International Journal of Computer Science and Engineering (IJCSE)
ISSN(P): 2278-9960; ISSN(E): 2278-9979
Vol. 8, Issue 4, Jun - Jul 2019; 11-24

International Academy of Science, Engineering and Technology
Connecting Researchers; Nurturing Innovations

AUTOMATIC PUBLIC GARDEN CARING SYSTEM

Pankaj Prajapati[1], Abhishek Shukla[2], Saurabh Shukla[3] & Akhil Yadav[4]

[1]Associate Professor, Ambalika Institute of Management & Technology, Uttaar Gaon, Uttar Pradesh, India

[2,3,4]Research Scholar Ambalika Institute of Management & Technology, Uttaar Gaon, Uttar Pradesh, India

ABSTRACT

In This research paper we have made an Automatic public Garden Caring System. We have tried to automate public gardens as much as possible. In our system we are controlling four things Lamp Lights, Watering of Plants, Counting number of Visitors into the garden and closing of the gate accordingly. We came up with this idea because we felt that people are wasting the resources which they are given, like Electricity, Water etc. mainly due to carelessness. In our Research paper we are making a Bidirectional Visitor counter using infrared sensor and Arduino, Lamp Light Controller using DS3231 Real Time Clock module, Automatic Water irrigation System for watering the plants. These types of automation are important because it will save our resources and that resource can be utilised in other ways.

KEYWORDS: *Ease of Living, Bidirectional Counter, Arduino Uno, DS3231 Real Time Clock Module, Internet of Things (IOT), Soil Moisture Sensor, Infrared Sensor, Relay, Buzzer, And LDR Sensor*

Article History

Received: *29 May 2019* **|** ***Revised:*** *04 Jun 2019* **|** ***Accepted:*** *30 Jul 2019*

INTRODUCTION

As we have seen that all Sensor Based Research papers for Engineering Students solves the one or other problem in society. And the most important problems faced are the misuse of resources like Electricity, Wastage of Water and many more. Sometimes due to carelessness of the authorities and the workers lamps are left ON which results in wastage of electricity[5]. Water wastage is another problem which needs to be dealt with. Our research paper helps us to overcome all these problems. So we came up with the idea of Automatic Public Garden Caring System, which will control the four basic parameters of any Public Garden.

The four parameters which we will be dealing with are:

- Switching of Lamp Lights (In Early Morning and at Night)
- Automatic Water irrigation for plants.
- Garden opening/Closing(By Matching count of Visitor's presence into the Garden)
- Message Display of 'Welcome', 'Closed', 'Going to be Close' and Warning Buzzer before Closing the Gate.

Our Proposed System will be able to save Water through Smart Water Irrigation into the Garden and save Electricity by automatically switching off the Lights in Day time. It also reduces the cost of the requirement of Physical labour in the Managing the Garden.[4]

First, the Gate will be Open at 4:00 AM sharp and at that time only one lamp will glow. At the same time message is displayed as 'WELCOME'. Now at 7:00 AM the only glowing pole light will be switched off and 'WELCOME' message disappear.

Meanwhile, the Automatic water irrigation waters the plant if needed through sensing the Moisture from the soil and switches on the water supply to water the entire garden before opening of the garden for public.

Now, at around 6.00 PM in evening, all lamps are switched-on and lights remain functional till the garden remains open for visitors. The garden remains open for about three hours and so at around 8.50 pm message 'Going to be Close' is displayed and a buzzer is sounded to indicate closure of the garden and alert the visitors to move outside.[3]

At 9:15 PM, if there is any visitor left into the garden (due to any reason like deafness, sleep, drunk etc.) a message is send to the owner if there is any visitor present into the garden. Then owner can himself check the garden and then can remotely close the main gate through his mobile.

After the closure of the main Gate the message 'CLOSED' is displayed and all pole lights are switched off except one which will remain on till 7 AM in morning. One lamp is kept on throughout the night.

The gate is opened by running the motor which is driven by a motor driver operated by the Arduino UNO board. These are the step involved in the operation of the System and the public garden automation. Arduino is used to supervise the actions of devices and to control the particular set of operations.[10]

Literature Survey

In today's world, there is a continuous need for automatic appliances. So from time to time various things are done to automate the Gardens.

This research paper can be applied with minimum cost and resources in any public garden which are generally maintained by municipal corporations.[1]

This research paper can also be used at private gardens like company or universities or educational premises like schools/colleges.

