KHULNA UNIVERSITY OF ENGINEERING & TECHNOLOGY

Department of Computer Science and Engineering

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Course Title: Peripherals and Interfacing Laboratory

Project Title

Automatic Plant Watering System

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Objectives

1. To learn about the Arduino and its working procedure.
2. To learn about the Soil and moisture sensor.
3. To learn about the piezo buzzer.
4. To learn about 5v relay module.
5. To learn about the mini water pump.
6. To learn about the water sensor.
7. To learn about the humidity sensor.
8. To use these components mentioned above for implementing the project.

Introduction

Automatic watering system is indispensable for households who want to grow plants but do not have time to water them. This system will provide the user with automatic action according to the sensor reaction. By using soil moisture sensor, the system will detect the dampness of the soil if it needs more water. Next, the water sensor start to detect the water level in the water tank. Another sensor is humidity sensor which will tell us the humidity of the environment. These sensors are the main component of this project.

Firstly, Arduino will check the humidity of the environment, if there is humidity then our sensor is working. Now, if there is moisture then the relay will be cut-off. If there is no moisture then, it will check for the humidity. If the environment is not rainy, then it will check the water level of the tank. If there is enough water in the tank, then it will pump the water.

Description

Arduino Uno

The Arduino uno is a microcontroller which is based on the ATmega328 datasheet. It has 14 digital inputs /output pins. It is an open source microcontroller which is used to control relay, simply connect to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. It is large assortment of included libraries for interfacing to wide range of hardware. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip.

Relay

One-channel relay board which operates on 5-6V is used here. The relay board consists of three pins which are normally open (NO), normally closed (NC) and common (C). The common pin is connected to NC pin when the relay is off and to the NO pin when the relay is on. The input pin receives logic high from Arduino Uno and in turn switches on the relay, thus common are connected to NO which turns the device on till the relay is on. The "VCC" and "GND" pins of the relay are connected to 5V supply and ground respectively.

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 submersible water pump which is connected to power supply through relay.

Soil Moisture Sensor

A soil moisture sensor measures the water content in soil by measuring the dielectric permittivity of the soil as a
function of water content. The volumetric water content is measured by the soil moisture sensor indirectly by
properties like electrical resistance and dielectric constant. Using this we can reduce manpower, save water to improve production and gravimetric method.

Water sensor

The sensor has a series of ten exposed copper traces, five of which are power traces and five are sense traces. These traces are interlaced so that there is one sense trace between every two power traces. Usually these traces are not connected but are bridged by water when submerged. There's a Power LED on the board which will light up when the board is powered.

Piezo Buzzer

Piezo buzzer is used to generate sound, beep or even melody of a song.

Humidity Sensor

The DHT22 is the more expensive version which obviously has better specifications. Its temperature measuring range is from -40°C to +125°C with +-0.5 degrees accuracy, while the DHT11 temperature range is from 0°C to 50°C with +-2 degrees accuracy. Also the DHT22 sensor has better humidity measuring range, from 0 to 100% with 2-5% accuracy, while the DHT11 humidity range is from 20 to 80% with 5% accuracy.

