

Green House Monitoring using IoT for Medicinal Plants

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Abstract : Agriculture is most important to human life so it can be improvised by using IOT technology gives a grasp to enhance the power of automation system in agriculture. Smart agriculture system uses the advantage of technologies such as Arduino and Wireless Sensor Network. This report is related to concept and features of the sensor world in the internet of things for agriculture which is used to enhance the production of the medicinal plants as well as maintains the medicinal property of it. The agriculture that is shown in this paper is combined with Arduino technology and different sensors and live data feed that can be obtained online through mobile phone. In India monitoring environmental conditions are the major factors to improve the yeild of efficient crops. The content of this report includes the development of a system that can monitor temperature, humidity, soil moisture level and control them in a Green house through sensors using Arduino board. With its energy efficient and low cost, the system has the potential to be useful in water-limited geographical areas.

Keywords: Internet of Things (IoT), Automation, Arduino technology, Sensors.

INTRODUCTION

In this report, we develop a Green house Monitoring system with the concept of the internet of things. Technology maintains the conceptual thinking of a farmer to smart agro-buisness which performs the path to the next era of soft computing. One of the main areas where IOT based research is going on and new products are launching on an everyday basis to make the activities smarter and efficient towards better production is in the feild of agriculture. Automation must be implemented in agriculture to overcome these problems. So, to provide a solution to all such problems, it is necessary to develop an system that will take care of all factors affecting Medicinal value at every stage. The product will assist farmers with live data (temperature, humidity, soil moisture) from the green house so that the necessary steps can be taken to enable them to grow plants wisely by providing required amount of water and controlling the temparture and humidity. But complete automation in agriculture is not achieved due to various issues. Though it is implemented at the research level and it is not given to the farmers as a product to get benifited from the resource. Hence this report deals with developing Green house Monitoring and Smart agriculture usin IOT devices that can be used by farmers. Agriculture is considered the basic source of food grains so that they still utilize the customary techniques for cultivating which results in low yeilding of harvests and natural products. Be that, wherever computerization had been executed and indivisuals had been replaced via programmed hardware, the yeild has been improved. Subsequently, there we have to

execute present-day science and innovation in the farming area for expanding the yeild. The majority of the papers imply the utilization of remote sensor organized which gathers the information form varios sorts of sensors and afterward send it to the fundamental server utilizing remote convention.

OBJECTIVE

To prepare a setup of a prototype to measure and maintain soil moisture, temperature and humidity of a plants in Green house Monitoring especially medicinal plants. By assembling the microcontroller, sensors and Wi-Fi module described below we can measure all the above features, as well as it can controll them if there is any variations in the required parameters by itself. To implement IoT for remodeling agribusiness empowering the agriculturists through the broad range of strategies to increase the productivity. To build a prototype of a system required SSSwhich is to be automated.

INTERNET OF THINGS

Internet of Things describes an emerging trend where a large number of embedded devices are connected to the Internet. These connected devices often provide sensor data to the cloud storage and cloud computing resources where the data is processed and analyzed to gain necessary insights, cheap cloud computing the power and increased device connectivity is enabling this trend.

IoT solutions are built for many vertical applications such as monitoring and controlling the environment, monitoring health, vehicle monitoring, monitoring and controlling industries, and home automation.

At a high level many IoT systems can be described using the diagram below

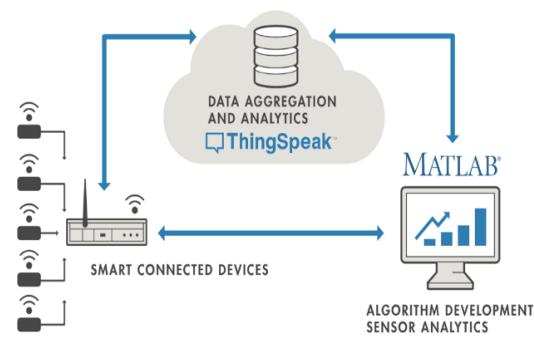


Fig. IoT SYSTEM.

On the left we have the smart devices that live at the edge of the network, these devices collect data and include things like wearable devices, wireless temperature sensors, heart rate monitors and hydraulic pressure sensors and machines on the factory.

