IOT BASED AGRICULTURE CONTROL AND IRRIGATION

PROJECT REPORT

submitted by

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ABSTRACT

The Internet of Things (IoT) has made a revolution in all the fields of human life by making the work be smart and effective. The IoT devices like sensors, controller, Wi-Fi module and the cloud play a significant part in smart farming which acquires yield in the field of farming and lessens the wastage. The goal of this paper is to propose the IoT based framework for the farmers by analyzing the live information like (moisture, temperature) in the cloud. The agrarian device is equipped with iot innovation and can be received through web servers with different sensors and live information transmissions through Thingsspeak.com. The smart agriculture stick is proposed through this paper which is integrated with controller, sensor and live data that can be monitored through the cloud.ur solution will provide a systematic automated farming approach in which it facilitates automated irrigation by taking soil moisture present in the rain forecast into account. This would also help in the future progress of cloud farms, as they could be monitored and controlled even from another continent. It would also reduce the problem of using too much fertiliser because the fertiliser would be provided in an adequate amount with proper classification. Keywords: IoT; Wi-Fi Module; Microcontroller; Agriculture; Sensors; Moisture; Temperature.

Contents

ABBREVIATIONS

CSE : Computer Science and Engineering
IOT : Internet of Things
GSM : Global System for Mobile Communications
LCD : liquid-crystal display
SMS : Short Message/Messaging Service
GUI : Graphical user interface
RFID : Radio-frequency identification
ISO : International Organization for Standardization
IEC : International Electrotechnical Commission
QWT : Quality Water Treatment TCP : Transmission Control Protocol/Internet Protocol
UDP : User Datagram Protocol
PCB : Printed Circuit Board
GPS : Global Positioning System

CHAPTER 1

INTRODUCTION

1.1 What is greenhouse and how it will control the environment ?

A greenhouse is a building or a house for plant growth. The dimensions of this structure range from small sheds to industrial buildings, depending on the unit requirements. The heat sink is a miniature house or a mini greenhouse. The greenhouses offer better control over the growing climate of the plants due to their smaller size. They allow the user to change or use them for small research purposes. Adjustable key factors, depending on the technical specifications of the greenhouse, include temperature, sun, shade, intensity, drainage, fertilizer and soil, and humidity. Greenhouses are valuable for solving scarcity or low productivity due to crop characteristics which include limited growing seasons and poor light, thereby increasing peripheral food production and saving time. Cash management technology is rapidly demanding precise, accurate and reliably quantifiable details outlined with the advancement of greenhouse gardening. In some nations, cable contact was used in most of the current cash management schemes, and the management states were also in the process of replacing other cables.

1.2 Impact of Climate in Agriculture

Climate surveillance is very important today. Early monitoring of the climate is of great importance for agricultural purposes. However, in modern times, value has increased significantly in various fields, in particular industrial conditions control.

Monitoring the environment helps us to understand various conditions, such as temperature, humidity, and light intensity. Temperature regulation or measures of temperature and humidity are mainly used in our country to evaluate patients, treat and diagnose them, manufacture food and drink, etc. The climate control system can be used to explain humidity and air temperature which can be wired or wireless. Wireless networking is more efficient and simpler to use than cable connectivity and does not involve the physical appearance of a person on the platform, thus increasing the value of wireless communication today.

1.3 MOTIVATION

Monitoring of live condition of soil and climate conditions help farmers to enhance the yield of the field.To get better yield and seamless management of the field. Management of crops using live data from sensors like temperature sensor , moisture sensor.Adding of fertilizer and irrigating the field in optimum level.A system that can closely monitor plant growth and identify if there is any crop disease for crops spread across different geographical location

1.4 PROBLEM STATEMENT

Humidity and temperature control is the key for success in farming.Improper management of humidity,weather and temperature would affect leaf growth, photosynthesis, pollination, occurrence of diseases and finally economic yield.In Traditional agriculture methods weather forecasting and rain detection is not possible.

