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Indoor Green Ecosystem

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***Abstract* – An adequate water supply is important for plant growth. We know people do not pour the water on to the plants in their garden when they go to vacation or often forget to water plants. As a result, there is a chance to get the pants damaged. In the proposed system we implement sensors which detect the moisture level in the soil. The proposed system is a microcontroller based design which controls the water supply. Soil moisture sensor measure the volumetric water content in soil by using property of soil such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content. Moisture readings are continuously monitored. If the moisture level is found to be below the desired level, the moisture sensor sends the signal to the Arduino board which triggers the water pump to turn On and supply the water to respective plant. When the desired moisture level is reached, the system halts on its own and the water pump is turned Off.**

***Keywords* -Arduino IDE, Green Ecosystem, Internet of Things (IoT), Soil Moisture Sensor**

I. INTRODUCTION

In the fast moving world human beings require everything to be automated and intelligent. Our life style demands everything to be remote controlled. Apart from few things man has made his life automated. During summers, most people are too lazy to water the potted plants every day. In the world of advance electronics life of human beings should be simpler hence to make life simpler and comfortable, we design an Indoor Green Ecosystem. An adequate water supply is significant for plant growth. We know people do not pour the water on to the plants in their garden when they go to vacation or often forget to water plants. As a result, there is a chance to get the pants damaged. In the proposed system we implement sensors which detect the moisture level in the soil, air temperature and humidity level. The proposed system is a microcontroller based design which controls the water supply. Soil moisture sensor measure the volumetric water content in soil by using property of soil such as electrical resistance, dielectric constant, or interaction with neutrons, as a proxy for the moisture content. If the moisture level is beyond predefined threshold it will off the motor automatically. The proposed system is designed to improve water use productivity, can as well achieve water saving.

II. RELATED WORK

In this system, temperature sensors, soil moisture sensor placed in root zone of plant and gateway unit handles the information about sensor and carry data to a web application. One algorithm was developed for measure threshold values of temperature sensor and soil moisture sensor that was programmed into a microcontroller to control water quantity. For power photovoltaic panel was used. Mobile-Internet interface used that granted for data inspection and irrigation scheduling to be programmed through a web page. The automatic system was tested for 142 days and save 92% compared with traditional watering system. Three replicas of the automated system have been used successfully in other places for 1 year and 6 months. Because of its energy autonomy and low cost, the system has the potential to be useful in water limited geographically isolated area [1].

III. PROPOSED SYSTEM

The automatic watering system was designed to continuously sense the moisture level of the soil. The system responds appropriately by watering the soil with the exact required amount of water and then shuts down the water supply when the required level of soil moisture is achieved. The reference level of soil moisture content was made, if moisture level is below 300, water starts flowing into the soil through valve. If the moisture level goes above 700 then flow of water is stopped automatically by closing the valve.

The above Fig1 explains the project architecture. It all starts with providing a power supply to the microcontroller board used. In the present case, the board used is Arduino Uno. A power supply of 5 volts is provided to drive the components and the sensor used is soil Moisture Sensor.

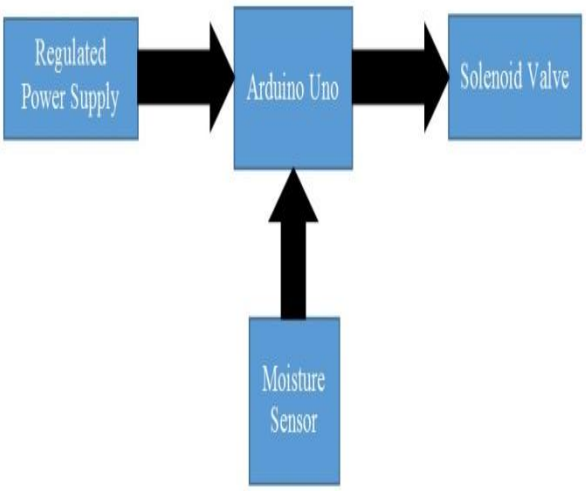

Fig.1System Architecture.

