ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Issue 5, May 2018

IoT Based Riceplant Disease Monitoring and Controlling Using ESP Module

[1]R.Devi, [2]V.Ramya
[1,2]Assistant Professor, ECE Department,
[1,2]Department, Saranathan College of Engineering, Tiruchirapalli, India
devi-ece@saranathan.ac.in,ramyav-ece@saranathan.ac.in

Abstract: Agriculture is the backbone of our country. India is an agricultural country where most of the population depends on agriculture. Research in agriculture is aimed towards increasing productivity and profit. It is the key to prevent the losses in yield and quantity of agricultural product. Plant disease identification by continuous visual monitoring is very difficult task to farmers and at the same time it is less accurate and can be done in limited areas. Hence this projects aims at developing an image processing algorithm to identify the diseases in rice plant namely rice plant, Bacterial blight, brown spot, sheath rot and sheath blight. Rice blast disease occurring in rice plant is due to magnaporthe grisea and this disease also occurs in wheat, rye, barley, pearl and millet. Due to rice blast disease, 60 million people are affected in 85 countries worldwide. The DHT11 sensor senses the field and its gives the information to ESP8266 module .ESP8266 module is wifi enabled device, so it transfers data from field to cloud storage. So user monitor the field and senses the data without manual intervention. Using Thinkspeak cloud platform and ESP8266 module monitoring is done.

Keywords: Agriculture, IoT, DHT11 Senor, Thinkspeak

I. INTRODUCTION

The **Internet of things** (**IoT**) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and connectivity which enables these objects to connect and exchange data. Each thing is uniquely identifiable through its embedded computing system but is able to inter-operate within the existing Internet infrastructure.The figure of online capable devices increased 31% from 2016 to 8.4 billion in 2017.Experts estimate that the IoT will consist of about 30 billion objects by 2020. It is also estimated that the global market value of IoT will reach $7.1 trillion by 2020.The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities.wild animals in coastal waters.

Using Internet of Things (IOT), we can control any electronic equipment in homes and industries. Moreover, you can read a data from any sensor and analyse it graphically from anywhere in the world. Here, we can read temperature and humidity data from DHT11 sensor and upload it to a ThingSpeak cloud using Arduino Uno and ESP8266-01 module. Arduino Uno is MCU, it fetch a data of humidity and temperature from DHT11 sensor and Process it and give it to a ESP8266 Module.ESP8266 is a WiFi module, it is one of the leading platform for Internet of Things. It can transfer a data to IOT cloud.

II. DISEASE DETECTION SYSTEM

The decision support system senses the field using sensor processes it and detects the plant diseases. The detected information is sent to user and the remote server. The proposed system is shown Fig 1.1.

The temperature and humidity sensor senses the field and sends data to ESP8266 WIFI module.ESP8266 Wifi module sends the data to cloud via internet.The data uploaded in thinkspeak platform are updated for every five minutes and finally message are also passed to farmer.This systems easily detects the palnt diseases and send the information to farmer via cloud platform.We add Adafruit and DHT11 Sensor library to Ardinuo module.

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Issue 5, May 2018

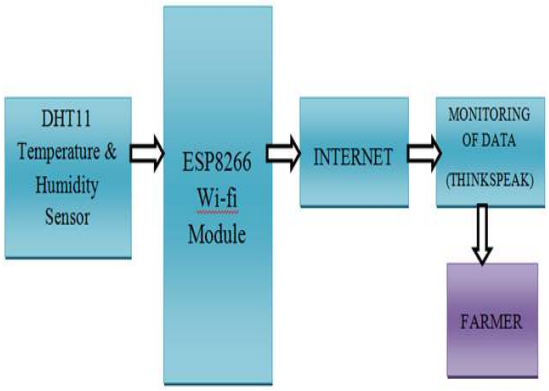

Fig 1.1 Disease Detection System

III. HARDWARE REQUIREMENTS

a) **Arduino** :**Arduino** is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL),[1] permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself (DIY) kits.

