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ARDUINO BASED IOT GARDEN MONITORING SYSTEM

Prof.R.K.Moje[1], Jaidatta Galdhar[2], Sagar Chaturvedi[3], Sakshi Kamble[4]

Department of Electronics & Telecommunication, PDEA's College of Engineering (Manjari B.K.)

Pune, India, 412307[1-4]

Abstract: Gardening is probably one of the best hobbies a more hardworking nature lover can do. This hobby is not for nature lovers who just want... These plants require constant care and attention. Sometimes it's a burden. Just as a gardener is out of work for a while, a garden can be neglected for a while. The Internet of Things can be a good solution to this. The garden can be updated with electronic devices that continuously monitor plants and soil so that plants can be watered and shaded as needed. All of this can be managed and monitored online using IoT applications.

This project uses the Internet of Things to create a simple garden landscape. In agricultural countries like India, many people go to work thinking of agriculture. Most people love planting trees at home, but most of all they love trees because of the time they take to work. The only way to address this problem is to update existing agricultural practices by observing plant growth. The planning process therefore aims to monitor intellectual developments in industrial automation technologies and the Internet of Things. The Internet of Things (IoT) has many applications in agriculture and development monitoring. The goal of this article is to improve plant growth by controlling humidity and temperature with humidity and temperature sensors. This article attempts to grow less irrigated crops by providing users with automatic watering. Water management is essential as most people spend a lot of time watering their plants. The proposed system processes the data sent by the sensors to predict the quality of plant growth. With the help of humidity and temperature sensors, information such as humidity and temperature are obtained and irrigation is performed according to these readings. The best thing about this system is that it creates a suitable environment for plants to grow while reducing the amount of water. Keywords - Green Finger, Smart Tracking, Internet of Things, Humidity Sensor, Temperature Sensor.

II. INTRODUCTION

Introduction to the Smart Garden is a system that uses Arduino to create a system that can use sensors to measure soil moisture and use pumps to irrigate plants. This system is designed to help you maintain healthy plants by providing the right amount of water at the right time. The IoT device created by Arduino UNO is equipped with DHT-11 temperature and humidity sensor, humidity sensor, LDR sensor and other sensors, which are connected to the input terminal via Wi-Fi, and send a cyclic transfer data to the IoT platform. ESP8266 Wi-Fi modem connected to an Arduino connected to a Wi-Fi hotspot. The device also interacts with the water pump controlled by the L293D motor driver IC.

The water pump is determined by the importance of many environmental factors. Freeboard.io boards can monitor various environmental conditions such as temperature, humidity, humidity and lighting. In fact, many of these devices can be installed to control large gardens. The Arduino sketch runs on the device to perform various design tasks such as reading sensor data, converting it into an array, sending it to the IoT platform, receiving commands from the IoT platform, controlling the water pump, controlling the water, and more. we saw it on time. Graphics were created, compiled and exported using the Arduino IDE. IoT platform sketches are created, compiled, and uploaded using Arduino IDE. The IoT platforms used are Thing Speak and Freeboard. io is used to create IoT dashboards. io is used to create IoT dashboards.

III. LITEATURE REVIEW

Nageswara Rao, proposed a system IoT provides various applications for crop growth and also helps in the decision support at the time of need.

The system works with data coming from sensors used to gather information such as moisture content, soil moisture and temperature. Amount of water so to minimize the loss, this paper proposed a system which will efficiently manages the watering system

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with less complexity. This system works on the data which comes from the usedfor gathering the information like moisture content, humidity and temperature of the soil. Major advantageof this system is to provide a smart agriculture and toimplement an automatic watering system for farmingwhich will helps to reduce the water consumption [1].

IV. METHODOLOGY

1.Proposed System
2.Circuit Diagram

1.Proposed System: -

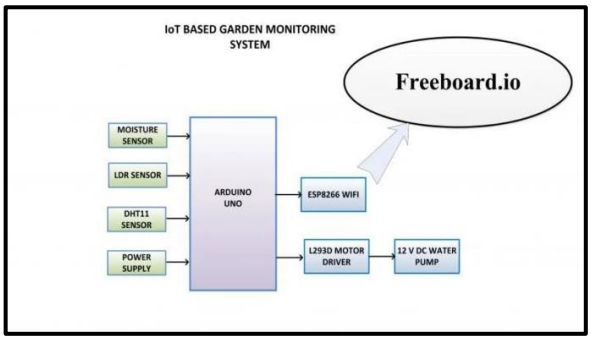

Figure No.: 1 Block Diagram

In the proposed system we have different type of sensors such as soil moisture sensor to maintain moisture level, temperature sensor to detect the temperature, Light Dependent Resistor (LDR) for light detection. This system also consists of the relay which is used for watering purpose and Arduino will acts as the heart of the system. Block diagram of the proposed system is shown in Fig.1.

