IOSR Journal of Engineering (IOSRJEN) **www.iosrjen.org**
ISSN (e): 2250-3021, ISSN (p): 2278-8719
Volume 13, PP 24-26

Smart watering system for domestic use using IoT

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Abstract: *Plants are very important living things. They have a great impact on human lives. Plants at home are also an important aspect, Today home plants are dying at a very fast rate and thus having adverse effects on human lives. Many people forget to water plants at their homes due to certain reasons especially when they are on a vacation or trip, when there's no one present to water plants at home. Untimely watering and over watering are also other reasons why plants growth get deteriorated. According to many studies and surveys the two major important reasons for fading of plants are not watering the plants, overwatering, untimely watering .The proposed system will solve all these problems. The proposed system is implemented using ArduinoNano/NodeMCU where the daylight sensor will alert the users about lack of sunlight via the android app and the moisture sensors will detect the moisture content present in the soil and will alert the users and android app.*

Keywords : *growth , home, lives , Plants, sensors ,watering*

I. Introduction

Proper watering at the plants can tell the difference between perfect looking plants and wilted or dying plants. Different watering methods use more or less water. We always have to look up the water requirements for specific plants. Plants that are in desert areas require less water than plants of the humid climate. Many plants have different water requirements, therefore, we have to use more than one method of watering[7]. People usually have plants at their homes but because there would be no one present at home to water them during vacations which is a long period during which plants health get hampered because of which a lot of plants die out every year. So in order to handle this issue the proposed system would be helpful in watering the plants in such situations and thus preventing the plants from dying out. The proposed system would sense the moisture content of the soil and will alert the user about it via SMS and android application along with the required action that has to be taken. And once the user takes an action upon that alert the plants will be watered and once the required water level in the soil is reached then an alert will be given to the user to stop the system.

1.1 Need

Plants need water to stay healthy and grow at a better rate but some times people forget to water plants especially when people are not present at home and there's no one to take care of them and due to various other reasons. Plants are slowly getting reduced and dying at a very fast rate [8], which is actually not good because Plants helps to maintain the environment condition healthy and hygienic. This is happening simply because we humans today are forgetting about watering the plants at their homes. Humans forget to take care of the living plants and in order to avoid such problems one important step is watering of the plants.

1.2 Basic concept

The system is constantly connected to the Internet where the overall system can be turned of/off through an android app installed in users device. The soil moisture sensor will kepp on checking if moisture value inside the soil falls below a certain level and if it does then through a relay the water pump will start watering the plants. A water sensor is used to alert the user about successful waatering of the plants or to alert if there is some kind of technical problem. the sensor values and power consumption values can be monitored in realtime via the android app itself. And these values via HTTP will also be logged into server to perform some analytics onto the logged data.

II. Working

The complete system will be powered by an external power adapter of 12 volts and 1A current. The system can be either turned on or off by switch on the electric board . If the electric switch for power adapter is on/off then accordingly the system will be on/off. While going out or somewhere on a vacation or so, then only the electric

switch of the power adapter has to be turned on. Now an android app is provided to turn the main system on/off, as the main system is connected to a wi-fi network. The main system has a Soil Moisture sensor which keeps on sensing the moisture inside the soil of the plant. Once the values reaches higher than a threshold value then the relay will be turned on and so as the water pump placed inside a water container will be turned on and the watering for that plant will start. once the watering is started then as soon as the moisture value falls below a threshold value then relay will be turned off and watering will stop[1] [2].. There is water sensor connected to the system placed in plant pot which will alert the user about successfully watering of the plant has been started and if there is any kind of technical problem or watering of the plant is not successful or water is not detected by water sensor inside the plant then that will also be alerted to the user. The moisture values, time for which Motor was On/Off and the Power Consumed in that cycle can be monitored in real-time through the android app itself. Similarly all these values will also be logged onto the server via HTTP (Hypertext Transfer Protocol) for performing analytics onto the logged data[5] [6].

