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IoT based Public Garden Monitoring System

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Abstract -Automation is done to minimize human assistance and provide comfort to man-kind.Public garden play a critical role in balance between land development and urban ecology.So maintenance of public garden is the need of the hour.The introduction of automation in garden maintenance is the motto of our project.In this paper,we have implemented a new design to monitor the garden parameters like temperature of the garden surroundings,moisture of garden soil,humidity of the surroundings,and people movement in the garden to maintain the garden.The system is proposed to gather these real time data and help the municipality to monitor the garden smartly using IoT. This system paves way to help municipality to conserve the energy utilization,usage of public garden in a proper manner to benefit the public

Keywords- Automation, public garden, IoT, Monitoring system.

Fig -1: Unmaintained Public Garden

1. INTRODUCTION

The aim of the project is to reduce the water, electricity and also man power in the maintenance of Public gardens. Since in countries like India, where usage of public garden by people is so important for their daily walking routines and for children playing areas. So, in our paper we have created an idea where a sensor based network garden is implemented and through this monitoring system the garden parameters like garden surrounding temperature, humidity and moisture which plays a vital role in the need to water the plants in the garden. Also, a measure of people usage is monitored and proper gate closing and opening is performed. The water required for watering the plants in the tank of the garden is also done. The electricity usage for lamps in the garden is also monitored to reduce power consumption. The sensors used in this project are Temperature and Humidity Sensor, Soil Moisture Sensor, Water level sensor, LDR,PIR sensor. The sensor sense the garden parameters and given to the controller for maintaining the garden parameters effectively and helping the authorities for public garden maintenance.

2. GARDEN PARAMETER MONITORING SYSTEM

In this fast moving world everyone is dependent on mobile phone for their day to day activities so we developed a project which entirely controlled by mobile phone. The garden monitoring system is controlled by controller which aids in watering the plants by collecting the real time data like temperature,humidity,moisture of the garden.To water the plants it is important to note the water level in the water tank therefore water level sensor is used.Temperature sensor is also used here because whenever the temperature of the soil is high the plants and soil of the garden needs to be watered. To measure the humidity and temperature DHT11 sensor is used which measure the volumetric content of the soil and temperature around the environment. An LDR or a photo resistor is a device which is made up of high resistance semiconductor material. It is used in garden by which luminesce of the garden is sensed and LDR is activated. When light falls on the LDR then the resistance decreases and increases in the dark.When a LDR is kept in the dark place,its resistance is high and when the LDR is kept in the light its resistance will decrease. Water level sensor measures the

water level in the tank for watering the plants. Soil moisture sensor used to measure the volumetric content of the soil, and based on this if the soil moisture level is too high, it sprinkles the water to the plants. PIR sensor is used to detect the human movement and based on the human movement and timing the gates of the garden can be operated. LDR senses the environment luminescence. If the luminescence is high LDR value is zero and when the luminescence is low it turn on the lights .Solar cell are used as a source, which converts the sunlight into electricity and which can be used for the lawn lighting purpose. The controller used is Arduino. It collects the gathered data from the garden to provide an increase efficiency. Module NODMCU is used to check the real time data's being collected for 24 hours so that we can monitor the garden from a remote location or through mobile phones from anywhere.

3. SYSTEMDESCRIPTION

The Block diagram of the Garden Monitoring is given below

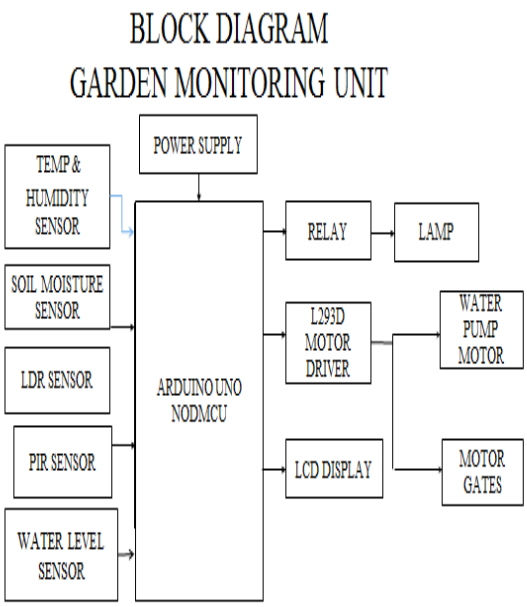

Fig -2: Block Diagram of Garden Monitoring Unit

A. ARDUINOUNO

The ARDUINO UNO is an open source microcontroller based on the microchip. The board is equipped with the set of digital and analog input and output pins that may be interfaced to various expansion boards and other circuits.It is able to read inputs-light on a sensor,a finger on a button and turn it into an output activating a motor, turning on an LED,publishing something online. These all support needed is done by the microcontroller.

B. DHT 1SENSOR

It is a digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on thedata pin. In this pin, no analog input pins is needed.It is simple to use, but requires careful timing to grabdata.

C. SOLAR PANEL

Photovoltaic solar panels absorb sunlight as a source of energy to generate electricity. A photovoltaic (PV) module is a packaged, connected assembly of typically 6x10 photovoltaic solar cells. Photovoltaic modules constitute the photovoltaic array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications like lighting of common and public gardens.

