Design and Implementation of Soil Moisture Detector using Arduino

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Abstract - India is known as land of farmers. It gives more importance to farming as agriculture contributes a lot in the economic growth of the country. Weather is very important for growing crops and should be monitored for proper growth and good quality of crops. The farmers have to adopt the modern technology to have better yield and quality crops. In order to help the farmers we decided to make this automatic water supply using microcontroller. The main aim of this project was to provide water to the plants or gardening automatically using microcontroller (Arduino Uno). We can automatically watering the plants when we are going on vacation or don't we have to bother my neighbors, Sometimes the Neighbors do too much of watering and the plants end up dying anyway. There are timer based devices available in India which waters the soil on set interval. They do not sense the soil moisture and the ambient temperature to know if the soil actually needs watering or not. Assimilation is that the artificial application of water to the land or soil it is used to assist in the growing of agricultural crops, maintenance of landscapes, and revegetation of disturbed soils in dry areas and during periods of inadequate rainfall

Key Words: (soil moisture sensor, adurino uno, LCD, pumping motor,)...

1.INTRODUCTION

On the hardware side, there are a number of products currently on the market that can perform some of the requirements of this project. The Automatic Sprinkle System is the best example. The Automatic Sprinkle System is a Connect microcontroller with a built-in Bluetooth module. It is able to perform many of projects functions, such as communicating with wired and wireless sensors, transmitting information to an Android device via Bluetooth, and storing data to an SD card. However, the main problem with this solution, along with many others like it, is that the microcontroller must be programmed to perform this operation. This makes the microcontroller an impossible solution for users who don't know how to program, and an impractical solution for those that can program, but don't want to. A better product would already have the code pre-compiled, the input ports clearly labeled, and require little to no setup from the user.

1.1 SOIL MOISTURE MEASUREMENT

Moisture content of the soil is a major factor determining plant growth1, especially in irrigated systems. Currently there are many and varied methods for determining soil water content on a volume basis or a tension as described by Gardener. The basic objective of irrigation scheduling is to minimise water stress of the plant, that of over irrigation, and under irrigation. The manager aims to manipulate the biological process of cell elongation and cell reproduction for improved plant yield3 and maximum use of available effluent

1.2 Types of Soil Moisture Measurement

1.2.1.The Neutron Probe (NP): The technique is based on the measurement of fast moving neutrons that are slowed in the soil by an elastic collision with existing Hydrogen particles in the soil. Hydrogen (H+) is present in the soil as a constituent of

1. Soil organic matter
2. Soil clay minerals
3. Moisture content

1.2.2. Tensiometers: Portable and stationary tensiometers measure the soil moisture content as a tension or pressure ranging from 0 to -100 kPa). Tensiometers fundamentally act in a similar fashion to a plant root measuring the force that plants have to exert to obtain moisture from the soil. As the soil dries the water is lost from the tensiometer via a ceramic cup. The loss of water creates a vacuum in the tensiometer and is reported as a pressure reading, the drier the soil the higher the pressure reading.Tensiometers may be placed permanently in the soil giving an analogue or digital output.

1.2.3. Oven drying method: The soil sample is dried in hot air oven at 105^0 C until constant weight is obtained and dry weight of the sample is recorded. Moisture content (on weight basis) = Wet weight-Dry weight X 100/ Dry weight