III. Figures And Tables

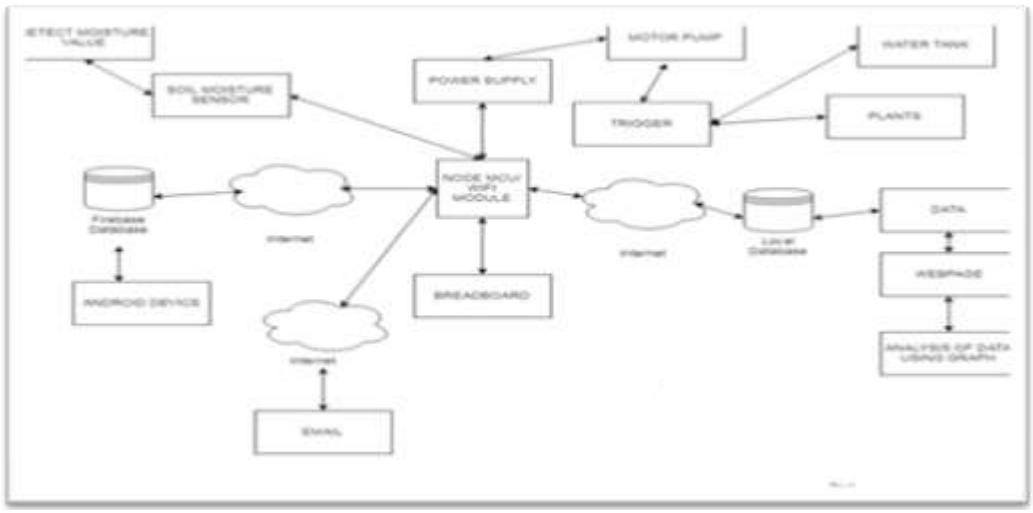

Figure 1 : Diagram of Working of System

Required Hardware	**Model**	**Voltage Required**
NodeMCU/Arduino Nano	ESP 8266 V3	3.3-5V
Moisture Sensor	FC-28	3.3- 5 V
WiFi Module	ESP8266	3.3V
Relay	2CH Solid State Relay	5V
Water Pump/Motor	Generic Motor	12V
Android Device	2.3 and above	
Water Sensor		5V

Table 1: Hardware Requirements

Parameter	**Min**	**Typical**	**Max**	**Unit**
Working voltage	5V	5V	12V	V
Analog output Voltage (VCC=5V)	0	Vout	5	V
Digital output Voltage (VCC=5V)	-	-	-	V
Working Current	0.80 mA	1A	1A	mA

Table 2 : Electrical characteristics of FC-28 Soil Moisture Sensor[9]

IV. Conclusion

The watering of the plants can be done remotely by using the android application. So even if there is no one at home to water the plants or user is on a vacation/trip anywhere in the world still the plants can be watered using

this system and thus solving a lot of problems. The android app is responsible for overall control of the system. And the moisture content, Motor On/Off Time and Power Consumed by Motor can be tracked down by the user in realtime through the same android app.This system is for residential use but can be very well extended to commercial use by farmers on a large scale. Some additional Modules can also be added to this system like Residential Air Pollution Monitoring can be integrated into this very system. The android app can display the Air Quality Index on a regular basis or whenever the user needs it. So that way individual efforts can be taken against air pollution problem.

Acknowledgements

We owe sincere thanks to our college Atharva College Of Engineering for giving us a platform to prepare a project on the topic "**Smart watering system for domestic use using IoT**" and would like to thank our Principal Dr. Shrikant Kallurkar for instigating within us the need for this research and giving us the opportunities and time to conduct and present a research on the topic. We are sincerely grateful for having Prof. Krishnanjali Shinde as our guide and Prof. Mahendra Patil , Head of Computer Engineering Department, and our project co-ordinators Prof. Deepali Maste, Prof. Suvarna Pansambal,Prof. Aruna Pavate and Prof. Mamta Meena during our research on Smart watering system for domestic use using IoT, which would have seemed difficult without their motivation, constant support and valuable suggestions. Moreover the completion of this research would have been impossible without the co-operation, suggestions and help of our friends and family.

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