. If water level is sufficient enough the solenoid valve automatically turn off. The LCD display will show the amount of water used in liters by sensing the water flow by the flow sensor also it shows the flow rate and temperature in the garden. This system is work well and can be expanding the network for a large scale garden for a low cost.

Key words: Arduino Uno, Flow sensor, Solenoid valve, Moisture sensor

1. INTRODUCTION

Agriculture is major source of food production to the growing demand of human population. In agriculture, irrigation is an essential process that influences crop production. Generally farmers visit their agriculture fields periodically and remain present during the irrigation to manually navigate water to the respective fields. This irrigation method takes lot of time and effort particularly when a farmer need to irrigate multiple agriculture fields distributed in different geographical areas. Nowadays, farmers need to manage their agriculture activity along with other occupations. Automation in irrigation system makes farmer's work much easier. Sensor based automated irrigation system provides promising solution to farmers where presence of farmer in field is not mandatory to perform irrigation process. Automated irrigation systems are developed to operate the water pump remotely [1], [2]. The advancement has even taken place to switch on or off the water pumping motor automatically depending upon the soil moisture level in the respective agricultural fields [3]. The need of electromechanically programmed system, for controlling mechanical devices like water pumping motor, water pipe valves, etc remotely based on the feedback of sensor node placed in irrigation field has arrived. Many existing systems use computers along with data base technologies for monitoring and controlling irrigation activity [4], [5] But in real time, farmers need cheap and simple feedback assisted

user interface for controlling automated irrigation system. Nowadays, mobile phone is the most common device used by famers. Therefore mobile phone is used in sensor based automated irrigation system [5]. This helps farmers to control irrigation process remotely. In this paper, we present a prototype for automatic controlling of irrigation water along with the water navigation. Prototype includes moisture sensors, solenoid valve, LCD display, flow sensor and Arduino Uno board. When water level goes low water will flush to the garden and LCD display the water amount used in liters, flow rate and the temperature.

2. METHODOLOGY

2.1. System Overview

Three moisture sensor, solenoid valve and , flow sensor and the LCD display have interface with the Arduino Uno board. Average value of the three moisture sensors feed to the microcontroller. We consider the average value of three moisture sensors If the average value is less for a certain value the solenoid valve automatically turn on , in this program we have set is to 3.3V. This value should obtain by doing trials because it depends on environment conditions such as temperature and moisture. Flow sensor gives the flow rate and the total amount of water used it will keep increasing until we reset the Arduino board.

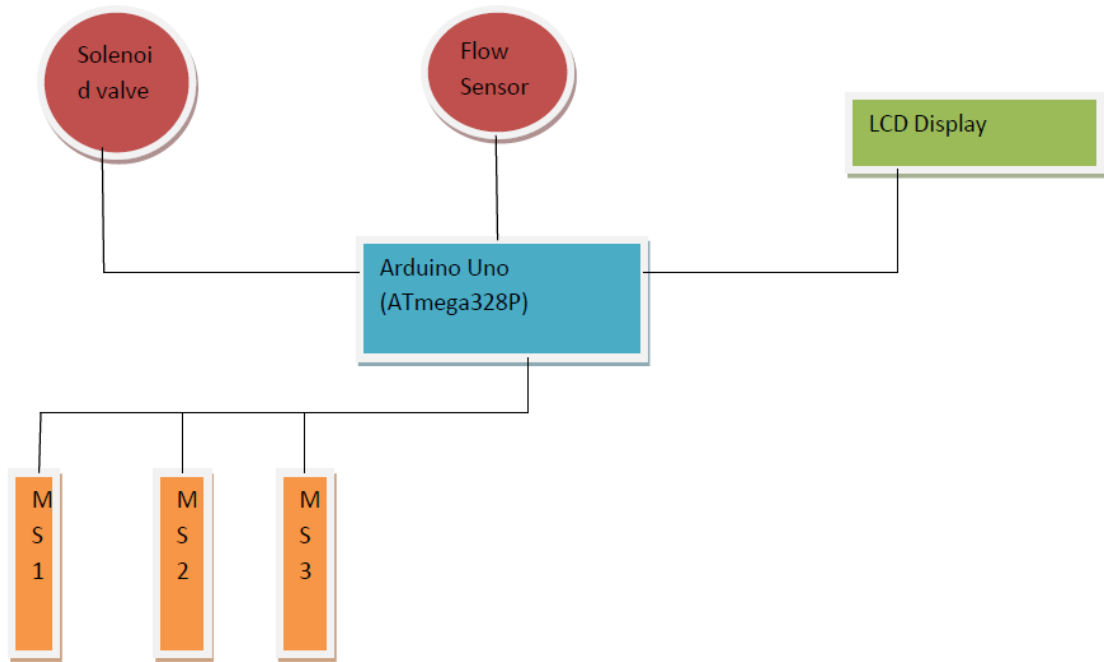


Figure 1: Block diagram of the system

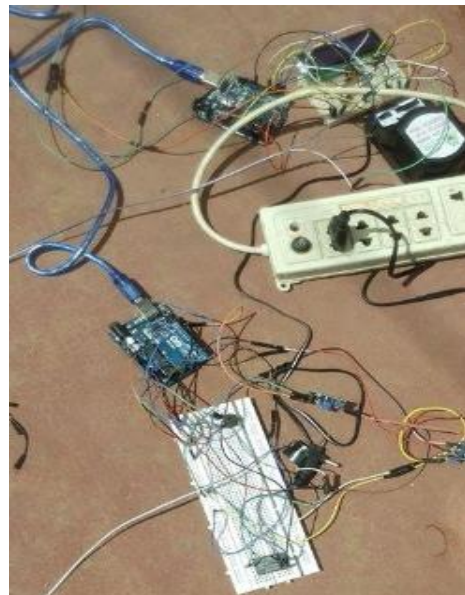


Figure 2: Diagrams of the prototype

3. RESULTS

The system was tested for 3 days starting from 7:00am to 7:00pm. Water amount was recorded as bellow

Table 1: Amount of water released by the system

Day	Volume (Liters)
1	11.4
2	13.9
3	14.5
4	10.4

4. CONCLUSION

The proposed model used Arduino Uno board and Arduino compatible sensors. This project developed for home gardens or small scale agriculture fields to increase the growth of food production. And also can be implement in a low cost.

5. REFERENCES

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