IOT Based Smart Garden Monitoring System

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Abstract

Plant provides us with almost all the basic needs for survival but we are unable to provide plant with its basic needs like water, non-polluted oxygen and as a result plants are unable to survive.In this paper on IOT based smart garden monitoring system which sense the requirement of the plant and provide it with water as the soil loses its moisture. Different soils have different fertility and moisture level so we have soil and moisture sensor used in this to dectect this problem.In ur country there are six different seasons and each day have different temperature and humidity level so to check the temperature and humidity for the better health and survival of plant temperature and humidity sensor are used which regularly sends data to the server. In this way it manages to perform its operations automatically.

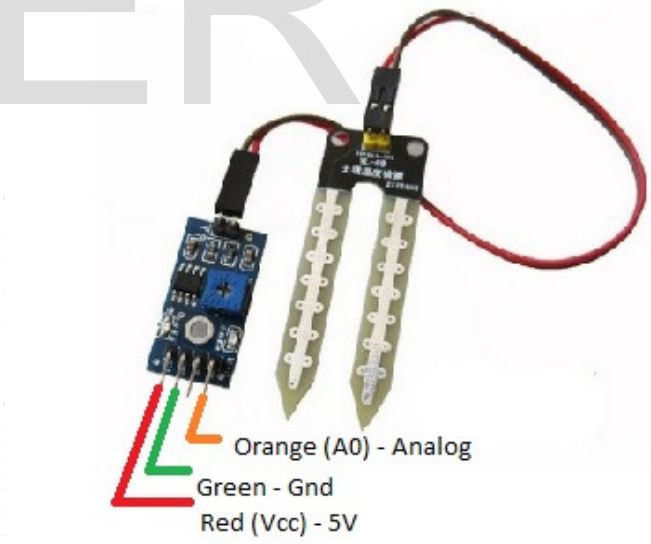
Index Terms— NodeMCU ESP8266, Temperature and humidity sensor, Smart Garden, Light sensor, Soil and moisture sensor, GSM TTL, pump controller

1 INTRODUCTION

is the future of present technology. It generally mean mechine IoTto mechine communication. According to study there will be 20.8 billion devices connected to internet till 2020.

The term "Internet of Things" was coined by Peter T. Lewis in a 1985 speech given at a U.S. Federal Communications Commission (FCC) supported wireless session at the 15th Legislative Weekend Conference. In his speech he states that "The Internet of Things, or IoT, is the integration of people, processes and technology with connectable devices and sensors to enable remote monitoring, status, manipulation and evaluation of trends of such devices.

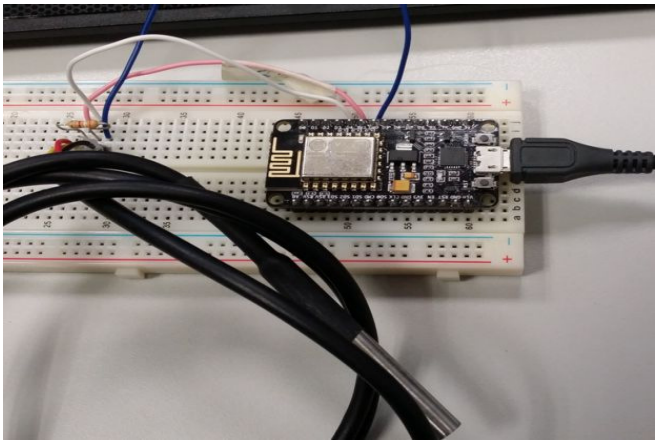
As the talk, the number of companies to help enable their IoT (Internet of Things) ideas. And as a result, we hear about new ideas and solutions that are already solving business challenges with M2M (Machine to Machine) communication. And today, we want to highlight some of the most compelling IoT applications in another industry—agriculture. Agriculture IoT is becoming one of the fastest growing fields (pun intended) within the IoT. Today, more than ever, farmers have to more effectively utilize and conserve their resources. That's where the need for data comes in, and M2M communication has made the ongoing collection of that info easy.

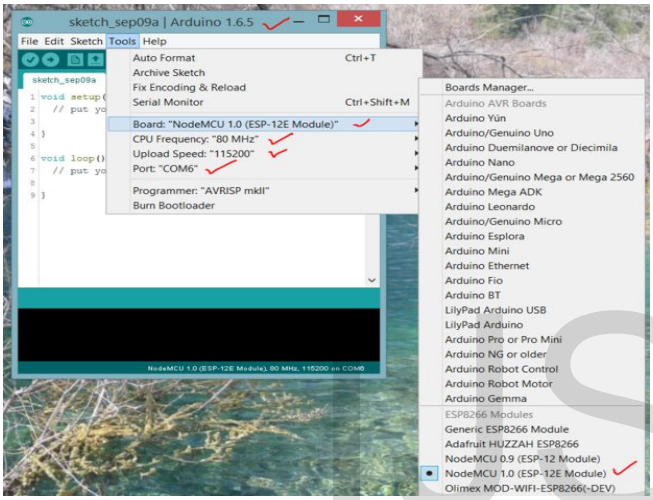


2 SYSTEM DISCRIPTION

This system is based on Internet of things which aims at connecting maximum devices through internet.We are surrounded by Plants and tress it provide us with oxygen, food e.t.c. In this Smart garden monitoring system water is provided to the plant with the help of pump motor.