Flow chart

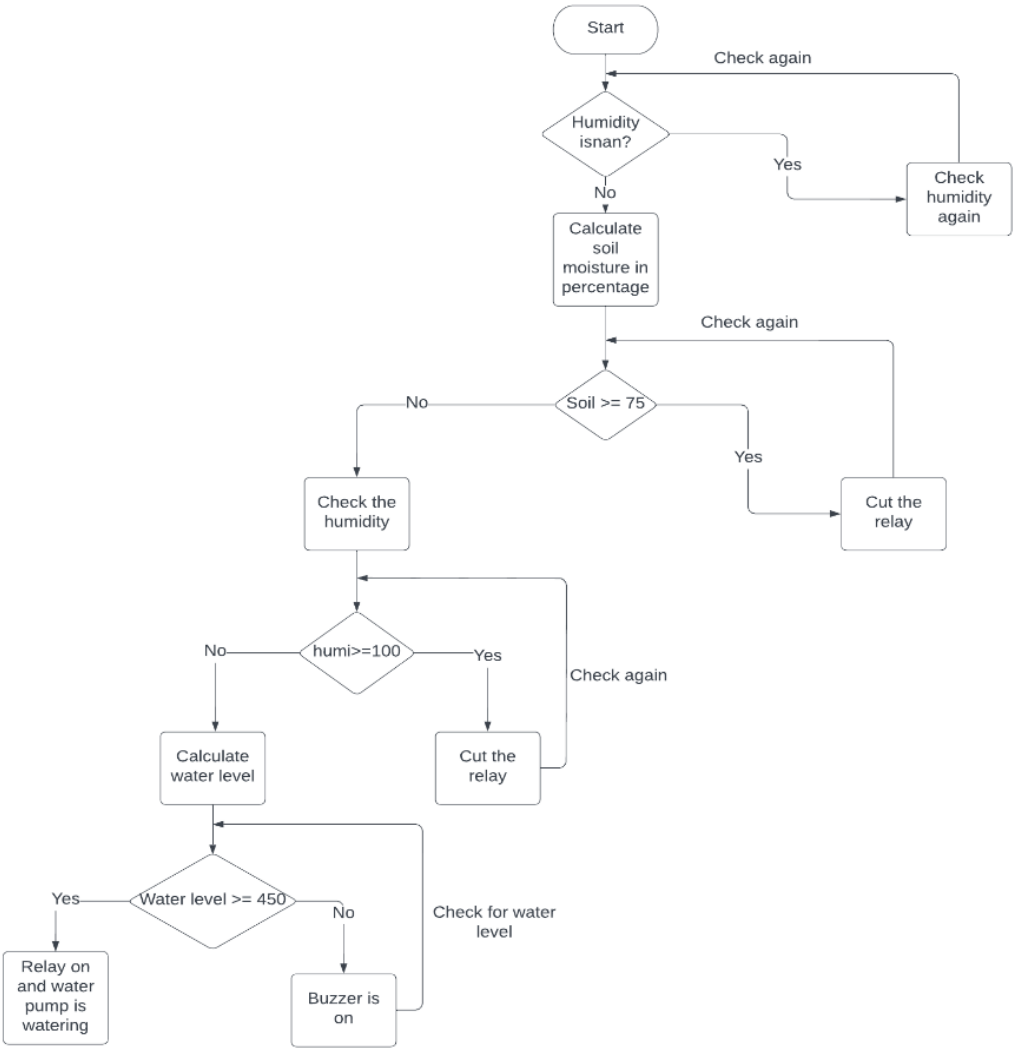

Figure 3.1: Flow chart of the project

Block Diagram

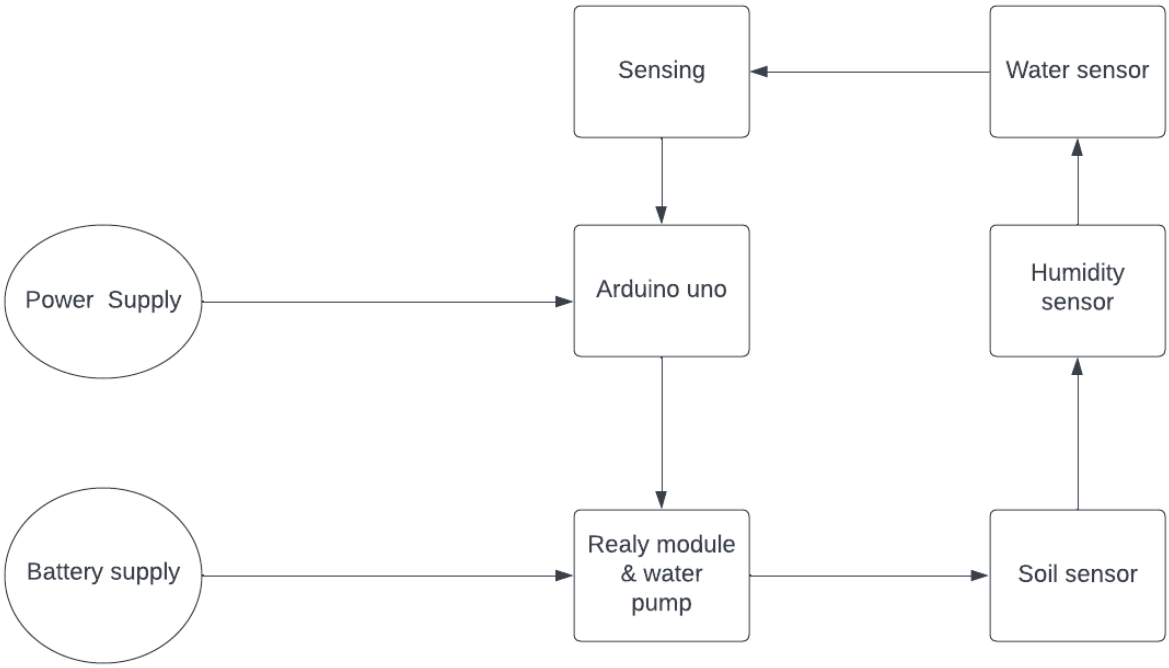

Figure 3.2: Block diagram of the project

Methodology

We have connected every instrument with Arduino uno. At first the Arduino will turn on the humidity sensor to check the humidity. If there is humidity it will then run the soil sensor and collect the data. If the moisture is greater than 75% then it will check for the humidity. If the humidity is above 100% then it will cut the relay or it will check for the water level. If the water level is high then it will pump the water to the soil. Else the buzzer will give us the sound. We have connected the common port and NC with the battery and pump. That is why when the relay input is low then the relay will turn on.

