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Elegant live temperature, humidity, PH and moisture monitoring in agriculture system using IOT

Dr.G.Ramani M.E., Phd.*, S.Dinesh Prabu*, G.Geevanantham*, B.S.Kannan*, K.Logeshwaran*

*Electrical and Electronics Engineering, Nandha Engineering College (Autonomous), Affiliated to Anna University, Chennai.

ABSTRACT

Agriculture sector is regarded as the more crucial sector globally for ensuring food security. Nowadays for efficient and better production in Agriculture many countries are following IOT based research and new products are launched on everyday basis to make the activities smarter and efficient. Internet of Things has a strong backbone of various enabling technologies- Wireless Sensor Networks, Cloud Computing, Big Data, Embedded Systems, Security Protocols and Architectures, Protocols enabling communication, web services, Internet and Search Engines. With the adoption of IOT in various areas like industry, homes and even cities, huge potential is seen to make everything Intelligent and Smart. Even the Agricultural sector is also adopting IOT technology these days and this in turn has led to the development of Agricultural Internet of Things (IOT).In this project is to propose IOT Based Smart Stick which will enable farmers to have live data of soil moisture, environment temperature at very low cost so that live monitoring can be done easily.

INTRODUCTION

Aim of the present system is to measure weather parameter temperature and humidity. Monitoring of weather parameter helps to manage greenhouse climate conditions and some industrial process environment. So it is essential to monitor weather parameters. Accurate and reliable weather information helps manage the work schedules, reduce the costs and achieve maximize outcome. In earlier period for monitor weather parameters mechanical or electromechanical instruments are used. These instruments suffer from the drawbacks like accuracy, need of human intervention, associated parallax errors and durability. Due to electronic instrument system becomes flexible, compact and cheaper. Despite of this, systems flexibility of remote monitoring and data logging was not good have developed embedded based industrial temperature monitoring system using GSM and PIC microcontroller.

System can send and receive weather messages facilitated by GSM technology. For measuring temperature IC sensor LM35designed a low cost micro-controller based weather monitoring system. The system uses sensor to measure temperature, atmospheric pressure and humidity have developed monitoring systems; using sensors for indoor climate and environment based on the parameters such as temperature and humidity. Further they developed a reliable and economically feasible remote sensing system for temperature and relative humidity measurement with the combination of sensors with data acquisition system have developed a weather monitoring system using micro-controller, which monitors temperature and humidity using sensors but this system suffers from low secured and low data rate have been designed and implemented weather monitoring and control system to monitor gas and humidity.

Author for correspondence:
Electrical and Electronics Engineering, Nandha Engineering College (Autonomous), Affiliated to Anna University, Chennai.

A greenhouse is a complex glasshouse building or house in which plants are grown. This structure varies in range in size from small sheds to industrial-sized buildings depending upon the requirements ass per user. A miniature greenhouse or mini greenhouse is known as a cold frame Greenhouses allow for greater control over the growing environment of plants because of its smaller size it allow user to modify or use it for small scale research work .depending up on the technical specification of a greenhouse, key factors which may be controlled include temperature, levels of light and shade i.e. intensity, irrigation, fertilizer application, and atmospheric humidity and soil moisture.

Greenhouses are useful to overcome shortcomings or lesser yield in the growing qualities of a piece of land, such as a short growing season or poor light levels, and they can thereby improve food production in marginal environments as well as saves time. With the advancement of the Greenhouse industries, the greenhouse control technology is of higher requirements because of how to obtain accurate, precise and reliable measurable information output, as described by. In some of the countries, most of existing greenhouse control systems used wired communication, which faces with wiring problem also time to time replacement of wire, it also includes high cost, installation and maintenance difficulties and that broken node is likely to cause the entire system out of work. By using wireless communication we can overcome these kinds of problems and can be controlled remotely. The wireless communication does not require wiring (but transmitter and receiver at both ends), it's low cost and easy to maintain and fetch data or information and you can also increase or decrease the measurement node arbitrarily.

Advantages in other Fields

Weather monitoring has a great importance nowadays. In early age weather monitoring has great importance only in agricultural purpose. But in modern age its value increased a lot in different field mostly in industrial condition monitoring. Weather monitoring helps us to explain different climatic behaviors including temperature, humidity and light intensity. In our country weather monitoring or the measurement of humidity and temperature specially used in some research laboratories, hospitals store and industries for research, treatment and diagnosis of the patients, production, storing food and beverage etc. Using weather monitoring system we can explain humidity and temperature of air. Weather monitoring system can be either wired or wireless one. Wireless communication is more convenient and user friendly then wired communication and it is not need to require the physical presence of person at the location that's why importance of wireless communication is increased nowadays.

