REVIEW ARTICLE

BUILDING AN INTELLIGENT WATERING SYSTEM

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ABSTRACT

Plants are the source of feeling comfortable for most people but because of the business of everyday life these works could lead to forget watering plants periodically plants making of Good Condition and beautiful landscape. In this project will work to build a intelligent irrigation system its cost is relatively simple There have a various type using automatic watering system that are by using intelligent watering system, tube, nozzles and other. This project uses Arduino board. It is programmed in such a way that it will sense the moisture level of the plants and supply the water if required. This type of system is often used for general plant care as part of caring for small and large gardens. Normally the plants need to watered twice daily morning and evening. So the microcontroller has to be system to water the plants in the two times per day.

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INTRODUCTION

A microcontroller is a self-contained system with peripherals, memory and a processor that can be used as an embedded system. Most programmable microcontrollers that are used today are embedded in other consumer products or machinery including phones, peripherals, automobiles and household appliances for computer systems. Due to that, another name for a microcontroller is "embedded controller." Some embedded systems are more sophisticated, while others have minimal requirements for memory and programming length and a low software complexity. Input and output devices include solenoids, LCD displays, relays, switches and sensors for data like humidity, temperature or light level, amongst others (Gunther Gridling, Bettina Weiss, 2007).

Objective

In this project will work to build a intelligent irrigation system its relatively simple by using Arduino board that is programmed to be sense the moisture level of the plants and supply the water if required.

What is smart watering?

Smart watering means more than just lower water bills. It means healthier gardens .Watering too much or not enough produces weak plants that are susceptible to pests and disease.

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Learn to give plants the right amount of water for healthy growth, and to apply it so every drop counts. Did you know that many landscapes require very little watering after plants are well established? This only takes 1 to 3 years with good soil preparation and proper plant selection so it pays to do the groundwork. That's not all. Smart watering promotes a healthier environment for all of us, (Dukes, 2012). As the demand for water increases, along with the need to protect aquatic habitats, water
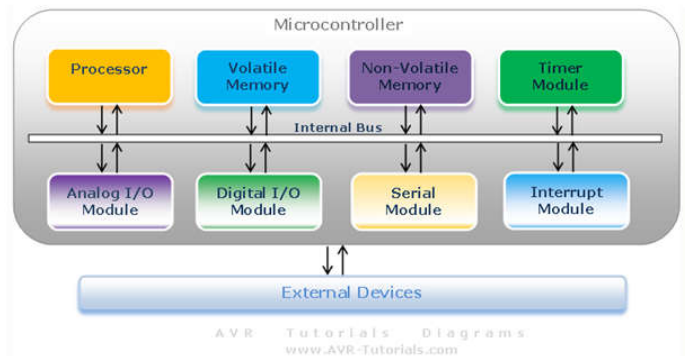

Fig.1. Component of micro control (Gunther Gridling, Bettina Weiss, 2007)

Embedded system

Embedded Systems are the electronic systems that contain a microprocessor or a microcontroller, but we do not think of them as computers the computer is hidden or embedded in the system An embedded system is a system that has software

embedded into computer-hardware, which makes a system dedicated for an application (s) or specific part of an application or product or part of a larger system, (Raj Kamal, 2008).

What is Arduino?

Arduino is an open source physical computing platform based on a simple input/output (I/O) board and a development environment that implements the Processing language (www.processing.org). Arduino can be used to develop standalone interactive objects or can be connected to software on your computer (such as Flash, Processing, VVVV, or Max/MSP). The boards can be assembled by hand or purchased preassembled; the open source IDE (Integrated Development Environment) can be downloaded for free from www.arduino.cc.

