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Effective Water Utilization using IoT

Bhavana S P, Chinannagari Deepthi [2], Sayandip Paul[3], Vinayaka KulKarni[4], Harshavardana D[5]

[1,2,3,4]*Students,* [5]*Assistant Professor*
[1-3]*Dept. of Computer Science and Engineering, S.J.C. Institute of Technology, Chikkaballapur, Karnataka-562101*

Abstract - *We demonstrate the effective way of house hold water reutilization using IOT. From the code written for this particular model we set the values low or high as input based on the soil moisture content. We provide a general and easy to obtain reward: the specific amount of water that has to use as output based on the input value. We use the dielectric values Obtained from the moisture of the soil to set the input values and provide the specific amount of water that is required. This demonstrates the way in which we can effectively reuse water Provided the initial parameters are set right. We discuss the challenges and opportunities to scale this approach to a broader range.*

Key Words: **Internet of Things (IoT), Arduino Uno, Soil Moisture Sensor, Permittivity, NodeMCU,**

1. INTRODUCTION

Internet of Things (IoT) is an inter-networking which enables to connect number of physical objects or devices to internet. These devices can collect, exchange and store data. IoT cloud provides a data storage in which the data from these devices can be stored and viewed at remote access. Presently the computerization is one of the critical parts in the human life which gives comfort as well as lessen burden and helps us to save time. We plan to develop a framework that helps the farmer to automatically provide water to the plant according to its need and current water moisture present in the soil. Soil Moisture Sensors works on the principle of Dielectric permittivity. The dielectric permittivity is the amount of electricity that can be passed through the soil. The dielectric permittivity is a function of water content present in the soil. Hence by measuring the dielectric permittivity we could measure the soil moisture content. A fixed (user defined) threshold value is set and data is acquired till it reaches the threshold value.

2. LITERATURE SURVEY

[1]IoT Enabled Plant Soil Moisture Monitoring Using Wireless Sensor Networks Authors: A.M.Ezhilazhahi and P.T.V.Bhuvaneswari .The main objective of this paper, is to establish a plant soil moisture monitoring system which enables the user to monitor the plant health remotely. For wireless communication, Zigbee technology is used to collect data which is then transferred to the server. In order to increase the lifetime of WSN, Event Detection Algorithm (EDA) is adopted.

[2] An IoT Based Soil Moisture Monitoring on Losant Platform Authors: Ravi Kishore Kodali and Archana Sahu. This system uses an esp8266 microcontroller and a moisture sensor using Losant platform. Losant is a simple and most powerful IoT cloud platform for the development of coming generation. It offers the real time data visualization of sensors data which can be operate from any part of the world irrespective of the position of field Knowledge of degree of soil wetness helps farmers to understand the condition of field and accordingly they react on it. Soil moisture determines the measure of soil water content which defines its expression in terms of mass or volume of water content of the soil

[3] Soil moisture monitoring using IoT enabled Arduino sensors with neural networks for improving soil management for farmers and predict seasonal rainfall Authors: Suhas Athani, CH Tejeshwar. In this project we use the information obtained from the input sensors which is handled using the neural networks algorithm and correction factors for monitoring. Soil monitoring, providing a series of assessments showing how soil conditions and/or properties change over time. The use of simple obtainable components decreases the manufacturing and maintenance costs. This makes this system more economical, appropriate and a low maintenance solution for applications, mainly in rural areas and for small scale agriculturists.

3. EXISTING SYSTEM

The Existing Model does not use the technology available but uses manual method or the methods that do not reutilize water from house hold activities.

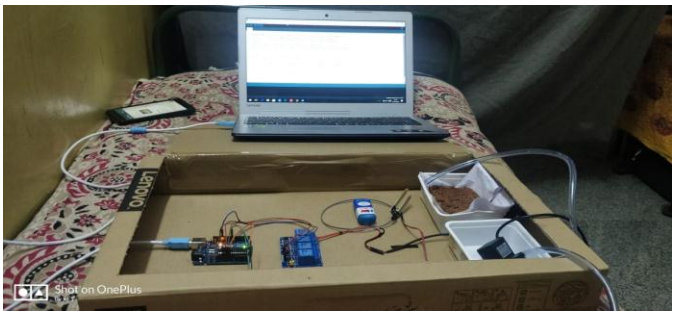
Some of the drawbacks are -1. Manual monitoring of water to the destination uses human resource and is a waste of resource as it can be monitored. 2. The water being essential resource is let down without being properly being used.