LITERATURE SURVEY

"Smart Farming: IoT Based Smart Sensors Agriculture Stick for Live Temprature and Moisture Monitoring using Arduino, Cloud Computing & Solar Technology", Anand Nayyar and Er.Vikram Puri (2016) [4].

Internet of Things (IoT) technology has brought revolution to each and every field of common man's life by making everything smart and intelligent. IoT refers to a network of things which make a self-configuring network. The development of Intelligent Smart Farming IoT based devices is day by day turning the face of agriculture production by not only enhancing it but also making it cost-effective and reducing wastage. The aim / objective of this paper is to propose a Novel Smart IoT based Agriculture Stick assisting farmers in getting Live Data (Temperature, Soil Moisture) for efficient environment monitoring which will enable them to do smart farming and increase their overall yield and quality of products. The Agriculture stick being proposed via this paper is integrated with Arduino Technology, Breadboard mixed with various sensors and live data feed can be obtained online from Thingsspeak.com. The product being proposed is tested on Live Agriculture Fields giving high accuracy over 98% in data feeds. "Smart farm using IOT", Amandeep, Arisha Battacharie, Paboni Das, Somudit Roy.

In this paper, different developing countries are also using traditional methods and backward techniques in agriculture sector. Little or very less technological advancement is found here that has

increased the production efficiency significantly. To increase the productivity, a novel design approach is presented in this paper. Smart farming with the help of Internet of Things (IOT) has been designed. A remote controlled vehicle operates on both automatic and manual modes, for various agriculture operations like spraying, cutting, weeding etc. The controller keeps monitoring the temperature, humidity, soil condition and accordingly supplies water to the field.

"Real Time Implementation of Hybrid Personal Tracking System for Anomaly Detection", Padmanabhan. R, Pavithran.R, Shanawaz Mohammad Rayyan and P.T.V Bhuvaneshwari (2016) [5].

In this paper they present a very accurate and trustworthy personal tracking system (PTS). Using the advancement in the current technology, it becomes a promising solution to meet the above requirement. In this research, an attempt is made to integrate both GPS and GSM technologies to detect and track the position of the target (mankind). Initially, the position of the target is tracked by the authorized caretaker using GPS technology. Whenever the GPS system is unable to track the target, an alternative GSM technology is activated and the information about the concerned individual is obtained. The proposed hybrid tracking system is implemented in real-time using a customized embedded device.

"Design and Implementation of an RFID-GSM based Vehicle Identification System on Highways", Fatemeh Nafar and Hossein Shamsi (2014) [6].

In this paper, a real-time RFID-GSM based vehicle identification system compatible with IEEE802.15.4 is designed and implemented at 2.4GHz which provides a full automation of highway scanning far away from the monitoring station. Once RFID reader broadcasts "Auto-Highway-Scanning" RF signal, each tagged-vehicle within the RF-field of 80m from the reader runs a collision-avoidance scheme involving two strategies. Firstly, the unique tag's CC2530F256 SoC MAC address is used to generate a fixed waiting-time. The second strategy utilizes tag's CC2530F256 pseudorandom number generator to add a random value to the first strategy output. This strategy makes the proposed scheme dynamic and secure because it prevents the attackers from accessing to the tag ID by estimating fixed waiting-time of the first strategy. Such a collision-avoidance scheme overcomes the conventional methods constraints such as tag population estimation latency in Aloha-based methods and time-consuming lengthy queries in Tree-based protocols. Simulation results show that the collision is avoided by using the carrier sensing capability and the identification efficiency of 63% is achieved by the proposed scheme, which is more efficient than conventional tag anti-collision schemes such as ISO/IEC 18000-7, CSMA non persistent, CSMA p-persistent, QT, CT and QWT. Besides, experimental results prove above scheme works properly.

"Towards a GSM Enabled Remote Monitoring Medical System", D. Tshali , M. Sumbwanyambe (2018) [1].

Telemedicine is becoming an important part of the modern healthcare system with the increasing interest in expanding access to quality healthcare in remote or rural areas. We present an innovative telecare system with GSM functionality, detailing its architecture as well as design processes and procedures that were undertaken during the development. Design science research (DSR) was used in the design and development of the system. Different system blocks were designed separately and then integrated as a functional unit system. The system was compared against the calibrated medical instruments for verification. The results showed that the system performed as anticipated against the calibrated medical equipment.