With little modifications, this research paper can be used in industries. By this the light bulbs can be controlled with respect to intensity of light in the environment. Also, various industrial devices can be turned on/off with respect to desired time for the specific interval of time.[11]

Objective

Our main objective in this research paper is to make a System to prevent unwanted electric power waste in Public Gardens. This whole process is operated automatically by the different sensors.[12]

We made a controller based model to count number of persons visiting the Garden and closing the gate accordingly. We are using Infrared sensor and controller to count the no of persons into the Garden and display it on LCD.In this research paper we are also going to control the light i.e. switch ON and switch OFF of the lamp which are installed in the garden. As we all know there is wastage of light when the bulbs keep on glowing during the day time. So in this research paper we are making a system which is going to control the glowing of bulb automatic.[2]

METHODOLOGY

The Methodology Divided into three Parts:

Block Diagram

Block diagram of whole System is shown below.

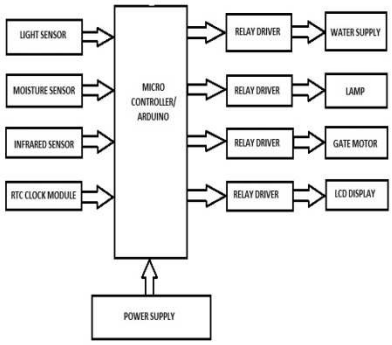

Figure 1.

The three parts of Methodology are as follows:

Visitor Counter Using IR Sensors and Arduino Uno R3

The Objective of this part is to make a controller which can sense if any person enters the Garden, counts how many people are entering the garden or going out of it. Thus displays the number of person presented into the Garden on LCD Display.[6]

Description

- In today's world, there is a continuous need for automatic appliances.
- The objective of this research paper is to make a controller based model to count number of persons visiting Garden, lighting up the Lamps automatically and watering the plants as per the moisture of the soil. Here we are using sensor and controller to count the no of persons in the room and display it on LCD.
- If there is at least 1 person in the room, the LED will glow else it will remain off[8]

Components Required

Hardware components:

- Arduino UNO
- Resisters
- IR Sensor module
- 16x2 LCD display
- Bread Board
- Connecting Wires
- LED
- BC547 Transistor

- Software
- Arduino

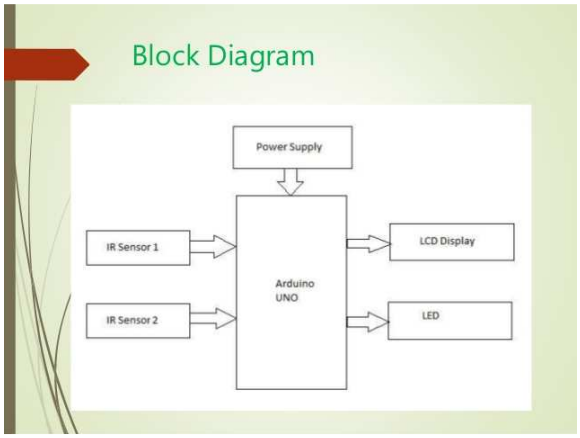

Figure 2.

Schematic Diagram

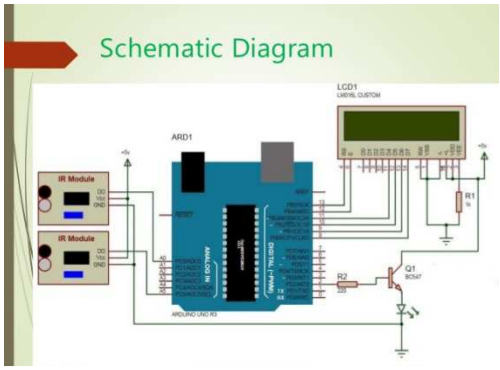

Figure 3.

Working

- The IR sensor continuously senses the presence of any person into the Garden.
- If sensor 1 senses a person, it informs the controller that a person has entered so that controller can increment the count.
- At the same time it gives a delay of 1sec so that the person can cross the sensor 2 and the count is maintained correctly.
- When a person exits, the sensor 2 informs the controller to decrement the count. Similarly it also provides a delay of 1 sec to maintain count properly.
- The count is displayed on LCD by the controller.
- At the time of Gate closure if there is at least 1 person inside the Garden, a Buzzer will blow and a message is send to the Owner of the Garden. Then owner can himself check the garden and then can remotely close the main gate through his mobile.

IR Sensor (Infrared Sensor)

You can see the basic hardware structure of the IR Sensor below.