3. When the climatic conditions are worse it is not possible by humans to come to the field and water the plants but it can be done using this method 4. In this method the water that could have been reutilized is let go without making the proper use of it

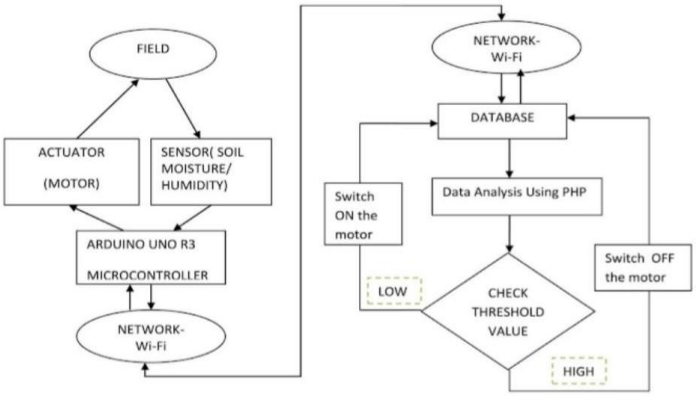
4. PROPOSED SYSTEM

The proposed system of Effective water utilization using IOT involves four major reasons .Some of the advantages are: 1. People with disabilities, like the blind, are capable of watering the plants and other activities, using this model helps reduce dependency on others 2. The water from the house hold is let as outlet with properly reutilizing the water 3. Sensory technology could potentially perceive the environment better than human could, seeing farther ahead

4.1 Experimental Model

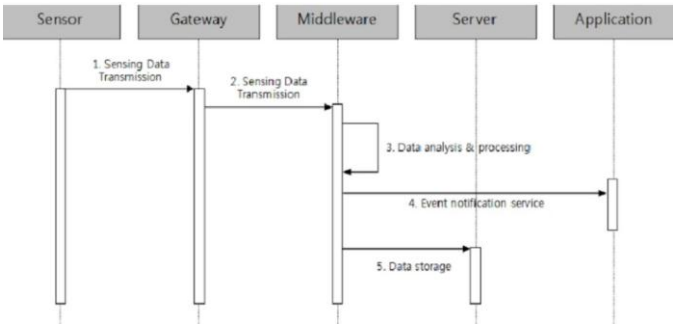


4.2 Data Flow Diagram



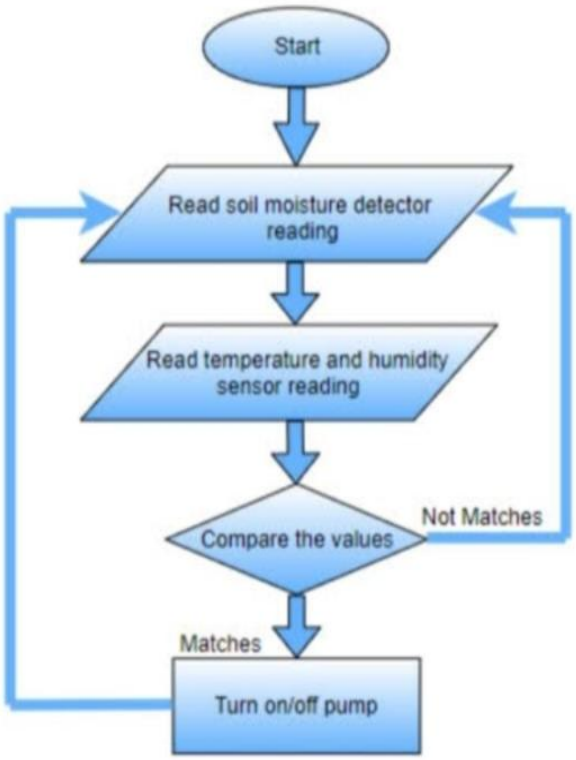
A Data-Flow Diagram is a way of representing a flow of a data of a process or an information system. The DFD also provides information about the outputs and inputs of each entity and the process itself. A dataflow diagram has no control flow, there are no decision rules and no loops. Specific operations based on the data can be represented by a flowchart.

4.3 Sequence Diagram



A sequence diagram shows parallel vertical lines (lifelines), different processes or objects that live simultaneously and as horizontal arrows, the messages exchanged between them in the order in which they occur. This allows the specification of simple runtime scenarios in a graphical manner sequence diagrams model the flow of logic within your system in a visual manner, enabling you both to document and validate your logic, and are commonly used.

4.4 User Case Diagram



A use case diagram at its simplest is a representation of a user's interaction with the system that shows the relationship between the user and the different use cases in which the user is involved. A use case diagram can identify the different types of users of a system and the different use cases. A use case is made up of a set of scenarios. Each scenario is a sequence of steps that encompass an interaction between a user and a system.