In the middle we have the cloud where data from many sources is aggregated and analyzed in real time often by an IoT analyzing platform designed for this purpose.

The right side of the diagram indicates the algorithm development associated with the IoT application. Here an engineer or a data scientist tries to gain insight into the collected data by performing a historical analysis on the data. In this case the data is pulled from the IoT platform into a desktop software to enable the engineer or scientist to make prototype algorithms that may eventually execute in the cloud or on the smart device. Thingspeak fits in the cloud part of the diagram and provides a platform to quickly collect and analyze the data from internet connected which is connected to sensors.

Thingspeak

According to its developers, "ThingSpeak is an open-source Internet of Things (IoT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network. Thingspeak enables the creation of sensor logging applications, location tracking applications and a social network of things with status updates".

Thingspeak was originally launched by IoT Bridge in 2010 as a service in support of IoT applications.

ThingSpeak has integrated support from the numerical computing software MATLAB from Mathworks, allowing Thingspeak users to analyze and visualize uploaded data using MATLAB without requiring the purchase of a MATLAB license from mathworks.

Thingspeak has a close relationship with Mathworks Inc. In fact, all of the Thingspeak documentation is incorporated into the Mathworks' Matlab documentation site and even enabling registered Mathworks user accounts as valid login credentials on the Thingspeak website, the terms of service and privacy policy of ThingSpeak.com are between the agreeing user and Mathworks, Inc.

Thingspeak is an IoT analyzing platform service that allows you to aggregate, visualize and analyze live data streams in the cloud. Thingspeak provides instant visualizations of data posted by your devices to Thingspeak.

With the ability to execute a MATLAB code in Thingspeak you can perform online analysis and processing of the data as it comes. Thingspeak is often used for prototyping and proof of concept for IoT systems that require analytics.

ThingSpeak Key Features

Thingspeak allows you to aggregate as well as visualize and analyze live data streams in the cloud and some of the key capabilities of the Thingspeak include the ability to:

- Easily configure devices to send data to Thingspeak using popular IoT protocols.
- Visualize your sensor data in real-time.
- Aggregate data on-demand from third-party sources.
- Use the power of MATLAB to make sense of your IoT data.
- Run your IoT analytics automatically based on schedules or events.
- Prototype and build IoT systems without setting up servers or developing web software.
- Automatically act on your data and communicate using third-party services like twitter.

LITERATURE SURVEY

Smart farming is a farming management concept using modern technology to increase the quantity and quality of agricultural products. Farmers in the 21st century have access to GPS, soil scanning, data management and internet of things technologies.

Due to weather condition, water level increasing farmers get lot of distractions which is not good for agriculture. Water level is managed by farmers in both automatic/manual using the mobile application. It should utilize minimum resource in terms of hardware and cost. This overcomes the manual operations required to monitor and maintain the agricultural farms in both automatic and manual modes. It should be able to measure the increase or decrease in level of water as well a moisture in the soil. They have designed automated smart agriculture system which reduces the time and resources that is required while performing it manually. This system uses the technology of Internet of Things.

Plants have had and still have a key role in the history of life on earth. They are responsible for presence of oxygen needed for human survival on this planet. At the same time agriculture is also important to human beings because it forms the basis for food security. It helps human beings grows the most ideal food crops and raise the right animals with accordance to environmental factors. Agriculture plays a vital role in India's economy. Over 58% of the rural households depend on agriculture as their principle means of livelihood.

Agricultural exports constitutes 10% of the country's exports. So the farmers and even the nations economy will be ruined if there are no proper yeilds due to lack of knowledge of the soil nature, timely unavailability of water. Thus the governament should take steps for a better and profitable irrigation. It is a smart farming stick based on IOT (Internet of Things) technology which has brought revolution to each and every feild of common mans life by making everything smart and intelligent. Aim of this project is to propose a novel smart IOT based agriculture stick assisting farmers in getting live data (soil moisture, humidity,temperature) for efficient environment monitoring which will enable them to do smart farming and increase their overall yeild and quality of products. The

smart agriculture being proposed via this project is integrated with. Arduino technology along with various sensors and live data feed can be obtained online from mobile app.