CHAPTER 2

LITERATURE SURVEY

2.1 Telemedicine in rural and remote areas

Telemedicine is tremendously increased in the process of improving access to high-quality medical care in rural and remote areas. We are deploying a ground-breaking telecommunications network with GSM features that delivers a robust architecture and design method that is introduced throughout development.
The system was compared with the verification-calibrated medical devices and the results showed that the system worked on the calibrated medical equipment in accordance with the standards

2.2 Intelligent management

Intelligent management is must in the modern world, although energy supply systems tend to be regulated using traditional methods. It also involves workers tracking and collecting consumer data, which leads to human error. Using the interactive user interface, the latest GSM-based program incorporates automated energy meters installed in the consumer unit with energy service providers to track, evaluate and control the flow of energy. The GSM network uses this dual-way communication system to send SMS through the device interface and send information to user through SMS. Relay and LCD circuits are used to alter and display information such as current, devices, voltage and billing, or sudden GUI power outages for customers. The main issue on the energy market today is

a water supply, which is taking place at various levels. In the event of a power supply voltage, our system may also send a warning to the energy supplier and automatically shut down the power supply until the power supply voltage has been corrected.
This work provides insight into the overall philosophy of energy measurement and reflects our success in designing, implementing, managing energy theft and measuring energy efficiency systems

2.3 IoT technology in daily agricultural production

IoT technology has made it digital and interactive and has revolutionized all aspects of human life. IoT is a network of things that forms an autonomous network. The development of stand-alone, farm based digital IoT equipment focuses not only on the improvement but also on profit and reduction of daily agricultural production. The method offers IoT-based smart farm stick that enables farmers to get streaming information's to monitor the environment for smart farming and its overall yield and quality. Goods are extensible. Farmworkers are integrated into Arduino's technology in this position.
The proposed product will be tested with high accuracy to feed data of more than 98% in vibrant agricultural fields

2.4 Personal Tracking System

An accurate and effective personal tracking system that provides a promising solution to the above requirements with regard to the development of current technologies. In this analysis, attempts have been made to combine GPS and GSM technologies to monitor the target position (humanity). In addition, GPS technology is tracking the fate of the care entrusted to it. The alternative GSM application is enabled and information about this person is retrieved whenever the GPS system is unable to achieve the objective. The method hybrid tracking system is designed with a customized app.

In this paper we proposed a automatic method for person location tracking.

2.5 Real-Time Vehicle Recognition System

Developing and executing an IEEE802.15.4-enabled RFID-GSM real-time vehicle recognition system with 2.4 GHz offers full automation of road scanning from the notification circle. Each RFbranded vehicle on the RF field carries out a plan to prevent collisions between two strategies within 80 meters of the reader when RFID readers send an RF "Auto Highway Scanning." First, the CC2530F256 MAC SoC address is used to set a fixed wait for a single label. The second strategy uses the pseudo-random tag generator CC2530F256 to add a modified meaning to the results of the first methods. Simulation results show that collisions can be avoided by using the carrying sensor feature, and the proposed system achieves 63% recognition efficiency that is better than traditional brand control systems such as ISO / IEC 18000-7, p-persistent CSMA, QT, CT, CSMA, and QWT. However, the results of the test show that the previous form is working correctly.

CHAPTER 3

PROPOSED METHOD

Intelligent smart IoT devices for agriculture are produced every day, which not only improves agricultural production but also makes it profitable and avoids waste. The purpose of this article is to propose a new agriculture smart IoT device to help farmers to collect live environmental data(temperature, soil moisture) to monitor smart agriculture and increase overall yield . The Smart Farming Stick dependent on IoT contains the ESP8266 soil temperature and moistness checking framework and moves information to the cloud through the ESP8266 Wi-Fi module to thinkspeak. This IoT device computes 3 qualities: environment, soil moisture.This would also take into weather,rain update,live crop analysis into consideration.Considering three input constrains of soil moisture ,temperature ,weather updates and present condition of crop fertilizers and irrigation pattern is formulated.This would act as a surveillance system during night time and analyse the live crop during the morning time

3.1 Smart Farming Stick dependent on IoT

The Smart Farming Stick dependent on IoT contains the ESP32, soil temperature and moistness checking framework and moves information to the cloud through the ESP8266 Wi-Fi module. . This IoT device computes 3 qualities: environment, soil moisture, and sunlight based board voltage that feed the whole framework.It also takes plant disease and growth monitoring with the help of image analysics.

