International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 07 | July 2020 www.irjet.net p-ISSN: 2395-0072

IOT ENABLED SMART GARDEN KIT ALONG WITH WEATHER STATION

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Abstract – *We know nowadays people stay connected with the internet while doing their every day work. There are many more technologies which have been evolved in the agriculture fields, where certain IOT devices can be used to spray the plants automatically and by looking the appearance we can select the good vegetable or fruit. Hence, this invented research project will concern about providing data which can be used in the future and this kit is used to observe the daily development of the plants. Why this kit is developed? Many people are busy in their works as we have busy schedule in this world and they want to grow their plants because of their buys schedule they are all the time fail to remember to provide water to their plants. For this the kit equipped with the water pump and this can be regulated by mobile applications. The kit uses four sensor namely light intensity sensor, soil moisture sensor, pressure sensor and DHT11 temperature sensor. The kit is established along with weather station. The reason for using weather station is, it provides the information about the changes of climatic conditions. It also gives the information about the weather such as hot, cold, cloudy, thunderstorm and rainy. The project is used to maintain data and transfer the output to the users with the help of mobile phone*

KEYWORDS: Arduino Uno, Bylnk App, NodeMCU, Smart Garden, Weather Station

1. INTRODUCTION

In this world, these days people are remain connected with internet while executing their works. There are many more technologies that are develop in the area of agriculture .some IOT devices are established that are used in the grassland of agriculture which spray plants automatically and get better fruits or vegetables based on its color and appearances. The concern of the project is to provide information of plants, to end users. Present IOT device is also executed with the weather station sensors where it can be observe all the readings of sensor. The moisturizing property of soil, air humidity, and temperature and water pumps is all controlled by weather station sensor. This project is advantageous for the users who are concerned about their growth of plants. The objective of this research is to create IOT enabled smart garden kit by using the IOT hardware components .The problem statement of the project is to implement smart garden kit, which is used to provide the information about the plants and observe the daily monitoring of the plants. The recorded data can be used in the future. It also forecast the future raining.

2. LITERATURE REVIEW

[1] "Smart Watering System for Gardens Using Wireless Sensors Networks" This paper is all about the utilizing the sensors in the field of irrigation. The sensors are checked using watering system which is called smart because it uses the valves to accompany the irrigation. Water resources become contaminated from last few years. Water resources such as river, canal, pond, lake, well and many more. Water became a scare resource due to growing population, climate changes and rapid urbanization. The "soil moisture sensor" detects the soil, water content and utilizes water efficiently. Using clay this study has been done. The reason for this is the, we want to find the property of the soil. After doing this research we get to know that time of sensor and period of irrigation can be detected.

[2] "Automated Plant Watering System" This paper makes use of ATmega328 micro controllers. This project is built determine the level moisture in the soil. The level of moisture in the soil should moderate. If the level of moisture is less then we have to provide water. If the level of moisture is more than no need to provide the water to the plants. So microcontrollers are programmed in such a way that it can provide watering plants twice per day. It also reminds if there is no sufficient water in the tank.

[3] "IOT Based Green House System with Splunk Data Analysis" Greenhouse agriculture has ability to protect the plants from the climatic conditions and giving suitable conditions for the growth of plants, and due to this there is improvement in the quality of crop. But the traditional systems for monitoring and controlling greenhouse are very costly and interface also not friendly. Therefore it's low cost and friendly with help of cloud computing and IOT, we are able to apply this low cost greenhouse system for small and medium sized area. To achieve these goal raspberry pi and splunk can be used.

[4] "Efficient Design of Low Cost Portable Whether Station" This paper tells about monitoring whether station using Arduino to get information about whether, whether plays an important role mentally and physically. There are many diseases present in the environment. Because of this it is always important to get updated with weather. It made our lives easier by producing the information of whether. It provide information such as temperature, pressure, humidity, and wind aspects etc. now a day's app based whether stations are popular. The main point is to maintain simple low cost and friendly whether station.

3. OBJECTIVES

- To create IOT enabled smart garden kit which uses the components of IOT.
- To store data and addresses the output to the end users through the Smartphone applications.

4. PROBLEM FORMULATION

To implement smart garden kit, which is used to provide the information about the plants and observe the daily monitoring of the plants. The recorded data can be used in the future. It also forecast the future raining.

5. PROPOSED SYSTEM

This project is very much useful for the gardener and it will provide the important resources that can be useful for the growth of plants, generally this device is equipped with many sensors and has an automatic function. Smart garden project is watering system for gardeners which use multiple sensors. Weather-Station is used to determine the 'temperature' and 'humidity' of air it also help in determining the predicted rain with the help of humidity and temperature sensor. The weather station helps in monitoring current weather as well as future weather. Perfect weather information helps in minimizing the use of water by turning of the water pump automatically.

6. METHODOLOGY

Detailed representation of the project is processed in this chapter. The below figure shows the overall construction of the project.

