Automatic Plant Watering System Using IoT

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***Abstract*—In the modern era of fast moving technology we can do things which we could never do before. But to accomplish these thoughts there is a need for a platform which can automate all our tasks with ease and comfort. Now-a-days, Automation is playing important role in human life. People want all things automated. Home automation helps people to do their tasks automatically when they are not present at the location or when they are not at home. Home automation not only reduces human efforts but also it saves energy and time. Home automation allows us to control home activities like watering plants, light, door, fan, etc.**

Internet of Things (IoT) is the domain under which we are implementing all these above tasks. The IoT techniques are used to identify and channelize the activities and to develop an automated technique, in order to perform the tasks. In this project, we are implementing automatic plant watering system using IoT techniques and various types of sensors. The platform is open to all and can connect and control all IoT devices from any remote locations. The main objective of the Home automation is to control and perform household chores using techniques based on IoT.

IndexTerms — IoT, Sensors, MQTT, MCU.

I. INTRODUCTION

Early stages of home automation began with labor saving machines. There is an increasing need of automation of tasks in our daily lives. For instance when the nursery owner or a garden owner is out of town or away from his garden they fail to take care of the same. Today people are looking at ways and means to better their life-style using the latest technologies as it becomes inevitable to have easy and convenient methods and means to control and operate these appliances. To design automatic systems and application for tasks in home in order to make smart home automation system using Internet of Things. To perform activity like plant watering and control ,monitor and perform these activities even in the absence of humans using IoT based techniques to make
Smart Home Automation System.

II. LITERATURE SURVEY

Shrinidhi Rajagopal ,Vallidevi Krishnamurthy[1] proposes the automated plant watering system with the help of soil moisture sensor. Sensors check the moisture level and if found below limit then plants will be watered at certain intervals. In remote monitoring of soil characteristics[2], inverse relation between soil moisture and soil resistance . Moisture is less when resistance is more. Audace Byishimo, Aminata A. Garba[3] represented smart irrigation system. In this, GSM module is used for data sensing and then sends to database server. SMSs are used for sending data to mobile phones but it does not work for long distance. Hence, it is not smart system.

Nelson Sales, Orlando Remdios[4], proposed a cloud based wireless sensor and actuator network communication system. It monitors and controls a set of sensors ,to access plant water needs. The data generated by sensors is send on the cloud storage devices. In Development of a Smart Irrigation System[6], the design and implementation of an automatic water sprinkler system for a farmland which monitors and controls a water sprinkler . It reduces wastage of water. need. System uses Arduino controller and main device used as Solenoid valve .It is electrochemical device and it is used for control the flow of liquid. In IoT Based Crop-Field Monitoring And Irrigation Automation[7], IoT crop-field monitoring using sensors like soil moisture, humidity, light, temperature and automates the irrigation system. The data from sensors are sent to web server database using wireless transmission. In server database the data are encoded in JSON format. This system is used in green houses and used there where water scarcity is the main problem. Power consumption is reduced and also reduces water consumption. For user side communication, android mobile application is developed.

III. PROPOSED SYSTEM

The system consists of three subsystems: input unit (moisture sensor, water level sensor, water flow meter), processing unit (Node MCU ESP8266) and system control unit. A MCU ESP8266 is attached with a Moisture sensor, an ultrasonic sensor which is used to find the water level, a water flow meter and a 2CH relay. We use an Android App as well as dashboard as user interface. If an Android app is not available to the user then he can use a dashboard. The sensors collect information from their surrounding and this data is then uploaded on the cloud server. Data clustering takes place in the cloud. Using clustering algorithm for pattern mining certain pattern using previous parameter values can be predicted and shown to the user on the application. The user will then take appropriate actions to control the water flow level to the plants.

An Android app which is an user interface and is used to make commands. A cloud server which takes as well as provides data for operation of the system. Sensors to monitor the environment. Node MCUs ESP8266 for controlling the system.