In our garden we have many types of herbs, shurbs and climbers.But in our busy schedule we don't have time to take care of these plants which provides beauty to the nature and foods for the needy so this system with the help of soil and moisture sensor checks the fertility of the soil and provide it with water through the pump. It has temperature sensor which checks the temperature of

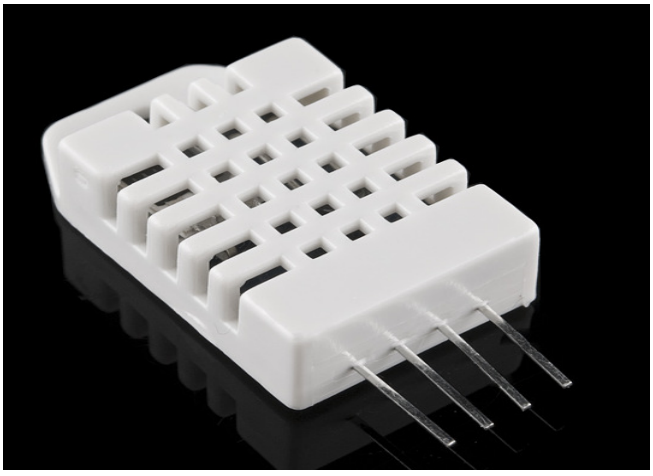




In this system NodeMCU will be programmed by connecting it through 3.3V USB cable. It will sense the data sent by temperature and humidity sensor, light sensor, soil and moisture sensor and GSM.

3.2 TEMPERATURE AND HUMIDITY SENSOR

The RHT03 (also known by DHT-22) is a low cost humidity and temperature sensor with a single wire digital interface. The sensor is calibrated and doesn't require extra components so you can get right to measuring relative humidity and temperature.



Features:

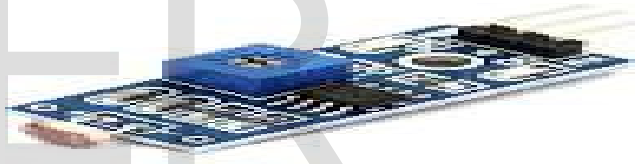
- 3.3-6V Input
- 1-1.5mA measuring current
- 40-50 uA standby current
- Humidity from 0-100% RH
- -40 - 80 degrees C temperature range
- +-2% RH accuracy
- +-0.5 degrees C

In this system temperature and humidilty of the soil will be checked by this sensor and data will be uploaded to the server with the help of NodeMCU ESP 8266.

3.3 LIGHT SENSOR

A **Light Sensor** generates an output signal indicating the intensity of light by measuring the radiant energy that exists in a very narrow range of frequencies basically called "light" and which ranges in frequency from "Infra-red" to "Visible" up to "Ultraviolet" light spectrum.

The light sensor is a passive devices that convert this "light energy" whether visible or in the infra-red parts of the spectrum into an electrical signal output. Light sensors are more commonly known as "Photoelectric Devices" or "Photo Sensors" because the convert light energy (photons) into electricity (electrons).

