Wireless Sensors Based Approach for Agricultural Tracking and Notification

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Abstract **- Nowadays the Network Technology going to increase a role an agriculture system in order to add product value in quality. Wireless Sensors in agriculture is an application of advanced technology in agriculture which solves a series of technical hurdles in information technology for wide area. This research aim to propose a model for wireless sensors based approach for agricultural tracking and notification. The Sensors and Microcontrollers are successfully interfaced with NodeMCU and wireless communication is achieved between various Nodes. There is Microcontroller for receive many data from sensors and send data with Wi-Fi to ThingSpeak for generate graph and Line Massage API for notification. User can view with Mobile Device.**

Keywords **- Wireless Sensors**, **Agricultural Tracking**, **NodeMCU, ThingSpeak**

I. INTRODUCTION

Nowadays the Network Technology going to increase a role an agriculture system in order to add product value in quality, Smart Agriculture is an application of advanced technology in agriculture which solves a series of technical hurdles in information technology for wide area. Here we have used various sensors to create a well-established agricultural monitoring system like Temperature and Humidity sensor, soil moisture sensor, is used to measure the temperature and humidity of the environment or surrounding, soil moisture sensor basically used to measure the soil moisture level and the image sensor is used to keep the track of field activities, thereby sending the data to the user. The remote monitoring solution that we offer can be monitored in real time through any remote devices including mobiles or tablets. This provides the flexible for the data visualization, data understanding, and the predictive analysis also given the scope for the farmers to prepare for the advanced data which might appear in the future.

II. LITERATURE REVIEW

Saraswathi Sivamani, Namjin Bae, and Yongyun Cho study a Smart Service Model Based on Ubiquitous Sensor Networks Using Vertical Farm Ontology we propose a vertical farm ontology (VFO), an OWL based ontology model which helps in more understanding of the relationship between the domain factors. With the proposed model, the information from the Internet of things is recomposed as context information and made understandable for the other systems. For the sake of agriculture.

Nikesh Gondchawar and Prof. Dr. R.S. Kawitkar study IoT based Smart Agriculture Agriculture plays vital role in the development of agricultural country. In India about 70% of population depends upon farming and one third of the nation's capital comes from farming The highlighting features of this project includes smart GPS based remote controlled robot to perform tasks like weeding, spraying, moisture sensing, bird and animal scaring, keeping vigilance, etc. Secondly it includes smart irrigation with smart control and intelligent decision making based on accurate real time field data smart warehouse management which includes temperature maintenance, humidity maintenance, and theft detection in the warehouse. Controlling of all

these operations will be through any remote smart device or computer connected to Internet and the operations will be performed by interfacing sensors, Wi-Fi or ZigBee modules, camera and actuators with microcontroller and Raspberry Pi.

Dharti Vyas, Amol Borole, and Shikha Singh study smart Agriculture Monitoring and Data Acquisition System we discuss about field signal monitoring system with wireless sensor network (WSN) which integrates different platform with different communication technology monitoring agriculture field we have to use different sensors with Raspberry Pi and Arduino or LPC 2148 or AVR based microcontroller. implementation using comparison of real time and historical data.

Vaibhavraj S. Roham study Smart Farm using Wireless Sensor Network Wireless Sensor Networks due to their vast area of application being used in current research areas Wireless Sensor Networks (WSN) does this job to automate and analyze the corresponding parameters. They are going to develop the Web Application, Smartphone Application and Sensor Network using ZigBee Devices, BeagleBone Controller, and Various Sensors.

III. METHOD

The proposed hardware of this system includes: NodeMCU, Light Sensors, Temperature, Humidity, and Soil Moisture Sensors. The system is low cost & low power consuming so that anybody can afford it. The data monitored is collected at the server. It can be used in precision farming. The system should be designed in such a way that even illiterate villagers can operate it. They themselves can check different parameters of the soil like salinity, acidity, moisture, etc. from time to time.

A. NodeMCU

NodeMCU is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module.

B. Temperature and Humidity Sensor

The Temperature and Humidity are important environmental parameters which work with a simultaneous change of climate, topography, vegetation, soil type, and other factors. By calibration and calculation, these measured quantities can lead to a Measurement of humidity.

