ARDUINO MICROCONTROLLER-BASED DRIP IRRIGATION SYSTEM

Undergraduate Thesis
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ABSTRACT

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The study was conducted from November 2013 to February 2014 for the development of an Arduino microcontroller-based drip irrigation system. Specifically it aimed to: 1. develop a controller unit that would automate the operation of drip irrigation system; 2. develop software that would automate a drip irrigation system concerned with irrigation scheduling; 3. evaluate the performance of the controller unit; and 4. conduct a cost computation of the system.

The primary component of the automated irrigation controller unit was the Arduino, liquid crystal display, keypad, solenoid valve, and soil moisture sensor. Reference values inputted from the keypad will be stored by the microcontroller. The solenoid valve operation in the device depends upon the real time reading of external soil moisture sensors. Sensors were calibrated to a gravimetric water content value for loam soil. The functional equation used in the program was $y = 8E^{-7}x^2 + 8E^{-5}x + 0.0331$ on which x represents the analog values and y is the actual moisture content of soil. Meanwhile, rapid flow of water to soil surfaces, sensor position, contact of the sensor probe to the soil surface, and the program delays affects the real time reading of the controller unit.

In addition, it is highly recommended that the software developed should include calibration for other types of soils and the irrigation controller unit should be evaluated for at least one crop growing season.