3.2 Sensor calculation using DS1820

DS18B20 is optical temperature sensor utilizes the Proverb 1 driver bus protocol to send and get bytes of information and to help status parasites. The following comparison shows the temperature to be calculated.

$$Temperature = (LowByte + (HighByte << 8)) * 0.0625 \tag{3.1}$$

The sensor of soil moisture changes the resistance principle. It has two major pads for measuring ground humidity and serves as a resistance component [13]. The conductivity between the coils is lower where the water content on the floor is low and the resistance high. The conductivity between cushions and the resistance is low and the signal strength is better if the water level on the floor is high.The ESP8266 is an economical series for the Wi-Fi module that can be easily connected to the Arduino Mega 2560. The AT commands are integrated into the ESP8266 and support the entire TCP / UDP stack. Arduino is designed as a wireless DC voltmeter to measure solar voltage [14]. Analog pins up to 5V are used to control the Arduino Mega 2560. A diode is used between the solar panel and the solar battery to protect the battery against the current [15].

CHAPTER 4

RESULT AND DISCUSSION

Usually, our highest source is AC, but our controller requires DC, we will convert AC to DC Voltage. The Reduction Transformer is used for the conversion of 230V AC to 12 VAC. The bridge rectifier pulses from 12V AC to 12V DC. In this circuit, we use 1000 color micro condensers after conversion. The microcontroller uses a voltage control unit. The 5 V DC is continuously supplied to the microcontroller. PIC16f877A has 40 legs which details are given Figure 2.