C. Soil Moisture Sensor

The soil moisture sensor used is capacitive type. The sensor gives analog output of zero volt when there is 100% moisture and 5V for 0% moisture. The moisture sensor is a resistive sensor. It determines the change in resistance of the soil between two probes which depends upon water content in it. Since water is a good conductor of electricity in the presence of ions.

D. Light Sensor (LDR)

An LDR is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits. Variation in resistance with changing light intensity. The most common type of LDR has a resistance that falls with an increase in the light intensity falling upon the device.

E. ThingSpeak Cloud Service

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.

F. Line Message API

The Messaging API is interact directly with individual users through either a LINE official account or a LINE @ account. With the Messaging API user can use APIs to automatically send customized responses to other users when they add your account as a friend or send it a message. You can also send interactive messages from your server to users

at any time.

IV. IMPLEMENTATION

The system architecture is composed of sensors (temperature, moisture, and the light), which are installed in the agriculture field. These sensors will be collecting the environmental parameters. The sensed data is mitigated into the cloud through an IoT gateway (ThingSpeak). ThingSpeak gives a real time data visualization.

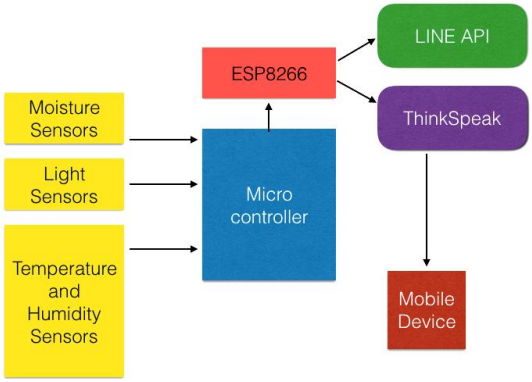

Fig. 1 The System Architectures

User can analyze the output in the ThingSpeak, which will give the graphical notations of all the values. ThingSpeak is an internet of things application and is an open source. ThingSpeak can also acts as an application programming interface in order to store and retrieve the data using the HTTP protocol over the internet or via a Local area. We can see the graphs of temperature value, light value, soil moisture value, and the rainfall value.

A real time data visualization can be analyzed in the ThingSpeak, which is an IoT hub. The following figure shows the real time data visualization.

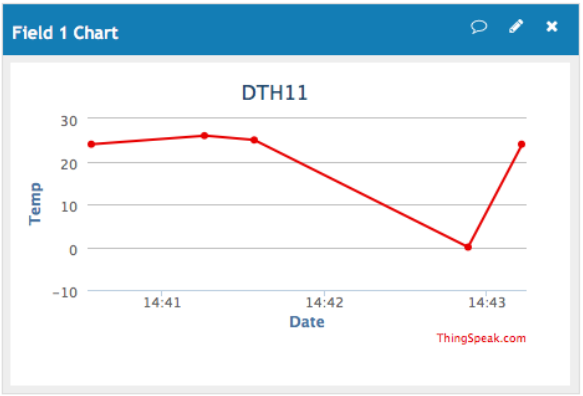

Fig. 2 Graph of Collect Data

The graph in the above figure suggests that the temperature value is analyzed in the ThingSpeak IoT Hub. The graph is plotted with temperature value v/s date.

Fig. 3 Line API Massage

Real time massage can be alert, if condition is true. User can view data everywhere every time with application LINE. Alert data like Robot is chatting.

V. CONCLUSION

The Sensors and Microcontrollers are successfully interfaced with NodeMCU and ESP8266 wireless communication is achieved

between Various Nodes. The Application also offers real time realization and analysis of data which can be used across the globe in conjunction with the parameter been monitored through to understand the abnormal behavior of the similar kind of the crop. The system can further been improved by incorporating new self learning techniques which could deployed in the cloud to understand the behavior of the sensing data and Alert on Mobile with Application LINE. User can take autonomous decisions.

VI. ACKNOWLEDGEMENT

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(Arranged in the order of citation in the same fashion as the case of Footnotes.)

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