In the proposed system Arduino Uno is considered to be the heart of the entire system. The Arduino Uno consists of several input and output ports through which several components are connected together and then functionalized which is shown in Fig 2. It also consists of inbuilt storage device which is of 256KB where the executable code is uploaded

2.Circuit Diagram: -

The garden monitoring device is built on Arduino UNO. So, reader should have knowledge of How to start with Arduino. The Arduino UNO is one of the most popular prototyping boards that is commonly used even in the IoT projects. Various sensors like DHT-11, Moisture sensor and LDR, the ESP8266 Wi- Fi Modem and L293D motor driver IC are interfaced to the Arduino.

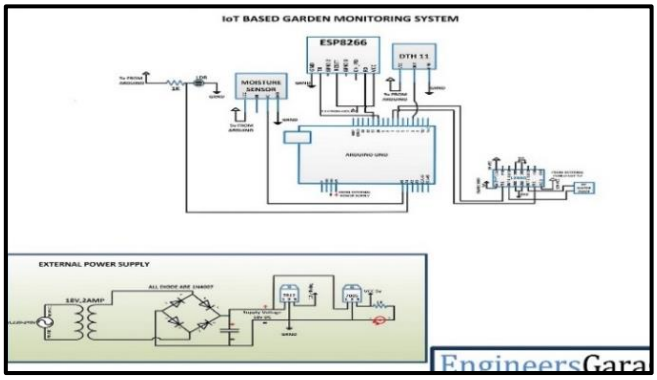

Figure No.: 2 Circuit Diagram

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A. Arduino UNO: -

Arduino function will be based upon the code which is uploaded into the memory. This code is done with the help of Arduino 1.6.13, it is coded in such a way that all the sensors have to be defined. Soil moisture sensor, temperature sensor, LDR are connected to the Arduino and its respective information is gathered. The soil moisture sensor will detect the moisture content, if the moisture content is less than the required moisture level through the relay the signal will be sent and the water pumped will be on, after a few seconds the water pump will be turned off. This module will help to increase the efficient usage of water. Temperature sensor is used to detect the temperature. Water level sensor is used to get the water level. LDR sensor will be used to detect the light presence and

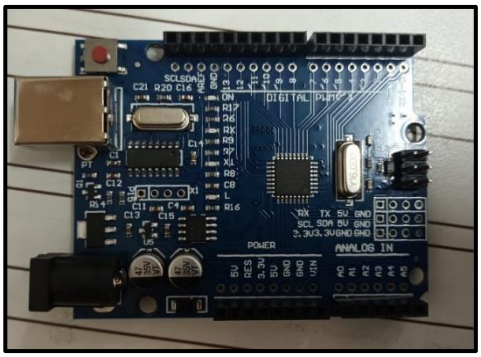

Figure No.: 3 Arduino UNO

LED light is used to increase the light presence if needed. This helps in the photosynthesis. During the night times LDR will automatically help to switch on the light which helps to observe our plant even at night times. With a proper GUI an android app is developed so all the plant growth details obtained from the plant will be made visible to the end user.

B. Soil Moisture Sensor: -

Soil moisture sensor consists of two probes which can be inserted into the soil which is shown in Fig 3. Soil moisture sensor mainly used to detect the soil moisture content present in the soil. When current is passed through these probes, if the soil has less moisture, then the electricity won't pass through out the soil which comes from the probes. But if there is some moisture content in the soil then the electricity from the probes passes through out the soil and this can be detected by the probes and sends the data to the LCD.

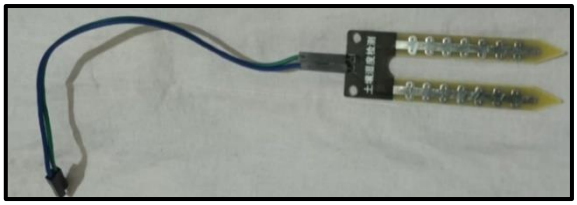

Figure No.: 4 Soil Moisture

C. LDR Sensor: -

LDR sensor is a device which has very tiny light sensing devices called as photoresistor who's resistance changes accordingly to the intensity of light. When intensity of light increases the resistance of the LDR decreases accordingly and vice versa. In this project we have used the LDR to monitor the intensity of the sunlight in various weather.