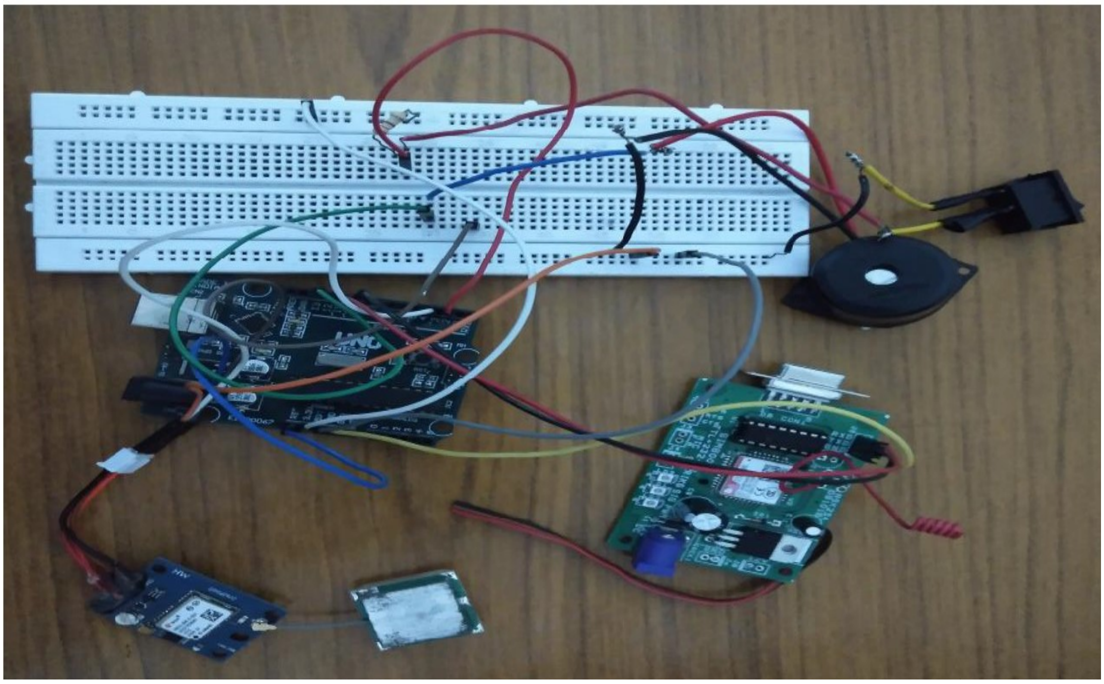

Figure 4.1: Prototype Model of IoT using Arduino.

4.1 Computation using microcontroller

Each screw controls the components used. All components are connected through microcontroller pins and are used to control the target.The different components are the following: GPS, Power supply unit, ESP8266, soil moisture, and temperature sensor. Here, the controller is used to connect all the components connected to the micro controller. It continuously takes the moisture level ,temprature and present wheather status and considers even presiction and plan irrigation accordingly with live weather analysics. And it send a notification to the customer regarding the present status . This project is under construction the development of bot ,intialisation of irrigation system is all under construction and the present status of code and result images are shared herby.

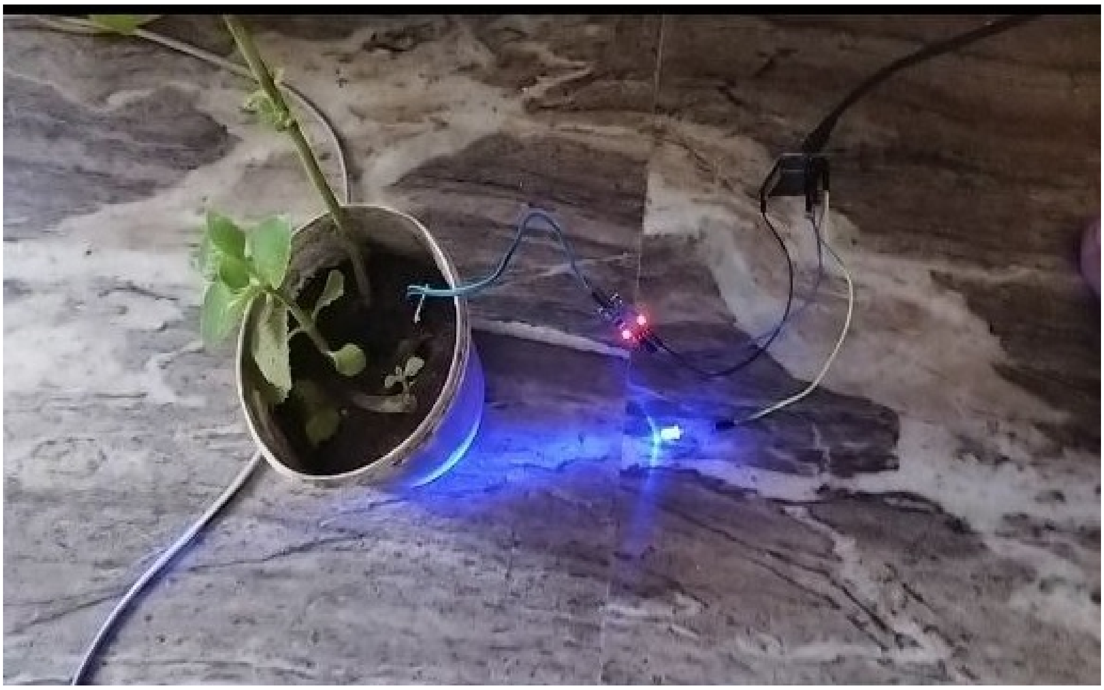

Figure 4.2: Prototype Model of IoT using Arduino.

