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IOT BASED AUTOMATIC PUBLIC GARDEN MAINTENANCE SYSTEM

Dr.D.Binu[1], Ragul J[2], Sivanath B[3],Vignesh M[4]

[1]Assistant professor (Sel.Gr.), [2,3,4] U.G Students,

Department of Electronics and Communication Engineering Sri Ramakrishna Institute of Technology, Coimbatore.

Abstract: Recent days, the utilization of electricity and water increased, because of its demand. The lamps and pumps are left ON which results in wastage of electricity and Water. Automation of the garden helps to overcome all these problems. In public garden automation system we use various sensors to measure the moisture of soil and detect the temperature of surrounding also LDR sensor for observing intensity of light. Soil moisture sensor measure moisture in the soil we set a threshold value for moisture if it goes on that level of value then water pump will turn on automatically. Even the switching ON or OFF of the Garden lights is automatic, there will be no delay. As the public garden needs to be opened and closed in the morning and night, it has been fixed with a motor to complete the action. The live Status of the garden will be updated periodically. The authorized person can collect the data being transmitted. This data can be used for calculating the amount of water and consumption of electricity. The wastage of water and electricity can be reduced. The maintenance of Public Garden can become very easy and efficient.

Index Terms **-Raspberry pi3 , soil moisture sensor, temperature and moisture sensor , LDR.**

I. INTRODUCTION

Automation rules the world nowadays. Computers or mobile phones are used in monitoring and controlling the parameters of daily life activities. The practice of using automation for simple things will be a part of life. The Internet of Things (IoT) is a real application that connects the physical devices through the Internet. The IoT can collect and transfer the data over a network without any human assistance. The devices are built with technology that can be controlled and monitored remotely real-time data will be collected by employing several analog sensors, such as light, temperature, humidity, and soil moisture sensors. A Public Garden has many parameters to be maintained, the important parameters are proper watering of the plants. Others are the turning ON and OFF the lights, opening, and closing of the main gate. Automating these parameters would improve the maintenance of the public garden. An automatic public garden maintenance system has been developed to automate the actions or can be controlled manually. The system gives Real-time data to the supervisor of the garden. The supervisor can control two or more public gardens in that locality with ease and effectively. Required actions can be carried without any human interference.

II. RELATED WORK

[1] Pawar.P [2017] et. al explains that an automated garden monitoring system that can be scaled down to improve the conditions of indoor gardens as small as household garden boxes for garden enthusiasts or as big as greenhouses for the agriculture industry. Real time data will be collected by employing several analog sensors, such as light, temperature, humidity, and soil moisture sensors.

[2] T.Thamaraimanalan [2018]et. al proposed that implementation of Smart Garden system using the Internet of Things has been verified to satisfactorily work by connecting different parameters of the soil to the cloud and was successfully controlled remotely through a mobile application. The system designed not only monitors the sensor data, like moisture, humidity, temperature and ultrasonic but also actuates other parameters according to the requirement, for example, if the water level in tank is reduced to a minimum value then the motor switch is turned on automatically to the water level of the tank reaches the maximum value.

[3] Jasmine Sweety.A [2017]et. al explains that the Internet of things is the internetworking of the vehicles, hardware devices, software devices and other items. The things which are working in internet of things are embedded or associated with electronics, sensors, software devices and internet connectivity. The internet of things allow the objects to work with the remote control, sensor control or internet connection. The internet of things connection does not need any manual help or computer interaction with the man Internet of things has the wireless connection.

[4] Thombare R.B [2018]et al explains water is the basic requirement for plant growth. The water usage varies with different plants. Sensors are used to automate the process. The water pump will be turned ON with the reading from soil moisture sensor. Lights are also turned ON or OFF using the reading from LDR sensor. The system is simple to implement in Indoor gardens and Small scale gardens.