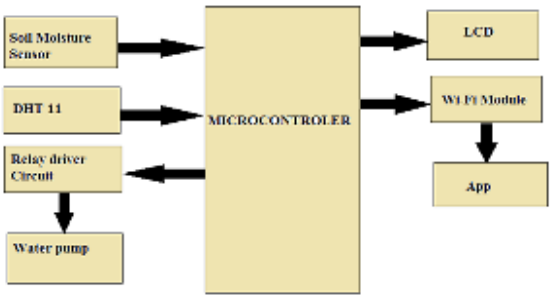

Figure 1: Overall construction of the project

6.1 Microcontroller: Arduino Uno

There is a requirement of central processing unit for the IOT hardware, which is used to take input from sensor and transfer data to the mobile applications again it also reads the data from mobile app and takes corresponding actions. In this project the central processing unit is Arduino Uno, it uses the ATmega328 microcontroller. It has more number of input/output pin along with large number, more number of analog channels to connect the analog sensor to it. Sensors namely temperature sensor and soil moisture sensor are connected to central processing unit namely Arduino Uno. The use of these sensors is to send environmental data to the mobile application water pump and relay is also connected with the central processing unit. After receiving the various data from the sensors in mobile app, we can turn on/off water pump if necessary. The environmental data can also be displayed on the 16*2 alpha numeric liquid crystal displayed unit. To transfer the data to mobile app via internet, Wi-Fi module is also connected to the CPU. Details of Wi-Fi module are given in the section.

6.2 Sensors

Sensors act as an eyes and ears of any system. In IOT enabled irrigation system, knowledge of the soil moisture is a must known parameter. Soil moisture decides when and in how much quantity of water is required at a given time. Farmer should have known this parameter prior to turning water pump ON or OFF. Along with soil-moisture data, environment temperature and humidity are also important factors and their knowledge also helps farmers to maintain a good crop. In order to enable farmers to known above stated parameters, in this work temperature –sensor, humidity-sensor and soil-moisture-sensor are used. DHT11 sensor module is used for both temperature and humidity monitoring. Details about the DHT11 sensor can be found at [11]. Further, details about soil-moisture sensor used in this study can be found at [12]. DHT11 sensor gives digital data about the temperature and humidity of the around us environment and read easily

through Arduino Mega2560. Soil-Moisture-Sensor provides analog output in the range of "0-5V" depending upon the moisture content available in the soil. Where 0V indicate wet soil and 5V indicate dry soil.

6.3 Display Unit

Display units play an important role of displaying various data at the location of the system. In this work, liquid crystal display unit is used to show the various sensors reading on Relay Board Water Pump ARDUINO UNO .LCD has total 16 pins and can be connected to the CPU easily. More about LCD can be found here at [13]. DB4-DB7 pins are used to transfer data to LCD and are connected to the CPU pin 45-48. RS and E pin are used to control the data transfer to LCD and are connected to the pin number 7 and 6 of CPU respectively.

6.4 Blynk Apps

The internet of things (IOT) uses this platform to create apps. This is utilized to control the components like Arduino \Uno, Raspberry Pi, and other. It has its own graphical interface. It's friendly that is, easy to use. This application uses the concept of dropping and dragging of widgets.

7. RESULT AND DISCUSION

7.1 HARDWARE SETUP

By using power supply circuit we are providing power to the kit and we are replacing 230 VAC to 5V DC. After this we are feeding this voltage to AC to DC conversion rectifier. If we want to convert this into pure DC than we have to use the capacitor. After making it to pure DC, the output is provided to 7805 regulator, which helps in giving 5V constant power supply. The final output which we are getting as 5V constant is given to microcontroller using Wi-Fi; it requires 3.3V, so we have to turned 5.5V to 3.3V. The LDR sensor provides the intensity of light and by using this we can inter the day and night. Rain sensor precedes the information about the droplets of rain on plate. And one more DHTII sensor gives the humidity & temperature reading to the central processing unit (Microcontroller). All the values from each sensor is recorded by the microcontroller. This output values are provided to the users though mobile phone applications and this is possible using Wi-Fi module