Arduino is different from other platforms on the market because of these features:

- It is a multiplatform environment; it can run on Windows, Macintosh, and Linux.
- It is based on the Processing programming IDE, an easy-to-use Development environment used by artists and designers.
- You program it via a USB cable, not a serial port. This feature is use ful, because many modern computers don't have serial ports.
- It is open source hardware and software—if you wish, you can download the circuit diagram, buy all the components, and make your own, without paying anything to the makers of Arduino.
- The hardware is cheap. So you can afford to make mistakes.
- There is an active community of users, so there are plenty of people who can help you.
- The Arduino Project was developed in an educational environment and is therefore great for newcomers to get things working quickly, (Mossaimo Banzi, 2011)

Design of smart watering system

Component of work

Arduino

Is a tool for making computers that can sense and control more of the physical world than your desktop computer.
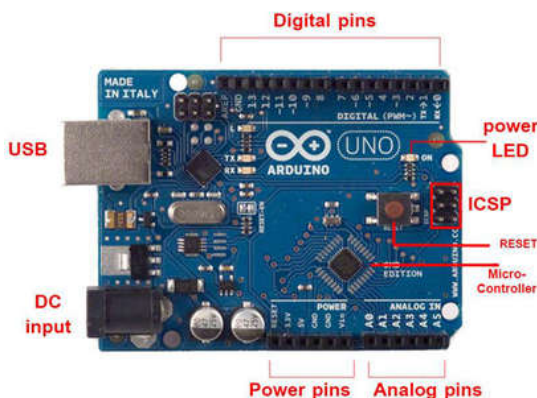

Fig.2. Arduino board

Servo

Servos are small mechanical devices whose sole purpose is to rotate a tiny shaft extending from the top of the servo housing. Extending from the side of the servo is a thin cable comprised of three wires. Two of the wires are used to send power to the servo's motors and one wire is used to send commands from the signal to the servo.
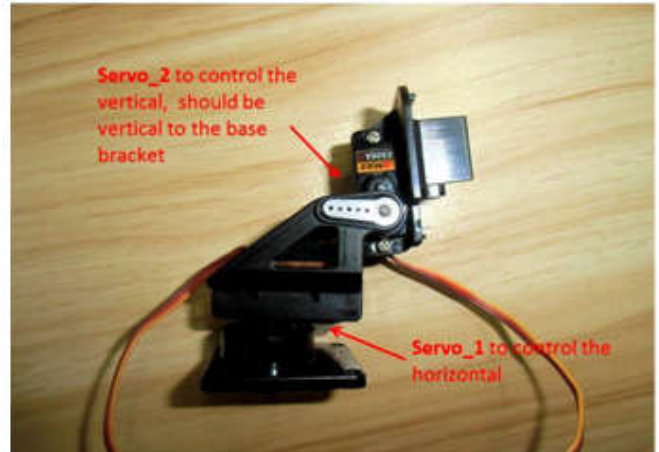

Fig.3. Servo motor

Sensor shield v4.0

The Sensor Shield's purpose is make it easy to connect cables and devices to the correct Arduino pins. It is not an active device. It simply connects the Arduino pin to many connectors that are ready to use to connect to various devices like Servos and Sensors with simple cables.
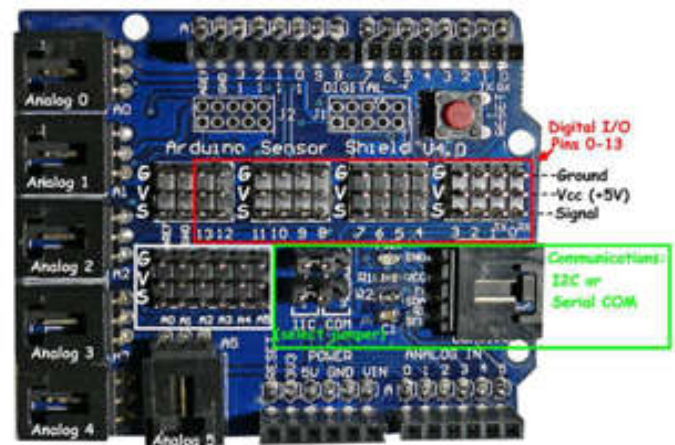

Fig.4. Sensor shield

Soil moisture sensor

Soil moisture sensors measure the water content in soil. A soil moisture probe is made up of multiple soil moisture sensors. In this particular project, we will use the moisture sensors which can be inserted in the soil, in order to measure the moisture content of the soil. the best advantage of this kind of sensor is, it is really cheap, while the disadvantage is that it may corrode after long-term usage. Of course, you can also use a better