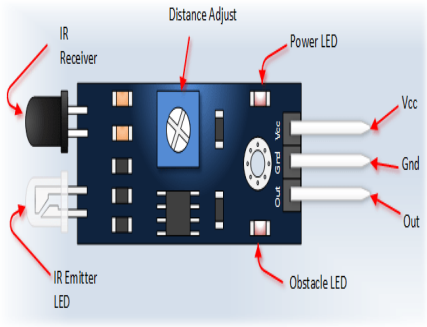

Figure 4.

This IR Sensor is consist of two LED Lights.

- **White:** Transmit the IR rays
- **Black:** Receive the IR ray

IR Sensor is Digital type sensor, so Its output is high or low.

How IR Sensor Works

As we give power to IR Sensor using Arduino at that time White LED light is transmitted the IR rays. This IR ray is strike with the object, it will reflect back and received at black LED light. As this phenomenon occur IR Sensor Produce Low or High Voltage at output pins. It depends on what type of sensor you choose.

Your Programming is depended on which type of sensor you choose. So you need to check it out.

- **Active High Sensor:** Output is High
- **Active Low Sensor:** Output is Low

Condition for Working IR Sensor

- IR Sensor doesn't work with Black colour objects, because black colour absorbs the transmitted rays fully.
- The object must pass in the range of IR Sensor, You can adjust the intensity of IR rays by distance adjust button.
- IR Sensor doesn't open directly to the sun.

Circuit Diagram of Visitor Counter using Arduino

Here is the Circuit diagram follow it.

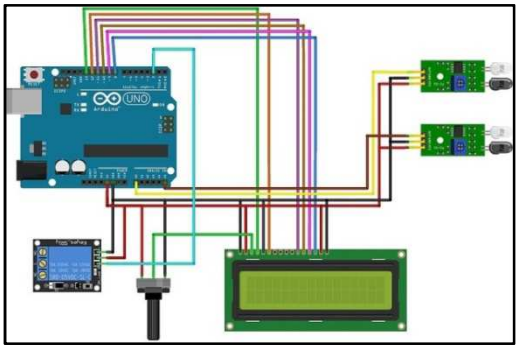

Figure 5.

Coding

```
#include<LiquidCrystal.h>   //including header file
LiquidCrystallcd(13,12,11,10,9,8);
define in 14   //defining pin number 14 as input pin
define out 19  //defining pin number 19 as output pin
define relay 2
int count=0;
void IN()
{
count++;
lcd.clear();
lcd.print("Person In Garden:");   //print the number of persons into
the garden
lcd.setCursor(0,1);
lcd.print(count);
delay(1000);
}
void OUT()
{
count–;
lcd.clear();
lcd.print(" Person In Garden: ");    // print the number of persons into
the garden
lcd.setCursor(0,1);
lcd.print(count);
delay(1000);
}
void setup()
{
```

```
lcd.begin(16,2);
lcd.print(“Visitor Counter”);
delay(2000);
pinMode(in, INPUT);
pinMode(out, INPUT);
pinMode(relay, OUTPUT);
lcd.clear();
lcd.print(“Person In Garden:”);
lcd.setCursor(0,1);
lcd.print(count);
}
void loop()
{
if(digitalRead(in))
IN();
if(digitalRead(out))
OUT();
if(count<=0)
{
lcd.clear();
digitalWrite(relay, LOW);
lcd.clear();
lcd.print(“Nobody In Garden”);    //It prints when there is
no visitor into the garden
lcd.setCursor(0,1);
lcd.print(“Light Is Off”);
delay(200);
}
else
digitalWrite(relay, HIGH);
}
```

Automatic Lamp Light Controlling in Garden

Description

In our research paper we will learn to design RTC clock Based Street Light Control Using Arduino & LDR sensor. In this research paper street lights turns ON or OFF on the basis of day and night timing controlled by RTC clock module DS3231. The concept of this research paper is based on, low consumption of energy. The timing is set from programming to determine ON/OFF time. Similarly, LDR sensor is used to detect the quantity of light and on that basis, street Light intensity is controlled.

In the garden there will be 5 bulbs in total. 4 bulbs will be inside the garden and 1 bulb will be in the gate entrance.