PROBLEM STATEMENT

In the earlier days of agriculture, farmers produced a large variety of crops. Both eatables and money-fetching crops were produced in abundance. However, with the passage of time and increased industrialization, farmers moved towards producing large quantities of few types of crops.

Due to modernization and the ever-increasing population, agriculture is facing some hurdles lately. These issues are impacting the production of agricultural crops both in qualitative as well as in quantitative terms.

Due to the change in the weather conditions and variations of moisture level in the soil for a particular crop farmers get a lot of distractions which is not good for growing particular crops. These problems can be solved by such mechanisms that are to be implemented by the recent technologies. This project is having such a kind of a set up for maintaining the required parameters like soil moisture content, temperature and humidity automatically which eases the farmers as well as the nurseries for developing the medicinal plants as per the required environment for better growth of the plants.

PROPOSED SYSTEM

We grow some plants in a closed box to resemble green house. Then programmed the Arduino to measure the soil moisture. And connected the soil moisture sensor to the Arduino and place the sensor in the soil and collect the dryness and wetness level.

Then programmed the Arduino to switch ON water pump when moisture level is low and switch OFF when reaches the required moisture level.

Then programmed the Arduino to measure temperature and humidity. Now connected the DHT11 sensor and acquired the required information.

Then programmed the Arduino to switch ON the DC motor (fan) when temperature is high and switch ON the light when humidity is less.

And programmed the Arduino to switch OFF the DC motor (fan) when temperature is less and switch OFF the light when humidity is more.

Then connected the water pump, light, DC motor and digital display to the Arduino.

By connecting the Wi-Fi module to the Arduino and connect your pc/mobile to the same Wi-Fi. Now the Arduino is programmed to collect and record the information in Thingspeak website in graphical representation.

EXPERIMENTAL RESULTS

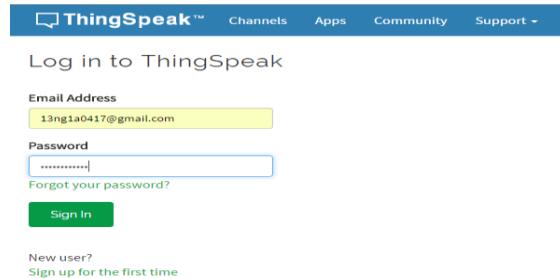
Hardware equipment



Stage 1 This is the Hardware Equipment of the task.



Stage 2 Initially we need to join in thingspeak iot site page by utilizing an email id and later we need to make channel on it dependent on our venture title.

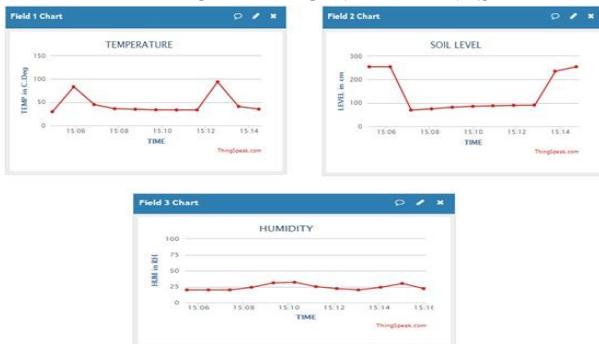


Step 3 This is an IOT Thing Speak web page. we have to login the thing speak by using an email address and we can connect to the Arduino which is present in the equipment through WI-FI module.



Stage 4 After effectively sign in to the Thingspeak.

Presently you can watch your channel name
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FOR MEDICINAL PLANTS**



Stage 5 The information collected by the soil moisture, temperature and humidity sensors is seen in the thing speak site as the watched information is stacked into the database of the thing speak by utilizing Wi-Fi module which is associated with the Arduino.

CONCLUSION

The primary favorable position is that the framework's activity can be changed by the circumstance (crops, climate conditions, soil and so on). This is less expensive and effective when contrasted with other kind of robotization framework. This project can be applied to both Nursery and Green houses in large scale. By implementing this project with some upgrade into a agricultural feild the supply and the demand gap will be closed, by providing high yields and profit. Multiplexers can be used to control more number of sensors at once. This system can be used to cultivate the crops grown in particular region in any where by controling the required parameters.

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