KADİR HAS UNIVERSITY

Faculty of Engineering and Natural Sciences

CE356 - Software Engineering

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Automatic Irrigation System with Arduino

Interim Report

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Aim of The Project

The main purpose of this project is to create a system that delivers automated watering, allowing farmers, gardeners, and others to save time, money, and energy by using greenhouses, for example. In traditional agricultural land irrigation practices, manual involvement is prevalent. This project demonstrates an arduino-based Automatic Irrigation System approach. With this autonomous watering method, human involvement may be reduced. On-site humidity sensors will be installed. When the concentration of water changes, these sensors detect it and send an interrupt signal to the microcontroller. Soil is one of the most vulnerable sources of soil pH, which is used to characterize the degree of acidity or basis that impacts nutrient availability and, ultimately, plant development. As a result, the system will enable automation, remote control, and increased efficiency. The humidity sensor is linked to the internal ports of the microcontroller through a comparator; anytime there is a change in temperature and humidity in the environment, these sensors perceive the change and send an interrupt signal to the microcontroller, causing the motor to turn on. To notify that the pump is turned on, an audio or visual warning is utilized.

Activities and Progress

First Implementation, it shows the results of our experiment in the form of a general representation of our automatic irrigation system tested on the basis of microcontroller and Arduino sensor technology. When the program was uploaded to the Arduino, the soil moisture sensor started to show the value of soil dryness. If the drying value is higher than the given value of 950, the pump will start to irrigate in the system. Completed. If we want to flood the system or the field, the humidity sensor will stay at a higher level or the programming value should be lower than the previous fixed value. As a result of the first application, it shows that the engine starts to water when the dry value is higher and sometimes later when the engine is saturated, the engine is turned off and comes to a balanced position. Here, when we put the sensor into the soil, we see that the dryness value is 1024 and irrigation starts as the dryness value above the maximum dryness level we defined in the program. After watering, the engine was stopped automatically when it met the demand, after a few seconds the soil environment was dry and the dryness value was 970. The engine was started again and after a few seconds of irrigation, it was automatically stopped and a fixed value was given.

Problems and Solutions

After the system modules were combined and the coding was completed, the codes were uploaded to the arduino. Although the system started to work, no text appeared on the LCD screen. It was discovered that the problem was in the brightness adjustment key and with the help of a screwdriver the problem was solved. When switching between the two states during the testing phase, distortions occurred on the LCD screen. After our research, we realized that we needed to include the Wire.h library. However, the problem was not resolved. There was no error in the texts, but it appeared repeatedly written in succession. We thought we should add a delay to our code. After trial and error, we added the delay to the right place and realized that the errors we saw on the LCD screen were fixed.

Further Work

In the next phase of the project, it will be used with the GSM module as a transceiver system using a network provider to connect and transfer data. GSM module is a simple device that uses a SIM card to send and receive messages from the user. The module can be controlled by Arduino using serial communication. AT commands are used to configure the GSM module. It is recommended to use GSM as this will allow the user to activate the water system remotely as opposed to using a wireless system which only activates within a certain range. In addition, a message will be sent to the user by measuring the fill rate of the water in the water tank. Thus, the user will be informed that the water tank is empty. Finally, an extra button will be added for the user to determine whether the system is turned on or off. Thanks to the button, the system can be stopped and restarted.