Apparatus required

Table 3.1: Table for Apparatus Required:

Serial No	Apparatus Required	Quantity
1.	Arduino Uno	01
2.	5 Volt Relay Module	01
3.	Water Pump and tube/pipe	01
4.	Soil Moisture Sensor	01
5.	Breadboard	02
6.	Jumper Wires	As Required
7.	Water sensor	01
8.	Humidity sensor	01
9.	Battery	04
10.	Piezo Buzzer	01

Circuit Diagram

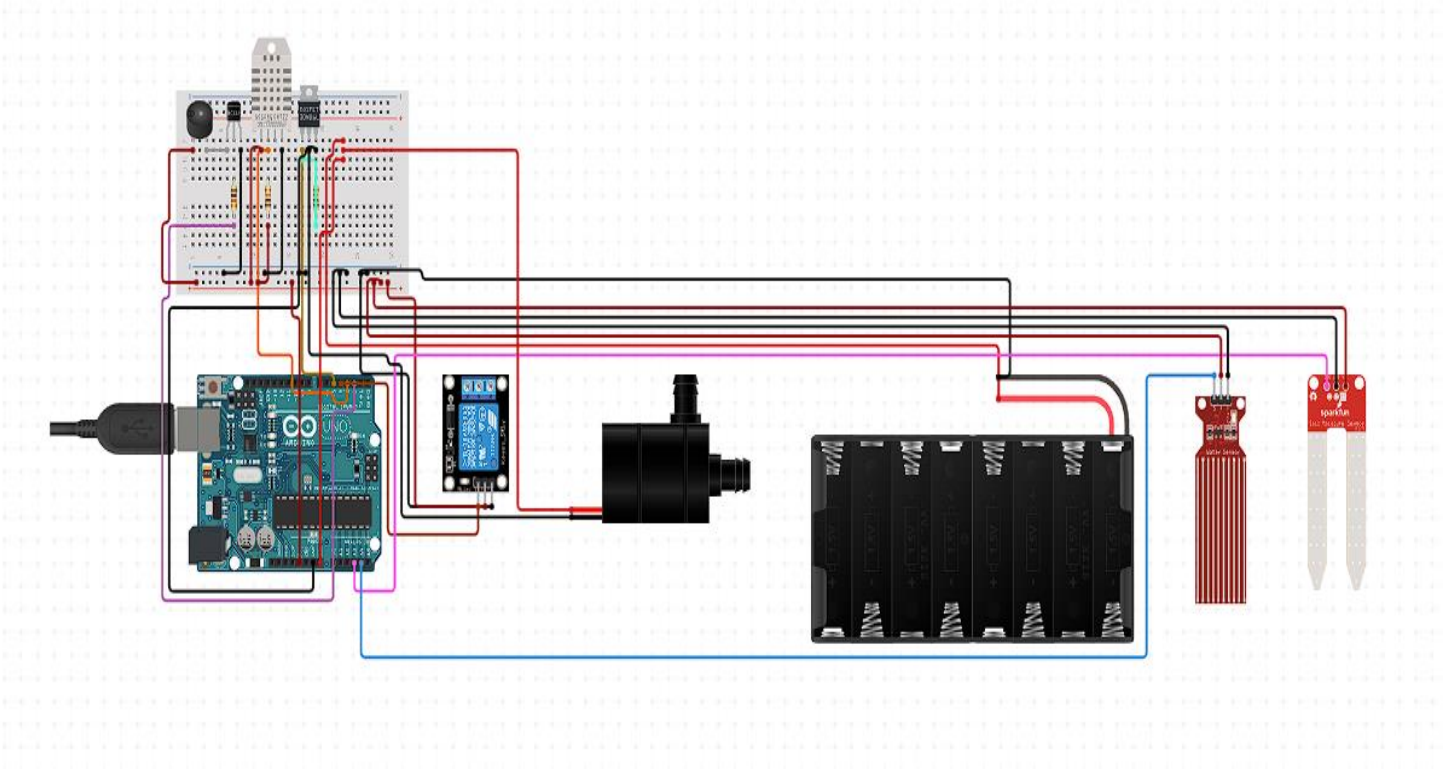

Figure: 3.3: Circuit diagram of the project

Conclusion and discussion

From this work, we can control the moisture content of the soil of cultivated land. According to soil moisture, water pumping motor turned on or off via the relay automatically. This saves water, while the water level can be obtained in a preferred aspect of the plant, thereby increasing productivity of crops. Submersible motor from vegetation water uniformly dispersed in water, in order to ensure the maximum utilization of absorption through. Thus, there is minimal waste of water. The system also allows the delivery to the plant when needed based on the type of plant, soil moisture, and observed temperature.

The proposed work minimizes the efforts of major agricultural regions. Many aspects of the system can be customized and used software to fine-tune the requirements of the plant. The result is a scalable, supporting technology.

Using this sensor, we can see that the soil is wet or dry. If it is dry, the motor will automatically start pumping water. Also using the water sensor, we can identify the level of the water. If it is low then we can sound a buzzer or if it is high then we can supply the water to the field. Automatic system using a microcontroller, moisture sensor and other electronic tools where been developed. It was observed that the proposed methodology controls the moisture content of the soil of cultivated land. The motor automatically starts pumping water if the soil is dry and need water and stops when the moisture content of the soil is maintained as required.

References

1. https://create.arduino.cc/
2. https://lastminuteengineers.com/
3. https://www.tutorialspoint.com/