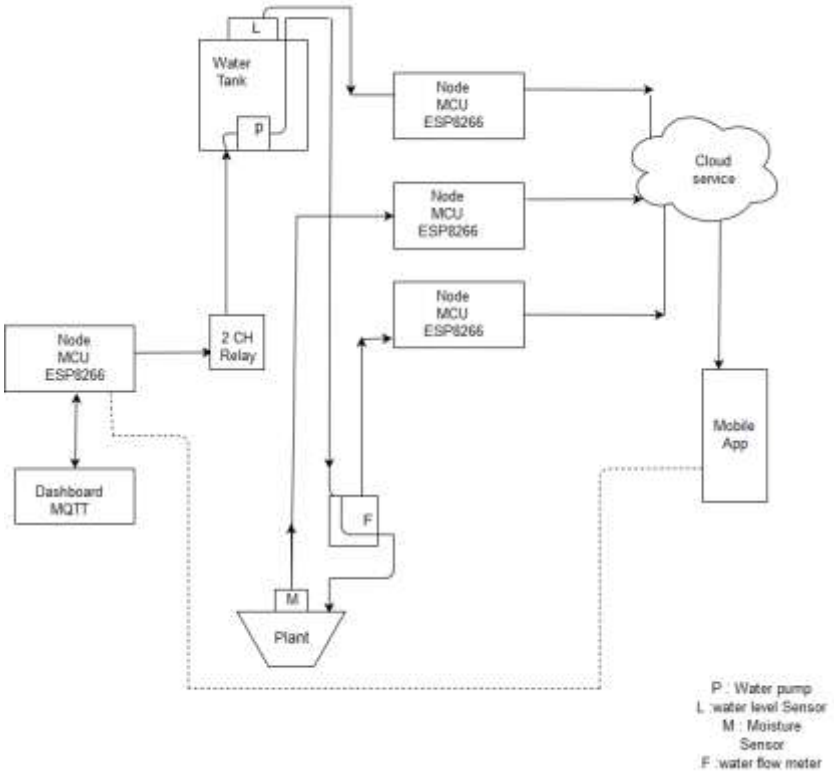

Figure 1 : System Architecture

IV. SYSTEM DESIGN AND IMPLEMENTATION

Hardware Interface components:

ESP8266 Node MCU - On-chip integration with sensors and other applications.
2CH Relay board - Used for controlling higher current loads.
Ultrasonic sensors - Used for measuring water level in the tank.
Fountain pump - To pump and control water flow.
Soil Moisture sensor - To read the moisture content values from the soil.

Software Interface components:

Arduino IDE - It contains a text editor for writing code and connects to the hardware to upload programs and communicate with them.

Communication Interface components:

WIFI module - Transmitting data from hardware to server.
Portable WIFI hotspot - Connects hardware to network.

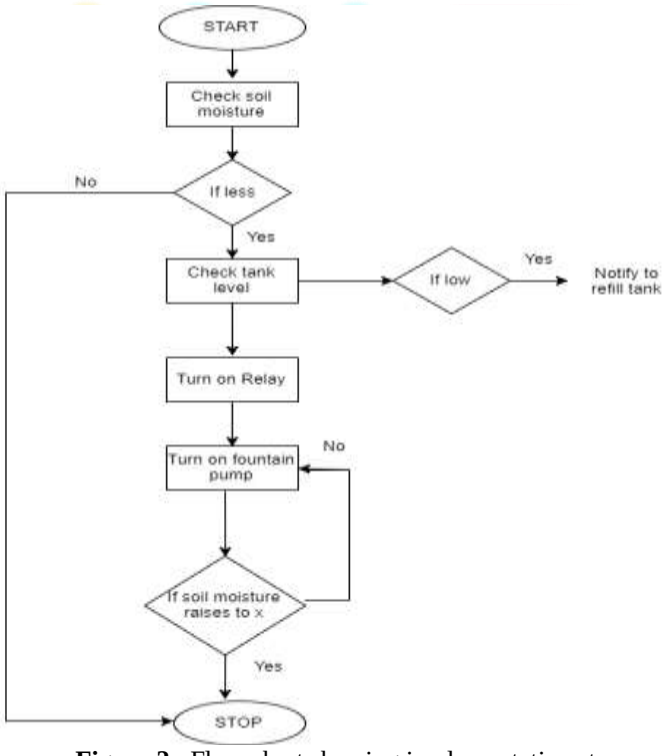

Figure 2 : Flow chart showing implementation steps

V. RESULT

Soil moisture level when low will give an alert to the user. The user can not only monitor the system but also can control the water level and water flow through android app from a remote location. The main advantage of the proposed system is that it gives portability to the user while monitoring and controlling the system. Finally, we could display the soil moisture level and pump status on the mobile app and dashboard.

VI. CONCLUSION

Internet of Things has enables the plant watering system easy and efficient for the people who work daily and are outside from home. Plant watering system allows the people to maintain and track water flow record and control the flow into the garden or nursery. The system can be used by anyone who owns a garden or nursery to monitor their plants and the water flow. This system not only monitors the activities but also give the people the rights to control the water flow and tank level. The reality is that the IoT allows for virtually endless opportunities and connections to take place, many of which we can't even think of or fully understand the impact of today.

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