5. IMPLEMENTATION

Implementation is the realisation is an application, or execution of a plan, idea, model, design, specification, standards or policies

5.1 Implementation Using C & C++ Language

Arduino IDE is an interpreter, C & C++ is object-oriented, high-level programming language with semantics. Its high-

level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for rapid application development, as well as for use as scripting or glue language to connect existing components together. C & C++ supports modules and packages, which encourages program modularity and code reuse.

5.2 Implementation using Arduino and Data Analysis.

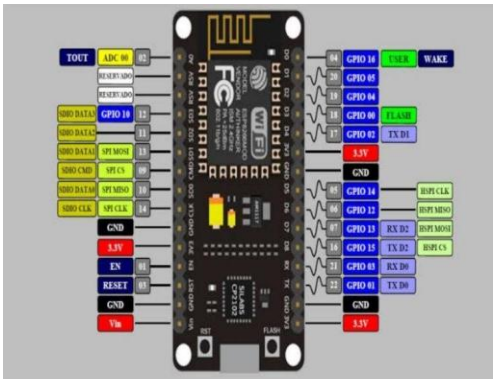
Arduino microprocessor board is connected with a bread board to extend the connections, for connecting the water pump with microprocessor. Soil moisture sensors are connected with Arduino kit to get readings of moisture of soil of farm. Then these gathered values are compared with threshold values of moisture levels and accordingly pump is being operated switched on or off. Data Analysis is a strategy in which information is gathered and composed with the goal that one can get accommodating data from it. Gathering Of Data - Soil Moisture Sensors works on the principle of Dielectric permittivity. The dielectric permittivity is the amount of electricity that can be passed through the soil. The dielectric permittivity is directly proportional to the amount of water present in the soil. Hence, by measuring the dielectric permittivity we could measure the soil moisture content. Soil Moisture Sensors are buried and are connected to the Arduino chipset at the other end. The soil moisture sensor reads the value of the dielectric permittivity of the soil after a stipulated interval of time. These values are sent to the Arduino chipset and are correspondingly displayed on the system.

5.3 ALGORITHM

Start
Input: Soil Parameters in voltage to pin 8
Output: set to pin 13
if (Input =low)
then,
Output (13, LOW) //If soil moisture sensor provides low value send low value
Else
Output(13,HIGH)// If soil moisture sensor provides low value send low value Delay End

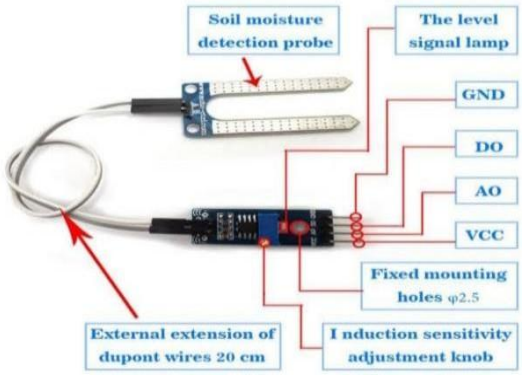
6. COMPONENTS

6.1 NodeMCU V1.0: NodeMCU V1.0



is an open source IoT platform with ESP8266-12E chips. It is lowcost, breadboard friendly, integrate a USB to serial chip, and a simple USB to micro USB cable can be used to power this board. This modules aimed for developing ESP8266 based Lua IoT applications and it includes firmware that runs on the ESP8266 Wi-Fi SoC from Esp to the system. This development board provides access to the GPIO (General purpose Input/Output) subsystem. Based on ESP8266 there are jungle of available modules and every module has certain advantages and disadvantages, depending on the targeted application.

6.2 Moisture Sensor



Soil moisture sensor is used for measuring the volumetric water content of the soil and loss of moisture which occurs due to evaporation and plant uptake. For survival of all plants, water is the most important factor. This soil moisture sensor determines the amount of water required for irrigation of plants. This module consists of LM393 comparator with a potentiometer included in it for adjusting the soil wet/dry detection sensitivity according to the requirements of plants. There are two types of soil moisture sensor: Frequency domain sensor and neutron moisture gauze. Frequency domain sensor has an oscillating circuit which measures the soil water content

7. CONCLUSION

The model primary focuses on the reutilizing the water that can be made useful again. In the proposed the system the water from the collector is used and for other activities that reduces the wastage of water. For example the water after the washed clothes can be used for plants, the water from mineral water purification can be used for toilets and it also know the exact amount of water to be used hence reducing water waste. This model if implemented in organizations can save a lot of water and can be made to be used again. The scope of implementing this is high as water can be an essential commodity in the near future.

8. ACKNOWLEDGEMENT

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