1. Key Objectives

The main objective of this project is to automatically control the watering system in Indoor ecosystem using moisture sensor and to provide a system that can help monitor plant growth by reducing the manual intervention.

2. Implementation

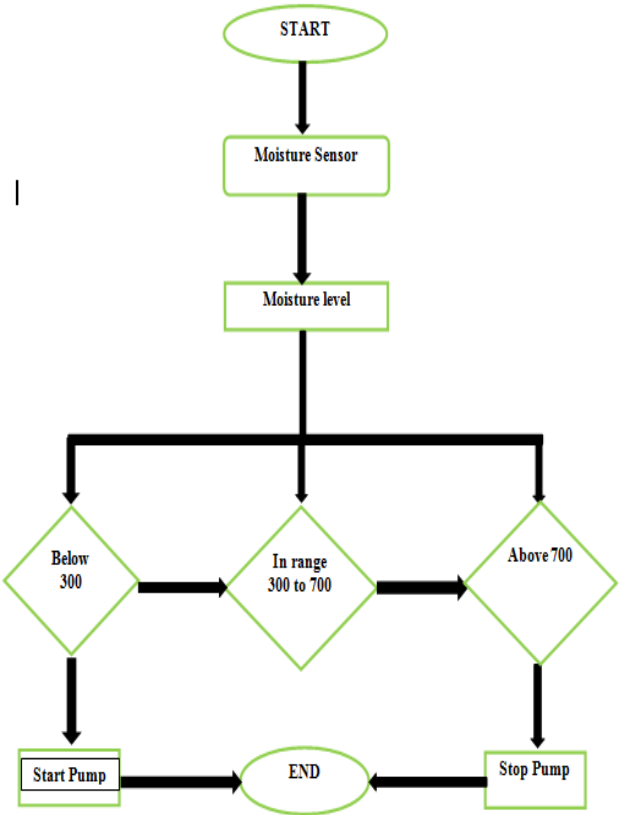

Fig.2 Dataflow diagram for Indoor green ecosystem.

The above Fig 2 explains the complete project flow, step-by-step-

- It begins with initializing the setup, in the sense the sensors' setup.
- The next step detects the moisture level of the soil.
- Further, the outputs of sensors are analyzed in the third step of the project flow.
- If the moisture level obtained is below 300, then valve is opened.
- If the moisture level is above 700, then valve is closed

IV. EXPERIMENTAL RESULTS

The Indoor Green Ecosystem is Arduino based design which controls the water supply for plants and the field to be irrigated. The soil moisture sensor present in the plant which is not activated till water is present on the plant filed. Once the plant gets dry soil, moisture sensors sense the dry level till the sensors readings go above predefined threshold and the valve is stopped.

The output from moisture sensor and system plays major role in producing the output. The chosen approach is expected to yield the following results,

- Reduced labor
- Reduced monitoring
- Decrease in water input
- Low maintenance
- Low power consumption

The advantage of using this method is to reduce human intervention and to ensure proper irrigation.

- Minimizes water waste and improves plant growth.
- This system is designed to work automatically and hence, there is no need for any human intervention.

V. CONCLUSION

The proposed project helps people in real time monitoring of plants in an indoor ecosystem and also efficient usage of water by identifying the soil moisture. The system has been tested to function automatically. The moisture sensors measure the moisture level (water content) of the different plants. If the moisture level is found to be below the desired level, the moisture sensor sends the signal to the Arduino board which triggers the water pump to turn On and supply the water to respective plant. When the desired moisture level is reached, the system halts on its own and the water pump is turned Off. Thus, the functionality of the entire system has been tested thoroughly. It has been developed by integrated features of all the hardware components used. The system components are readily available, relatively affordable and they operate quite reliably.

For future work on this project, recommend that for a large scale implementation a more powerful water pump can be used. Also a microcontroller should be used to accommodate more than one sensor input and also control different irrigation regimes independently. A wireless

sensor and GPRS(General Packet Radio Service) based automated irrigation system can also be employed.

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