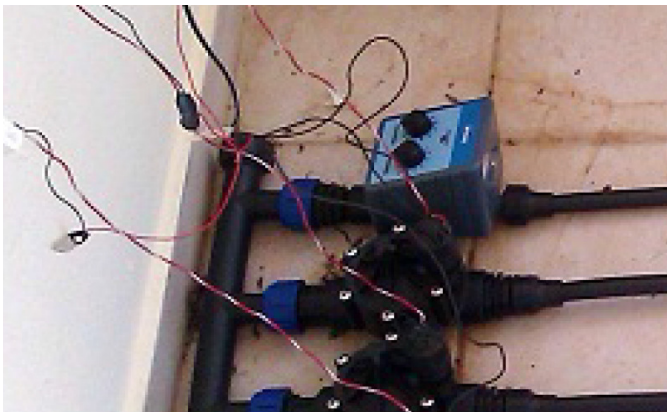


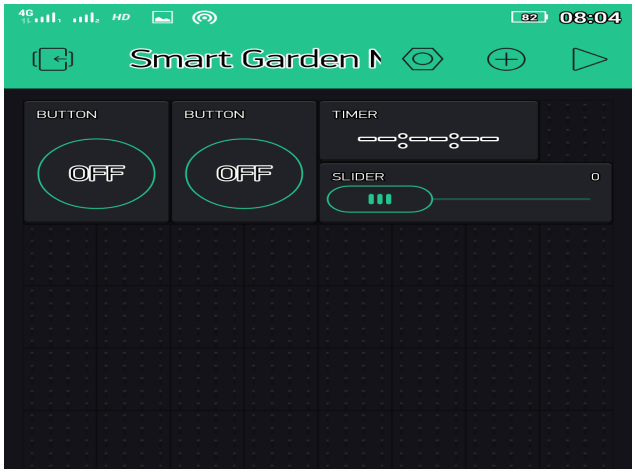
3.4 GSM

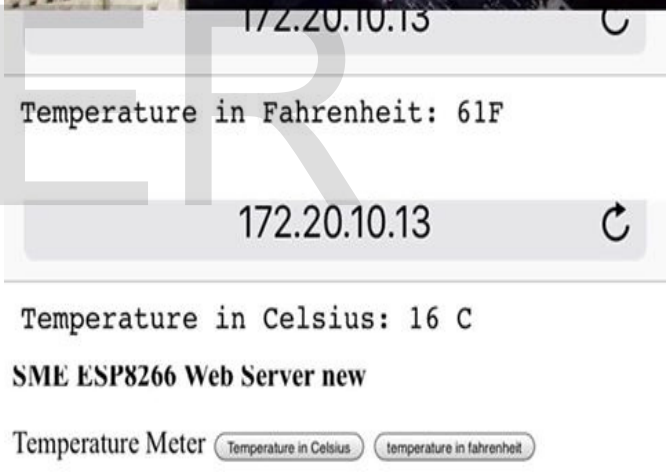
GSM (Global System for Mobile communication) is a digital mobile telephony system that is widely used in Europe and other parts of the world. GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz or 1800 MHz frequency.

3.5 PUMP CONTROLLER

This controller is suitable for any type of motor - Single or Three Phase.Switches ON the pump when the water in the overhead tank goes below the pre-decided minimum level.
Switches OFF the pump when the water level in the overhead tank reaches the maximum level therefore prevents overflow.
Shall again switch ON the pump when there is sufficient water in the underground tank.Therefore no need to switch ON or switch OFF the pump manually.

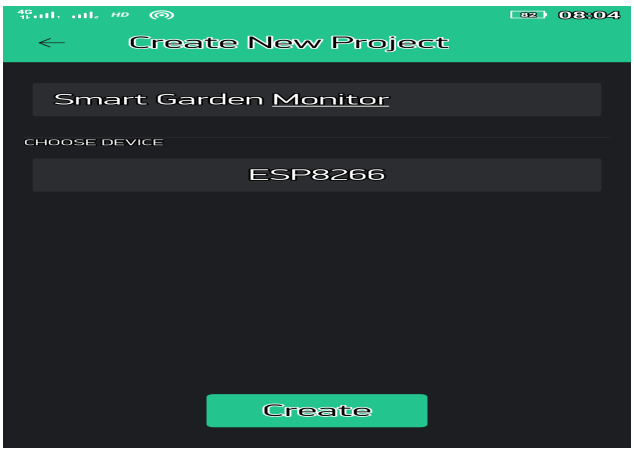




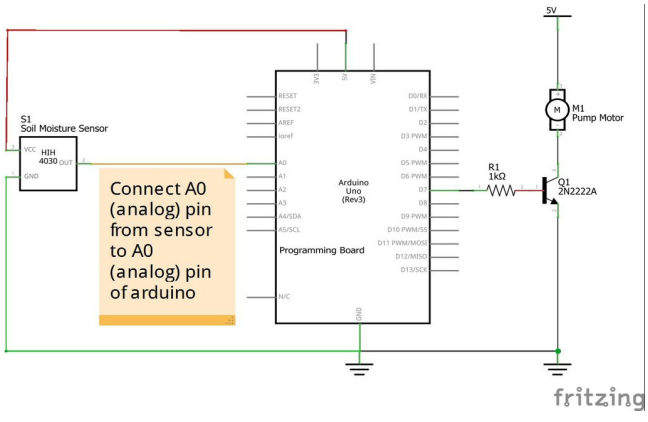


4 SOFTWARE DISCRIPTION

This paper is based on Internet of Things.It work on the mobile application and on the web server by uploading the data on the arduiono application available on PC. In mobile application BLYNK we upload the wifi hotspot name and the password in our program based on embedded C programming language.
In web server on a particular IP address or the web page data is uploaded on the server and through the sensors data is uploaded on the web server. GSM connectivity is also programmed in ESP 8266 by using the GSM library availbale in the Arduino application. It is shown in the figure how the button is selected in the application and how the temperature, moisture and humidity is uploaded on the web. Rx and Tx of the ESP 8266 is connected through the pins and it is defined in the programming.



BLOCK DIAGRAM



5 CONCLUSION

In this paper we presented the architecture and the implementation of a smart home irrigation system. The system consists of two types of sensors motes (TelosB and IRIS), special soil humidity sensors, electro-valves that are motedriven with the use of relays and a Java application that is used for data collection. Performance evaluation showed that our system manages to maintain soil hmidity levels regardless of external factors (i.e. variations at temperature and sunlight). It also proved that the system is aware of the different watering needs each.

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