b) ESP8266 Module: The **ESP8266** is a low-cost Wi-Fi microchip with full TCP/IP stack and microcontroller capability produced by Shanghai-based Chinese manufacturer, Express if Systems. The chip first came to the attention of western makers in August 2014 with the **ESP-01** module, made by a third-party manufacturer, Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at the time there was almost no English-language documentation on the chip and the commands it accepted. The very low price and the fact that there were very few external components on the module which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, chip, and the software on it, as well as to translate the Chinese documentation.

c) Moisture and Temperature sensor: The Soil Moisture Sensor uses capacitance to measure the water content of soil (by measuring the dielectric permittivity of the soil, which is a function of the water content).Simply insert this rugged sensor into the soil to be tested, and the volumetric water content of the soil is reported in percent. The DHT11 is a basic, ultra low-cost 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 the data pin (no analog input pins needed). Its fairly simple to use, but requires careful timing to grab data.

IV. CIRCUIT CONNECTION AND WORKING

First make the connection as shown in fig: 1.1.The 2nd pin is of DHT11 is a data pin, it can send a temperature and humidity value to the 5th pin of Arduino Uno.1st and 4th pin of DHT11 is a Vcc and Gnd and 3rd pin is no connection. The Arduino Uno process a temperature and humidity value and send it to a ESP8266 WiFi module. The Tx and Rx pin of ESP8266 is connected to the 2nd (Rx) and 3rd (Tx) of Arduino Uno. Make sure that input voltage of ESP8266 must be 3.3V, not a 5V (otherwise it would damage a device).For that, we are using AMS1117 Voltage regulator circuit. It can regulate a voltage from 9V to 3.3V and will give it to Vcc pin of ESP8266.The Ch_Pd is a chip enable pin of ESP8266 and should be pullup to 3.3V through 3.3KΩ resistor. For reset the module pull down the RST pin of ESP8266 to Gnd.ESP8266 have 2 GPIO pins GPIO 0 and GPIO 2.

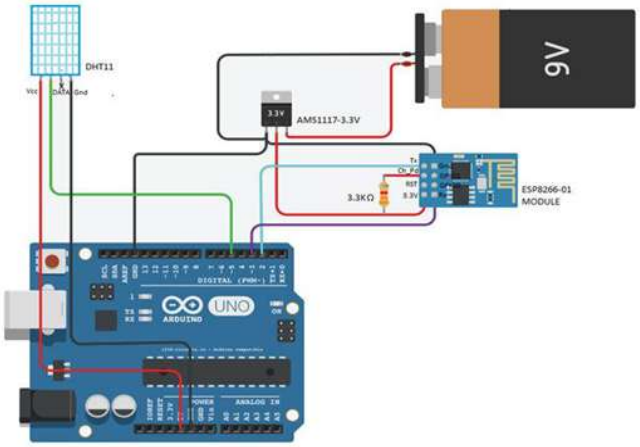

Fig: 1.2 Circuit diagram for monitoring Humidity and Temperature in IOT cloud

ISSN 2394-3777 (Print)
ISSN 2394-3785 (Online)
Available online at www.ijartet.com

International Journal of Advanced Research Trends in Engineering and Technology (IJARTET)
Vol. 5, Issue 5, May 2018

Construction and Testing

ThingSpeak is an open source platform to store and retrieve a data for Internet of Things application. To use this, you need to register in ThingSpeak cloud and then login to your account. After create a new channel with temperature in one field and humidity in another field as shown in Fig: 1.2. Once you created a new channel, it will generate a two API keys, they are READ API keys and WRITE API keys. First, copy the WRITE API keys from ThingsSpeak and paste it into the line (String apiKey = "OX9T8Y9OL9HD0UBP";) of the program. Next, replace the Host_Name and Password with your WiFi name and WiFi password. The Arduino program Uses DHT library, if it is not presented in your arduino IDE, select SketchàInclude libraryàManage libraries.Install DHT Sensor library. Then compile the program and upload to a Arduino Uno through Arduino IDE. Ensure that WiFi modem and internet connection in your Smartphone or PC are working properly. After uploaded a program, the Temperature and Humidity data is uploaded on ThingSpeak platform. The user see graphically in the private view window of your channel as shown in Fig: 1.4.The user see the uploaded data from serial port of Arduino IDE.