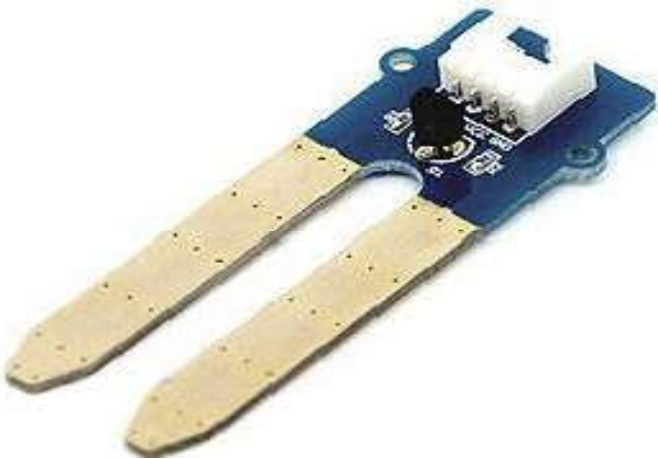humidity sensors, such as the capacitive soil moisture sensor, but you may need to pay ten times the price.

Fig.5. Soil moisture sensor

Relay

A Relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate the switch and provide electrical isolation between two circuits. It is used to switch on/off the pump according to the watering requirement of the soil.

Fig.6. Relay Module Board

Water Pump

The water pump is used to artificially supply water for a particular task. It can be electronically controlled by interfacing it to a microcontroller. It can be triggered ON/OFF by sending signals as required.

The process of artificially supplying water is known as pumping. There are many varieties of water pumps used. This project employs the use of a small water pump which is connected to a Relay.
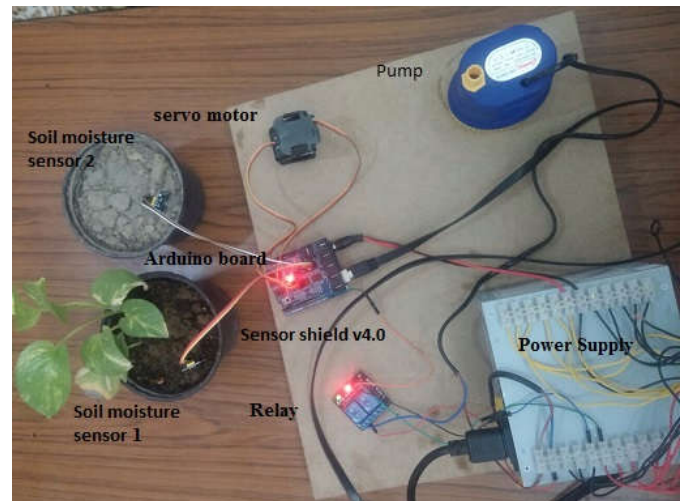

Fig.7. Water Pump

Fig.8. Servo motor connected to the Arduino Board& Arduino with Pump and Relay

Software Design

The software used in our project is Arduino. It provides a number of libraries to make programming simple. In our prototype, the controller UNO is programmed in Arduino. The program in Arduino designates a preset range of moisture sensor value in digital format (ranging from 0 to 1023) . Any aberration from the set range switches on/off the pump, to water the plants.

The system work

Senario No.1

When the soil is dry the planted soil moisture sensors to send information about the root zone and thus the microcontroller (Arduino) will be controlled the servo to rotate into the area dry and running water PUMP

Senario No.2

When the soil moisture Cafe Arduino servo will stop spinning and turn off Mator water pump.

The Result

Running through the irrigation system provided we get the amount of water rationing in disbursed due to lack of water sparingly if soil moisture is inadequate or the adequacy of the plant to the amount of water given for a healthy plant.

Conclusions

Building an intelligent watering system will work to build a intelligent irrigation system its cost is relatively simple. This project uses Arduino board It is programmed in such a way that it will sense the moisture level of the plants and supply the water if required. This type of system is often used for general plant care as part of caring for small and large gardens.

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