[5] Bishnu Deo Kumar[2017]et al water scarcity is the major problem in Country. Various methods are implemented in water irrigation. The automated water irrigation system is designed to reduce water consumption and increase water conservation. Water the plants with pipes or oscillators tend to waste water. This system can be used to water in targeted area which helps in water conservation.

III. METHODOLOGY

The proposed methodology is based on IoT, the system will automatically control lamps, the main gate and water the lawn. Sensors like Soil moisture sensor, temperature sensor, Light Depended Resistor are interfaced. Servo motor is used for controlling the Main gate. Water pump is used for sprinkler system. An LCD display is present to indicate the current status. Raspberry Pi3 is used to control the modules and collect Real time data. The block diagram of the proposed system is shown in Fig.1

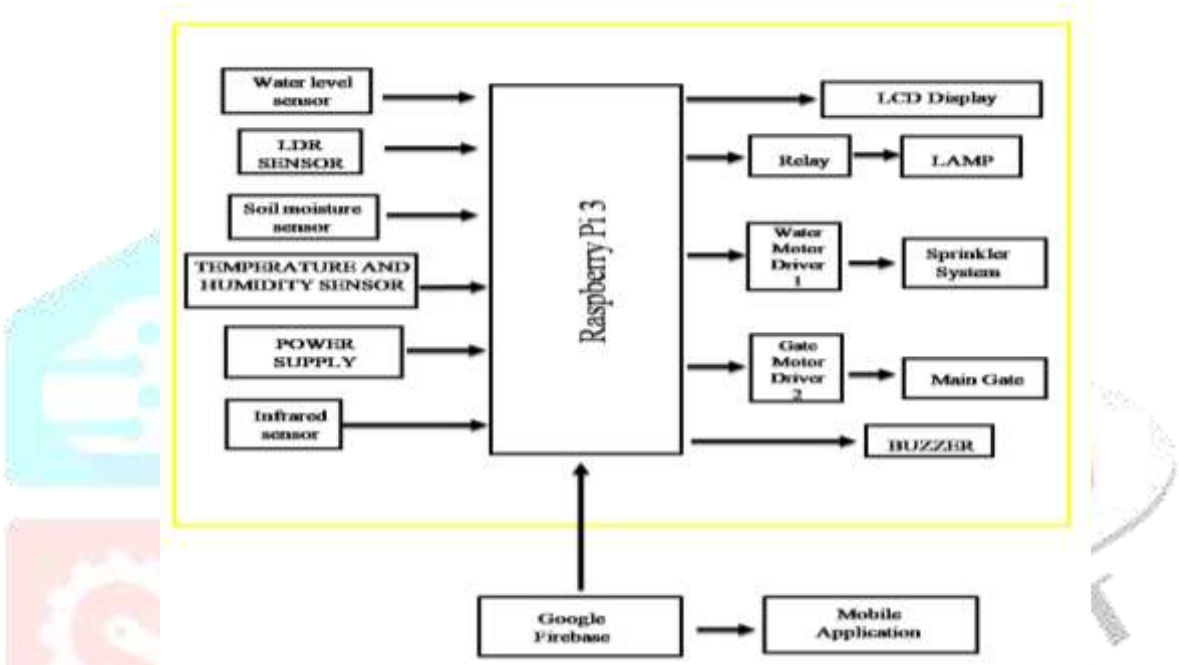

Figure 1: Block diagram of proposed system

3.1. WORKING OF PROPOSED SYSTEM

The collected data is sent to firebase and displayed in the mobile application developed. The automatic system is pre-programmed to water the field at regular intervals using sprinkler system, the moisture sensor will also detect the moisture level and initiate the sprinkler system, LCD screen is used to indicate the process. The public garden gates will be opened or closed automatically when its time, when it is about time the buzzer is alarmed to indicate the opening or closing of the garden. The garden lights are turned ON or OFF automatically or by the signal sent using LDR, in the early morning and Evening, one light is kept ON throughout the night. The Internet of Things (IoT) is a real application that connects the physical devices through the Internet. The IoT can collect and tranthe data over a network without any human assistance .The flow of process is represented in Fig.2.