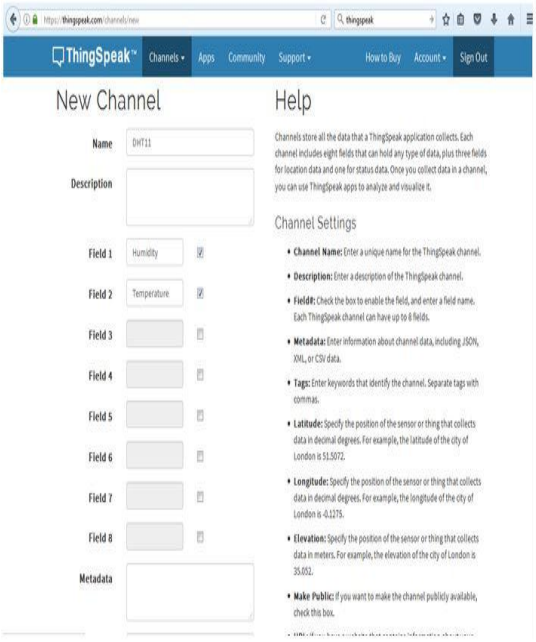

Fig: 1.3 Creating new channel on ThingSpeak cloud

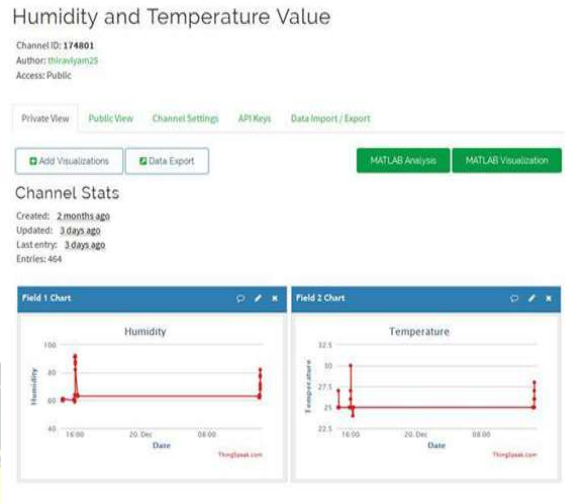

Fig: 1.4 Graphical representation of Humidity and Temperature data

V. CONCLUSION AND FUTURE WORK

Decision support system is aimed to management of crops from early stage to mature harvest stage involves identification and monitoring The ESP8266 MODULE is capable of sending information to user and then user retrives the data from Thinkspeak cloud platform. Extension of system in such a way that it will be capable to detect and identify abnormalities on the other parts of plants.

REFERENCES

[1]. Jagadesh D.Pujari, Rajesh, Abdul munaf, "Image processing based detection of fungal diseases in plants", International journal of Information and communication Technologies, (Elsevier), vol. 46, pp 1802-1808, March 2015.

[2]. Manisha Bhangea, H.A.Hingoliwala, "Smart Farming: Pomegranate Disease Detection Using Image Processing, International journal of Computer Vision and the Internet (Elsevier), vol. 56, pp 102-108, May 2014.

[3]. Aqeel-ur-Rehman , Abu Zafar Abbasi , Noman, "A review of wireless sensors and network's applications in agriculture" in International journal of Computer Standards & Interfaces, (Elsevier), vol. 36, pp 263-276, May 2014.

[4]. Ms. Iran R. Gavhale, "Unhealthy Region of Citrus Leaf Detection Using Image Processing Techniques", in proc IEEE International Conference for Convergence of Technology ,Gujarat, vol. 98, pp 214-218, Aug 2014

[5]. Vijai Singh, Varsha, A. Misra, "Detection of unhealthy region of plant leaves using image processing and genetic algorithm" in proc IEEE International Conference on computer engineering and Applications, Haryana, Vol. 88, pp 58-68, Aug 2015.

[6]. http://www.tnau.ac.in/agcbe/about.html