4.2 Overall Set Up Of Iot Based Agriculture System

Overall micro python program which is development stage is being attached.It mainly takes weather update ,present temprature, moisture level into consideration .The model is connected to the wifi to send data to the cloud and recieve data from cloud.

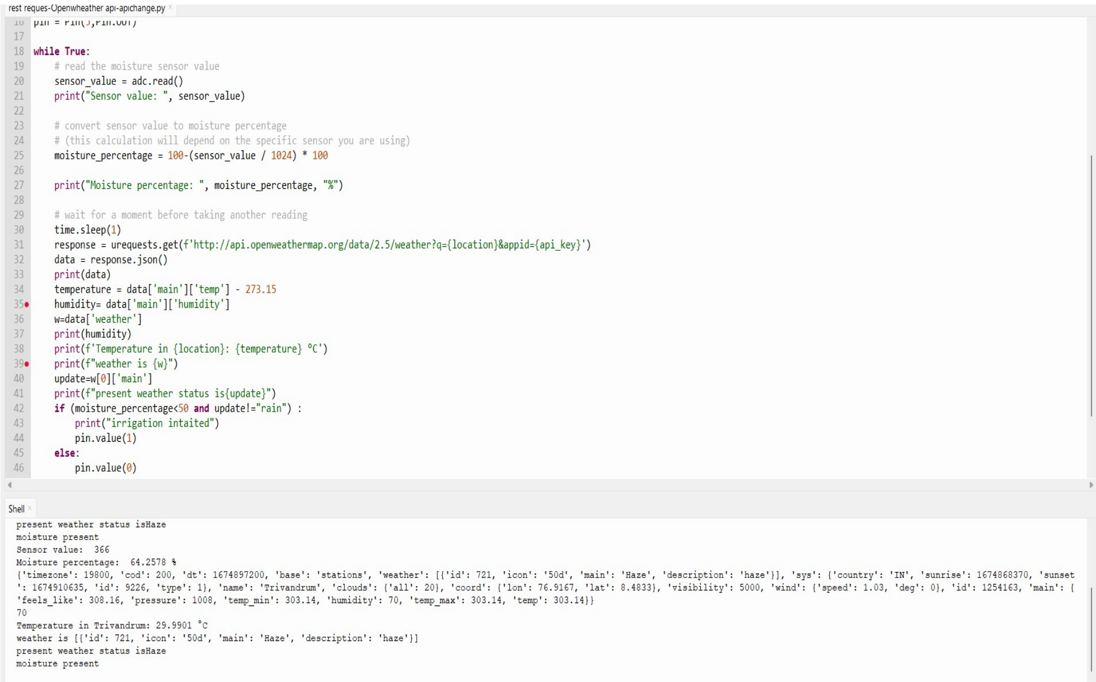

Figure 4.3: Experimental Setup of Proposed Work

4.3 Agriculture set up and data transmission through cloud

The overall setup of the system can be viewed in Figure 5it is basically runs under the prototype model. The major power circuit design can be using proper PCB model. The agricultural device is equipped with esp8266 and it is programed using micro python and can be accessed through online test boards with various sensors and live data transmissions through Thingsspeak.com. The sensors like temperature, soil moisture with cloud server.

CHAPTER 5

Conclusion

Agriculture stick using IoT will be used to support the farmers to monitor the data like temperature and soil moisture, which results in an increase in food production. The wireless monitoring of the farm using a temperature sensors and humidity sensors will be used to schedule irrigation dates and reduce human power consumption. The system is implemented with a cloud which is used to allow end-users to monitor and control the farm.
The GPS module is used to gain the status of Android in our work. . The purpose of this article is to propose a new agriculture stick based on Smart IoT to help farmers to collect live environmental data (temperature, soil moisture) to monitor smart agriculture and increase overall yield and product quality. The agricultural device is equipped with Arduino technology and can be accessed through online test boards with various sensors and live data transmissions through Thingsspeak.com. The sensors like temperature, soil moisture with cloud server. The data's can be pushed to the app or webpage and can be viewed to the system

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