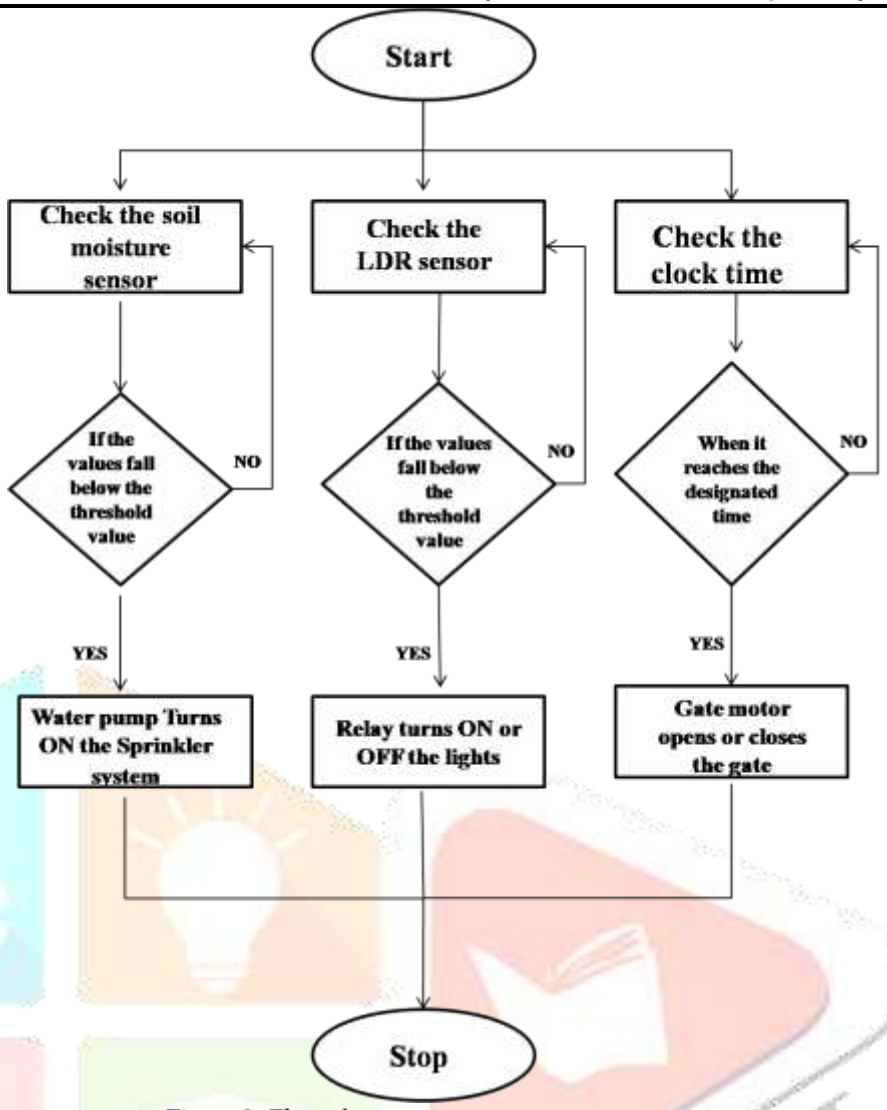

Figure 2: Flow chart

IV. RESULTS

Raspberry Pi3 controller is being interfaced with various sensors like Soil moisture sensor, Temperature and humidity sensor, LDR sensor, Infrared sensor, LCD display, Buzzer, Motor drivers, LED light, Buzzer. Water sensor is used to check the level of water in the tank. An mobile application is developed to read the live status of the garden parameters. The mobile application is developed in android studio software. Sensor values are saved in firebase database. The controller transfers the values to the database.

The conditions for the sensors are represented in Table-1.