The Block Diagram of Lawn lighting Unit with solar panel is given below

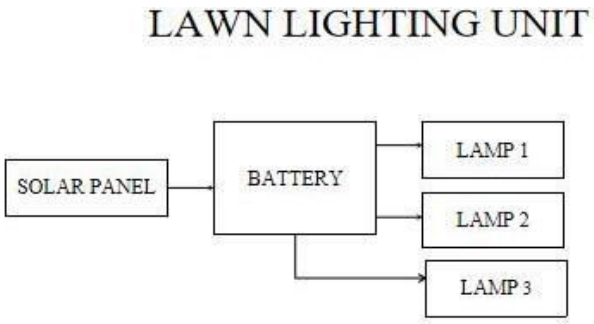

Fig -3: Block Diagram of Lawn Lighting Unit

D. DCMOTOR

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.DC motors were the first type widely used, since they could be powered from existing direct- current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its fieldwindings. These motors are used for gate opening and closing of the gardens based on the people movement and timing of the public gardens.

E. SOIL MOISTURESENSOR

Soil moisture sensor measures the volumetric water content in the soil. When the soil is having water shortage,the module output is at high level,else the output is at low level.This sensor reminds the user to water their plants and also monitors the moisture content of soil. It has been widely used in watering the plants in public gardens and parks where unmanned watering process is required.

Fig -4: Moisture Sensor

F. WATERLEVELSENSOR

It is used for measuring the level of water in application such as flumes,weirs,pipes,tanks,wells,basins and cooling towers.These are reliable cost effective instruments for these applications.The sensor is mounted over the water.To determine the distance to the water,it transmits a sound pulse that reflects from the surface of the water and measures the time it takes for the echo to return.

G.LDR

The controlling of lights and home appliances are generally operated and maintained manually in several occasions. But the process of appliances controlling may cause wastage of power due to carelessness of human beings or unusual circumstances. To overcome this problem we can use the light dependent resistor circuit for controlling the loads based on the intensity of light. An LDR or a photo resistor is a device which is made up of high resistance semiconductor material.

4.HARDWARE IMPLENMENTATION

The system demonstrates creation of innovative system that facilitate control and super vision regardless of distance and time .In this project both humidity and temperature levels should be monitored regularly in ensuring the system runs smoothly. The temperature sensor used to sense the temperature of the surroundings. The water level is also measured in the water pump motor will be turned on automatically to water the plants. Soil moisture sensor is used to measure the volumetric water in the soil .LDR is used in light sensing .when the lights fall on the LDR the resistance decreases and increases in the dark. When the LDR is kept in the dark place its resistance is high and when the LDR is kept in the light its resistance will decrease this will automatically turns on the garden lights by collecting the real time data's like temperature, humidity, moisture. Based on this collected data it sprinkle water to the plants.Using the DC motor, it open and close the gardengates.

Practical Implementation

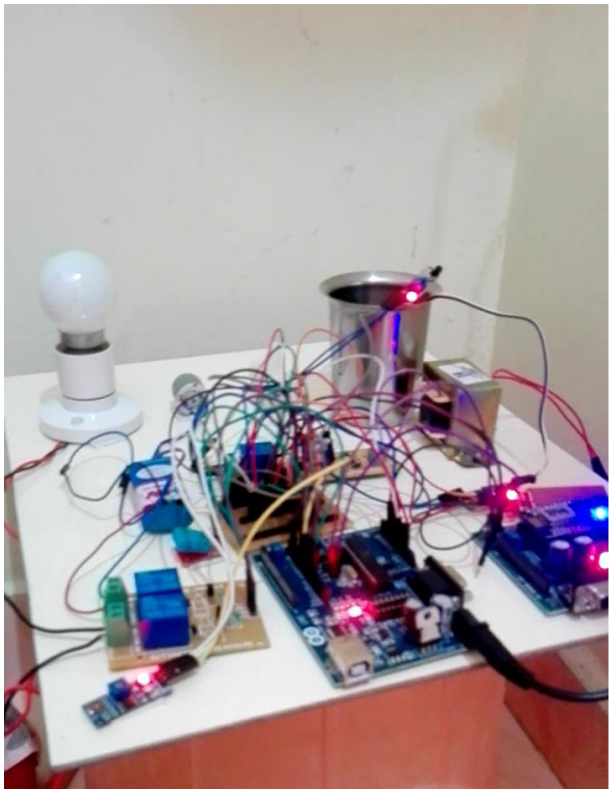

Fig -5: Hardware Implementation

The hardware was implemented and each and every module was tested and the output of each sensor was noted down and the parameters were tabulated for further use .The simulation was done and the output of the garden monitoring unit was given to the NODMCU section for display the data's in real time either in a remote device or in a mobile phone for easy access of data's.

5.RESULT

The results were collected for different temperatures and different environments and humidity and moisture conditions for verification purpose. The output from the individual sensors are verified and the outputsare tabulated as shown below in the table.

Table -1- Output of temperature, humidity Sensor &LDR

Testing of Temperature Sensor-Results

	TEMPERATURE	HUMIDITY	LDR
5am-11am	23.00 C	40.0%	0
11am-2pm	35.00 C	20.0%	0
2pm-6pm	30.00C	25.0%	0
6pm-5am	18.00 C	70.0%	1

6. CONCLUSIONS

Thus in order to maintain the Public Gardens in an cost effective manner and to conserve the energy spent in the implementation and also to reduce the man power involved in the maintenance this project will play a vital role. Now a days there is lot of water scarcity problem and wastage of current to overcome these problem we have designed a system that reduces the water consumption, electricity usage and also man power.In future this project can be implemented where a number of gardens are monitored and given to a common device in order to help the Corporation Authorities to maintain the data base of Public GardenMaintenance.

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The heading should be treated as a 3rd level heading and should not be assigned a number.

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