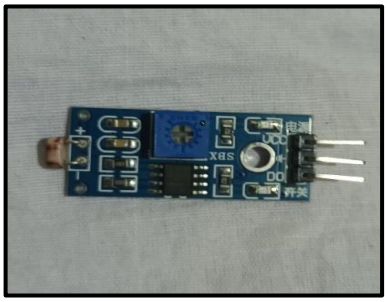

Figure No.: 4 LDR Sensor

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D. DHT11 Sensor: -

DHT 11 is a digital temperature and humidity mentoring sensor. It consists mainly of humidity sensor and thermostat to check the quality of air. It has a digital output so there is no need of analog input pins

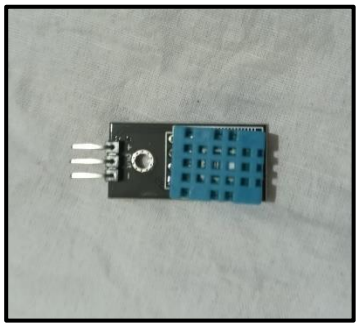

Figure No.: 5 DHT 11 Sensor

E. ESP8266 Wi-Fi module: -

This Wi-Fi module enables the microcontroller like ATMEGA328P like we used in this project, it mainly uses the 2.4GHz frequency with IEEE 802.11 bang. It can operate with ESP-AT firmware providing connections to other MCUs or it can be used as self-sufficient MUC by operating on RTOS-based SDK

Figure No.: 6 ESP8266 Wi-Fi module

F. HW130 Motor Control: -

The HW 130 Motor Control is one of the most commonly used motor drivers shield alongside of Arduino, this mainly constructed form IC L293D which is a motor control, the HW130 can run bi-directional DC motors with 8-bit speed control, 2 stepper motors and 2 servo motors.

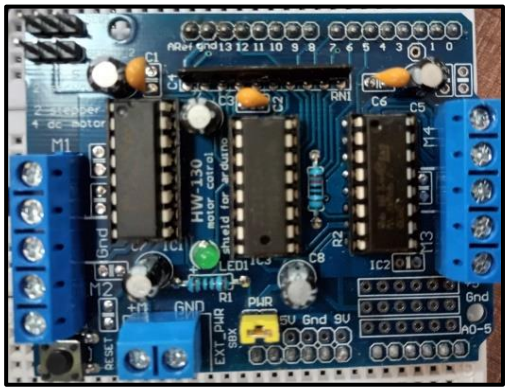

Figure No.: 7 L293D Motor Control (HW130)

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CONCLUSION

In this article, as mentioned earlier, the system considers the Arduino Uno as the core of the system and then connects the sensors as needed. Its main purpose is to monitor the plants by providing the required space and to control the humidity with the help of sensors such as humidity sensors. The thermometer measures the temperature around the plant, and then the light sensor detects the presence of light, which plays an important role in the photosynthesis process. Automatic irrigation with the help of a relay if the humidity level is lower than required. The internal code in the Arduino then reads these values and a notification is sent to an app on your phone or on the web. These alerts help provide the information needed to create the right environment for plants to grow. The system will not only sound to warn the plants, but will also examine the properties of the soil and then tell you if the existing soil is suitable for potted plants. These warnings can be given with the help of pre-recorded data. This preliminary information includes information such as which plant is good for which plant. The main purpose of the project is to have a suitable environment for the growth of plants.

FUTURE SCOPE

This system has a lot of future scope when everything is getting smart with every day new smart appliances are being introduced. with making little modifications to the circuit this system can monitor multiple plants or multiple parameters further it can save money for business organization which has a small garden at their HQ. traditionally these gardens require manpower to maintain them, but with the help of this system it can be done with lot of ease with little to no man power. A similar system is being us ed at Emirates Golf Club of Dubai to maintains their 36-hole golf course where their systems manage and maintain their lawn fields.

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Contact information: -

Porf.R.K. Moje - ravindra.moje@gmail.com
+91-99708 57007
Jaidatta Galdhar – jaidattaugaldhar@gmail.com
+91-9834997094
Sagar Chaturvedi - Chaturvedi_sagar@yahoo.com
+91-97177 95372
Sakshi Kamble - kamblesakshi529@gmail.com
+91-9356987677