Table-1 Sensor Conditions

Water Motor	Temperature	Humidity	Soil Moisture
Turn ON	40 ^{0}c and above	35 and above	1023
Turn OFF	Less than 35^{0}c	20 to 34	Less than 900

The Conditions for the opening and closing time of the gate for the public garden is represented in Table-2

Table-2 Garden Timing

Main Gate	Time
Opens	5-9 AM &PM
Closes	other timings

The light ON and OFF conditions based on the LDR is given in Table-3.

Table-3 LDR Range

Lights	LDR
ON	0-700
OFF	700-1023

When the system is being turned ON it displays the message AUTOMATIC GARDEN SYSTEM. The controller is being programmed with this message. The controller reads the values of the all the sensors being interfaced. The conditions being pre-programmed will be checked internally with the sensor values. Controller turns ON or OFF the pump when the conditions are satisfied. The processing speed of Raspberry Pi is fast enough to process the entire task at once.

Figure 3: LCD display of the system.

Soil moisture sensor reading is displayed in the above picture. The range of the soil moisture sensor is from 0-1023. The sensor works on the principle of conduction. Relay is also interfaced with the controller, it turns ON the water pump when the reading is above 900. When the reading falls below 900 the relay is turned OFF, and the water pump is also turned OFF. The humidity and moisture sensor also indicates the soil's condition to the processor. Whenever the conditions are not satisfied the processor initiates the actions defined in the program. The lights are also turned ON and OFF using the real clock time and values from LDR sensor. The gate of the garden is fixed with motor which opens and closes with the garden timings.

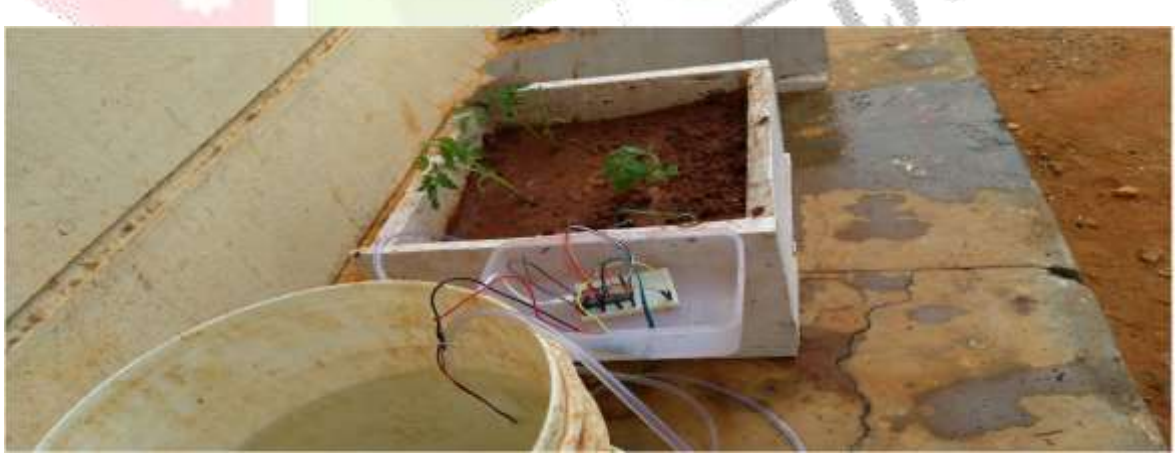

Figure 4: Implemented design of the system.

V. CONCLUSION

The system not only monitors the sensor data, like temperature, light, moisture, water level but also actuates a process according to the requirement, for example switching on the light when it gets dark. It also stores the sensor Data in the cloud in a timely manner. Such a system can easily be made and it is not very costly. Improving the sensor technology, the system can become more efficient and useful. For instance, a more accurate weather forecast can help better decision making in supplying water and reducing water wastage. This system can save manpower. This can be implemented in automated irrigation system because of its reliability, low cost and optimized usage of water resources for agricultural production.

VI. REFERENCES

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