Automatic Plants Watering and Treasuring System

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Abstract -- **Impacts of climate change on water can be seen worldwide, for example, flash floods, droughts, unavailability of clean drinking water, food crises, etc. The device proposed in this paper can water your plants automatically. The first step involves collecting water from households that is being used for washing dishes and food materials. Water from rain and the kitchen is collected in one tank. With the help of DC motor, water is supplied to the fields. If sufficient moisture is sensed by the sensor then the system stops the water supply.**

Keywords: Water crisis, Automatic plants watering, Clean drinking water,

I. INTRODUCTION

Although 75% of the Earth is covered by water, only 3% is fresh water which is stored in the form of glaciers. The amount of freshwater on Earth that is appropriate for human consumption is only 1%. In future our daily lifestyle is going to be severely affected. So every water drop lost means one less drop in our freshwater bodies. We all know water is the most important for agriculture, but due to recent climate changes , availability of water has become a major concern [1]. Due to this, cultivable land is decreasing and barren land area is increasing resulting in loss of farmers' income, leading to suicide in extreme cases. Ten per cent of the world's food is produced by pumping groundwater. In houses, considerable wastage of water occurs.

The world's water supply is rapidly diminishing. Climate change has adverse implications on the world's water resources. Sustainable use of water can help us achieving 17 global goals of United Nations.

To remedy this situation, authors propose the idea of an APW&TS model [2]. It will not only help in water from being wasted but also keep plants healthy by supplying water according to requirements.

II. SYSTEM BLOCK DIAGRAM

Above block diagram illustrates how automatic plant watering and treasuring systems work. Moisture sensors are used to measure the soil's moisture content. Arduino is utilised to automate the entire system and for programming purposes.

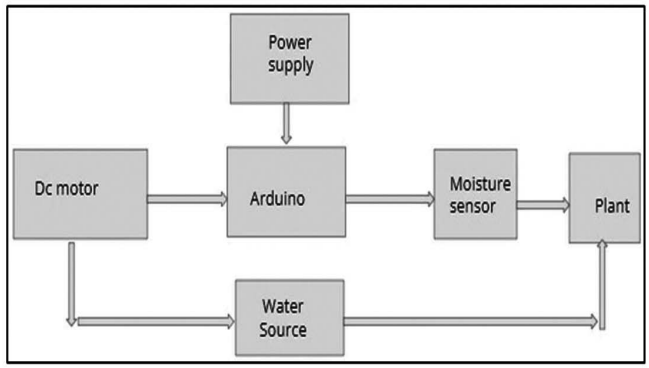

Figure 1. Block diagram of Automatic plant watering and treasuring device.

III. COMPONENTS USED FOR HARDWARE IMPLEMENTATION

A DC Motor is required to supply water, a moisture sensor to gauge the amount of soil moisture present, a single channel relay, Arduino UNO for automation and programming purposes and jumper wires for connections.

For usage in a variety of electronic applications, the programmable microcontroller board known as Arduino UNO is affordable, flexible, and easy to use. This board can communicate with other Arduino boards, Arduino shields, and Raspberry Pi boards as well as control relays, LEDs, servos, and motors as an output [11]. The Single Channel Relay Module is a useful piece of hardware for controlling high voltage, high current loads, such as motors, solenoid valves, lighting, and AC loads [12]. The Arduino, PIC, and other microcontrollers can be connected to it. An LED is also added to display the status of the relay [13].

Direct current is used in a variety of methods by DC driven pumps to transfer fluid, including from the motor, battery, and solar power. Typically, motorised pumps run on 6, 12, 24, or 32 volts of DC electricity [15].

The sensor's electrical resistance is assessed after the electrodes have received a small charge. As soil moisture declines or as plants use the sensor, water is drawn from

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it, increasing resistance. However, resistance decreases as soil moisture increases [16]. Figure 2 shows hardware implementation of the model.

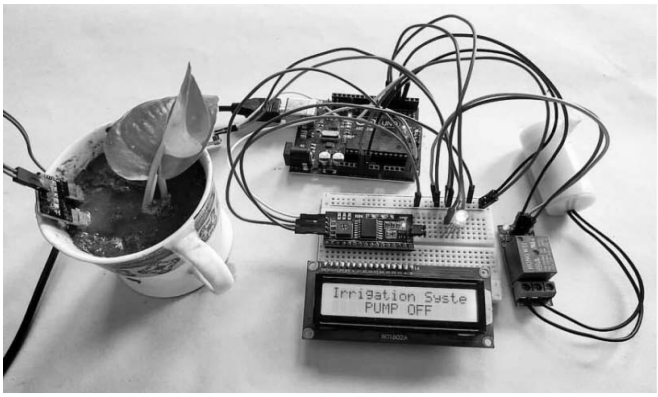

Figure 2. Hardware implementation of the model.

Flowchart outlines the working strategy for the entire process (Fig. 3).

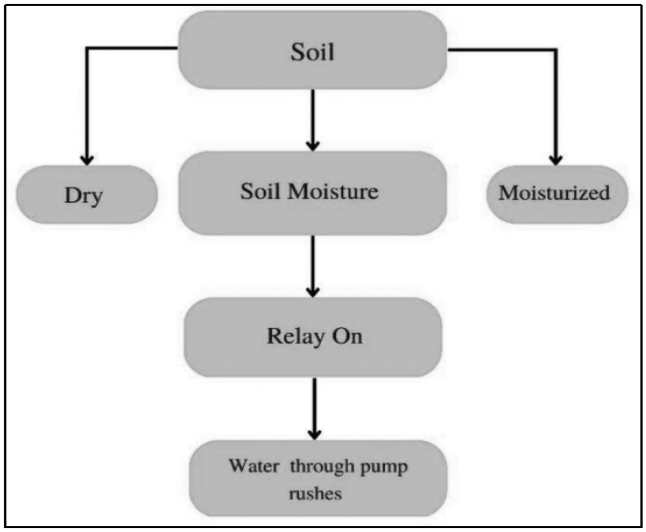

Figure 3. Flow chart of automatic plant watering and treasuring system.

When the soil becomes dry, the operational amplifier produces an output that is higher than the required threshold value because it produces a significant voltage drop due to high resistance, which is detected by the soil moisture sensor. The relay's normally-open state is consequently changed to one of closing [17]. Relay is activated. When the relay is turned on, the valve opens, allowing water to flow through the pipes to the crops. A regulated 5V power supply powers the project's internal blocks, while a regulated 12V power supply powers the relay board. The sensor probes are buried in the ground at predefined locations in the field at a depth of 5 cm below the soil surface to cover a large region [18].

IV. RESULTS

The hardware model for the automatic plant watering and measurement system has been used, and it has been observed that when the soil moisture sensor detects a soil moisture level below the acceptable level, water rushes through the pump and automatically moistens the soil.

V. CONCLUSION

With the increasing population and demand, it is very necessary to use water resources in a sustainable manner. APW&TS model is a targeted approach to save water on a household basis and use it for watering plants. These small simple steps can create a huge impact in saving the environment and reducing climate change. This system automates the plant watering mechanism and saves plant from dying even when no one is around. This is great step for saving the environment by saving water and plants. With reference to the current scenario, this model can effectively contribute to tackle the today's world climatic conditions.

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