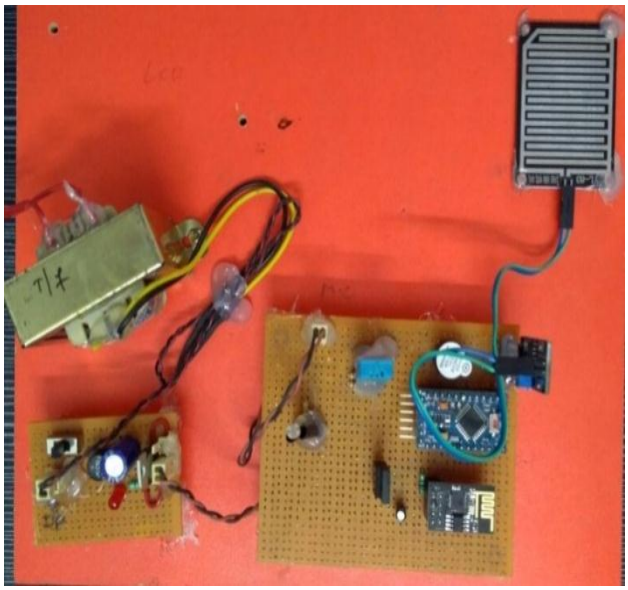

Figure 2: IOT based smart garden with weather station

8. CONCLUSION

Project represents smart garden kit using IOT technology. This is equipped with the weather station. Weather station provides the information about the weather like temperature, pressure, humidity and rain. This kit provides the information to the end users with the help of mobile phone applications. This project is advantageous and system can easily managed by the farmers and children. Device is implemented by using more "sensors" like 'temperature' & soil-moisture sensor. The device contains the water pump to adjust the soil moisture which is present in the soil. The electronic devices which are placed far away control by the Wi-Fi.

9. FUTURE SCOPE

With the concept of Internet of things (IoT), on future we can add noise and air pollution monitoring system which experimentally tests for two parameters. It also sends sensor parameter to the cloud. The data which are going to store for future is good enough for analysis and this can be easily shared among other end users. This model can further expanded to monitor the cities which are going to be developed and manufacturing zones for pollution monitoring. To protect the people form pollution, this system provides an efficient and low cost solution for monitoring environment.

ACKNOWLEDGEMENTS

The author gratefully thanks to guide *Mr. Aslam J Karjagi,* for helping and guiding throughout this project. The author extends her thanks for HOD of the Department Dr.Syed *Naimatullah Hussain***,** for giving permission to establish this project. The author specially thanks each of the persons who helped me to get information about the environment

REFERENCES

[1]. D. Divani and P. Patil, "Automated Plant Watering System," pp. 180–182, 2016.
[2]. Y. Chen, "IoT-based Green House System with Splunk Data Analysis," IEEE Conf. Pap., no. iCAST, pp. 260–263, 2017.
[3]. A. Imtiaz, S. G. Omar, and T. A. Ali, "Efficient Design of a LowCost Portable Weather Station," pp. 2–8, 2018.
[4]. R. C. Brito and E. Todt, "Development of a Low-Cost Weather Station Using Free Hardware and Software," 2017.
[5]. M. S. Ali, A. O. Akode, S. D. Awadalkareem, F. M. Ahmed, and W. Madani, "Monitoring System," pp. 0–4, 2017.
[6]. B. C. C. Gaja Priya, M. Abishek Pandu, "Automatic Plant Monitoring and Controlling System over GSM using sensors.," pp. 5–8, 2017.
[7]. Maslennikov, "Hardware and software architecture of multi mems sensor inertial module," 2017 24th Saint Petersburg. Int. Conf. Integr. Navig.Syst.ICONS 2017 - Proc., 2017.
[8]. L. M. Thet, A. Kumar, N. Xavier, and S. K. Panda, "A Smart Lighting System using Wireless Sensor-Actuator Network," IEEE Conf. Pap., no.September, pp. 217–220, 2017.
[9]. I. Srilikhitha, M. M. Saikumar, N. Rajan, M. L. Neha, and M. Ganesan, "Automatic irrigation system using soil moisture sensor and temperature sensor with microcontroller AT89S52," 2017 Int. Conf. Signal Process. Commun., no. July, pp. 186–190, 2017.
[10]. Instructables.com, 'Growing plants with LED lights', 2011 https://www.instructables.com/id/Growing-Plants-With-LEDLights/. [Accessed: 25- Nov- 2018]
[11]. Heather Rhoades, 'How Light Affects The Growth Of A Plant & Problems With Too Little Light', 2018. https://www.gardeningknowhow.com/plantproblems/environmental/how-light-affects-the-growth-of-a-plantproblems-with-too-little-light.html. [Accessed: 25- Nov- 2018]
[12]. W.Dargie and C.Poellabauer. "Motivation for a Network of Wireless Sensor Nodes," in Fundamentals of Wireless Sensor Networks Theory and Practice, 1st ed. United Kingdom: Wiley, 2010, ch. 1, pp. 3-16.
[13]. M.llyas and l.Mahgoub, "Opportunities and Challenges in Wireless Sensor Networks," in Handbook of Sensor Networks: Compact Wireless and Wired Sensing Systems, 1st ed. Florida: CRC PRESS, 2005, ch. 1.
[14]. Pollinator Partnership. 2017. Bee Smart Kit for elementary school kids. smart, last accessed on Feb 8th, 2018. (October 2017).
[15]. Pollinator Partnership. 2017. Bee Smart Kit for elementary school kids. http://pollinator.org/bee-smart, last accessed on Feb 8th, 2018. (October 2017).
[16]. M.Mohankumar, T.Thamaraimanalan, N.Sanjeev M, "Distortion Correction Scheme for Multiresolution Camera Images." in Asian Journal of Applied Science and Technology (AJAST), Volume 1, Issue 1, Pages 195-198, February 2017.