The bulb at the gate entrance will be in ON condition from 6PM to morning 7AM (winters due to fog) i.e. for whole night it will be ON. The other 4 bulbs will be in ON condition from 6PM to night 10PM and then they will be turned OFF.[7]

So, this research paper is very helpful for controlling the electricity wastage. The best part is that it will be done automatically without any human interference. Earlier people use to come at night in garden and left the lights but know some electricity will be saved.[9]

Components Required

- Arduino UNO Board
- DS3231 RTC Module
- LDR
- 16*2 LCD Display
- Push Button
- 10K Resistor
- LED - 3 to 5
- Connecting wires
- Breadboard

Circuit Diagram

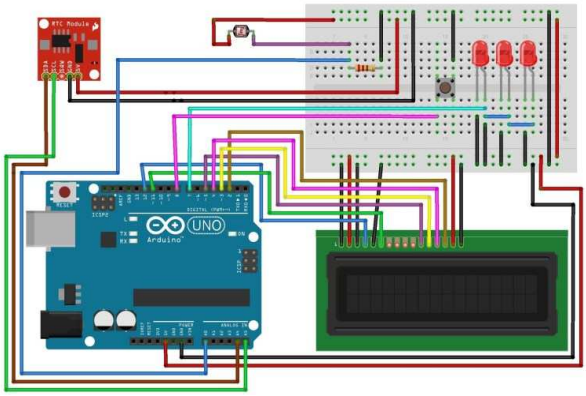

Figure 6.

Working of this Circuit

The research paper RTC Based Street Light Control Using Arduino & LDR sensor operates in two modes i.e. **RTC Mode and LDR Mode.** In LDR Mode, the street lights have an intensity control based on the ambient light near the LDR sensor. In RTC Mode, the lamps lights turn ON automatically based on the ON Time set in the code and turn OFF based on the OFF Time.

After the code is uploaded, the research paper runs in RTC Mode. There are two times set in the code, i.e. the ON TIME and the OFF TIME.

Arduino compares the ON TIME with the time from RTC clock Module. When they match, the LED is turned ON. After this, the Arduino waits for the OFF TIME and once the time from RTC Module reaches the OFF TIME, the LED gets OFF.

Real Time Clock

We are going to use DS3231 Real Time Clock (RTC) module for the purpose of providing time delay for which the bulb will be in ON and OFF condition.

The RTC is a low cost device which is embedded with the rechargeable battery on the opposite side of it. The delay provided on RTC with the help of programming done on the Arduino Uno IDE. The delay can be provided in the form of hours, minutes, and seconds and also in form of days, months or years. The battery provided on the RTC module can work for 2 years. With the help of jumper wires the RTC module will be connected to Arduino board.[8]

Relay

The relay is also used here which is of 5V. As we know that relay is an electrically controlled switch. So, this will act as switch for ON and OFF for the bulbs used here. The relay also has more than one channel to control more than one electrical appliance. We will use it here because we are going to control more than one lamp. When the specified time matches with the real time then the relay will be triggered or not triggered. On other situation it will be in off situation.

Arduino Board/Arduino IDE

Arduino board is the main component used in this research paper. It is used to provide link between the RTC module and the relay. The programming done on IDE and the time delay provided will be received by Arduino board. The Arduino will send the message to the RTC module. The RTC module will receive the time delay and relay will be triggered or untriggered accordingly.

Automatic Water Irrigation System for Plants

Description

The smart water irrigation system is based on the Arduino technology in which the water irrigation is done using the Soil Moisture Sensors. Nowadays, it has been seen that in the season of summer as well as in winter, due to the sloppiness of caretakers (of garden) huge amount of water is wasted. So, this research paper will help them to Water the parks with no human interference at Garden.[2,4]

The model that we are going to develop is programmed and its movement is controlled by an Arduino.

This research paper consist of the humidity and moisture sensor which senses the moisture and the humidity and matches with the data if the data is not matched then the module will send the signal to the provided Arduino and the Arduino can turn ON the pump as the water will be filled the another signal, the matched data will be sent to Arduino to turn OFF the pump using his phone.[1,5]

Planning of Work

- Constructing the structure of the system.
- Placing the components to the structure.
- Write the Arduino program on the IDE platform.
- Burn the program into the Arduino.
- Connect the components as per the program.
- Interface Arduino with Soil Moisture Sensor.

Facilities Required for Proposed Work

- Metal or hard plastic plate
- 12 volts DC battery
- Arduino UNO
- Temperature and humidity sensor
- Soil moisture sensor
- Peristaltic pump
- Adapter/ Breadboard
- Relay
- ARDUINO IDE Software

Procedure for the Research Paper

- We Connect the Relay to Arduino UNO

  Connections

  Arduino to Relay

  5V - VCC

  GND - GND

  PIN 13 - IN1

- We Connect Soil Moisture Sensor to Arduino UNO

  Connections:

  Arduino to Soil Moisture Sensor

  5v - VCC

  GND - GND

PIN 8 – AO (Analog Output)

- We Connect DC Water Pump to RELAY

  Connections:

  DC Water Pump to Relay

  (We just cut the negative wire of pump and connected to NORMALLY OPEN PORT & COMMON PORT of RELAY)

Circuit Diagram

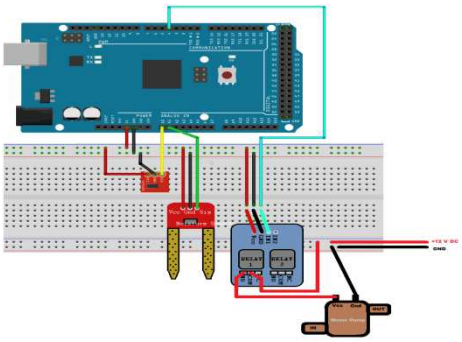

Figure 7.

Coding

To connect the soil moisture sensor FC-28 in the digital mode, we will connect the digital output of the sensor to the digital pin of the Arduino. The Sensor module contains a potentiometer with it, which is used to set the threshold value. This threshold value is then compared with the sensor output value using the LM393 comparator which is placed on the sensor module. The LM393 comparator will compare the sensor output value and the threshold value and then gives us the output through the digital pin. When the sensor value will be greater than the threshold value, then the digital pin will give us 5V and the LED on the sensor will light up and when the sensor value will be less than this threshold value, then the digital pin will give us 0V and the light will go down. Circuit Diagram

The connections for connecting the soil moisture sensor FC-28 to the Arduino in digital mode are as follows.

VCC of FC-28 to 5V of Arduino

sGND of FC-28 to GND of Arduino

D0 of FC-28 to pin 12 of Arduino

LED positive to pin 13 of Arduino

LED negative to GND of Arduino

Int led_pin =13; int sensor_pin =8;

void setup() {

pinMode(led_pin, OUTPUT);

pinMode(sensor_pin, INPUT);

```
}
void loop() {
if(digitalRead(sensor_pin) == HIGH){
digitalWrite(led_pin, HIGH);
}
 Else
 {
digitalWrite(led_pin, LOW); } else {
digitalWrite(led_pin, LOW);
delay(1000);
}}
```

Future Aspects

- This System can also be used for the betterment of farmers by including the some more sensors which work over quality of soil and nutrients present in soil.
- It can be used at homes and other places to keep a check on the number of persons entering a secured place.
- It can also be used as home automation system to ensure energy saving by switching on the loads and fans only when needed.
- This System can be further integrated by adding Security features at the opening of the Gate so that only the registered member can enter into the Garden.

CONCLUSIONS

The research paper we have undertaken has helped us gaining a better perspective and practical knowledge of electronics and electrical equipment and communication. We became familiar with Planning, Designing, Implementation, Testing and proper maintenance concerned with our research paper. An advantage of this system is very simple, more competent and low cost. Using this system the farmers can be able to utilize the availability resources efficiently without wasting of resources. This system gives the accurate condition as per the requirement of authority of garden.

The user can also feed the input by GSM and IOT technologies and on the basis; particular condition will turn on for defined time period system can be implemented for any field like home garden automation, in restaurant, public garden and college garden etc.

REFERENCES

1. *RTC Based Farm Automation–Mr. Vaibav A.Pawar IJSRD-International Journal for Scientific Research AND Development Vol. 3.*
2. *www.ethesis.nitrkl.ac.in*

3. *www.mathwork.com*
4. *www.electronics4fun.com*
5. *www.electronicshub.org*
6. *IIT Bombay/spoken tutorials*
7. *Douglas John McConnell (2003). The Forest Farms of Kandy: And Other Gardens of Complete Design. p. 1. ISBN 9780754609582.*
8. *Douglas John McConnell (1992). The forest-garden farms of Kandy, Sri Lanka. p. 1. ISBN 9789251028988.*
9. *Jump up to:[a] [b] "A Brief History of Gardening". Retrieved 4 June 2010.*
10. *Ryrie, Charlie (2004). The Cottage Garden: How to Plan and Plant a Garden That Grows Itself. Collins & Brown. p. 7. ISBN 978–1–84340–216–9.*
11. *Scott-James, Anne; Osbert Lancaster (2004). The Pleasure Garden: An Illustrated History of British Gardening. Frances Lincoln Publishers. p. 80. ISBN 978–0–7112–2360–8.*
12. *Anne Scott-James, The Cottage Garden (London: Lane) 1981, de-mythologised the origins of the English cottage garden, and its treasured topiary among the vegetables and flowers, popularly supposed to represent heirlooms from the seventeenth century.*