"Wireless Controlled Smart Digital Energy Meter and theft control using GSM with GUI", Naseem Khan, Yasir Naseer, Imtiaz Alam, Tasawar Abbas, Yasir Iqbal (2018) [2].

In modern world intelligent control has become a priority, although the services for providing energy are still being controlled with conventional methods. The conventional method is expensive and time consuming as well as it requires man power for monitoring and data collection of the consumers which may also lead to human errors. The proposed GSM based system integrates digital energy meters installed at consumer unit with an electric supply companies to monitor, profile and control energy flow with the help of Graphical

User Interface (GUI). In this two-way communication system, the GSM network is utilized to profile the energy flow with the help of SMS to the energy supplier and showing it on the monitor of the energy supplier using the GUI and can also communicate with the user via SMS. Relay circuit and LCD display is provided to update information like Voltage, Current, Units and billing or sudden power cut to the energy supplier company and is displayed on GUI. Nowadays the main problem in energy supply is that of power theft being done on various scales. Our system can also send an alert to the energy supplier in case of any power theft at the consumer side and cutoff the supply automatically until the power theft is not being cleared. This research highlights the general theory of energy metering system and focuses on our user friendly low power energy metering system design, implementation, power theft control and results.

"Application of IoT in Military Operations in a Smart City", Frank T. Johnsen, Zbigniew Zielinski , Konrad Wronak , Niranjan Suri (2018).

This paper addresses a scenario where a medium sized smart city in an Alliance nation has been struck by disaster. A small, multi-national force is deployed for disaster relief. Situational awareness (SA) is important so that resources, including personnel and supplies, may be prioritized to have the most impact and help those in the most need. This SA can be significantly enhanced via information obtained from Internet of Things (IoT) devices, especially in a smart city environment. This paper, which presents work performed by the NATO IST147 "Military Applications of Internet of Things" group, explores the potential to exploit smart city IoT capabilities in military operations.

PROPOSED SYSTEM

Every crop has its unique nature to grow in a particular temperature, soil moisture and humidity. So to gain a better result of cultivation all these values has to be monitored and care has to be taken for the variation that occurs either by naturally or due to man made mistakes. In the proposed system, the temperature sensor, soil moisture sensor, humidity sensor and the pH sensors are placed in the agricultural land.

The values of all the sensors such as temperature, soil moisture, humidity and the water pH will be send to the microcontroller and based on the relative value feed to the microcontroller the motor interface will activate the motor based on the necessity. Also the relative values will be feed to the farmers mobile through the App.

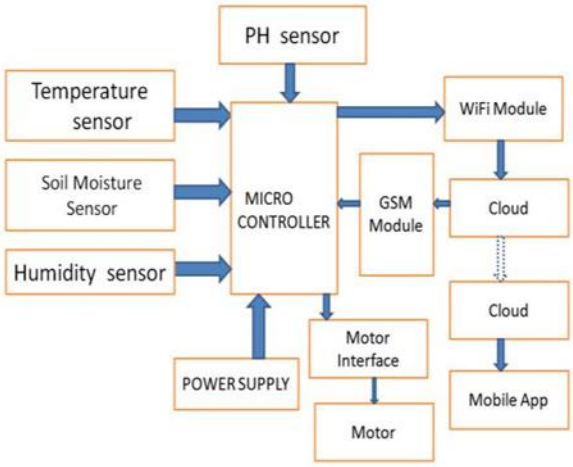


Figure 1. Proposed System Block Diagram

Generally in our maximum source is Alternating Current (AC) but microcontrollers operating at direct current(DC) so we need convert AC to Constant DC. Step down Transformer is used to 230v AC to 12VAC conversion purpose. Bridge Rectifier is used to convert 12v AC to

Pulsating 12v DC. After Conversion and in this circuit connection we use 1000 micro fared capacitor. Instead of using this capacitor we reduce the harmonics present in the given power supply. In the microcontroller 7805 voltage regulator is used. The DC supply is given to the voltage regulator is used for providing constant 5V DC supply.

PIC16f877A microcontroller has 40 pins. Each pin control the various components used in this project. Through microcontroller pin all the components are connected and it is used for controlling purpose. The various components are as follows controller unit, GSM, Adriano Nodemcu, Temperature Sensor, Humidity Sensor, Soil moisture sensor.

Figure

Here the controller is used to drive all the components connected to the micro controller. This is a controlling unit of this project. The output is simply displayed by using the LCD display. The LCD is having the special specifications. The variable resistor is used for adjust the contrast of the LCD display. In our project we had taken the 16*2 type LCD display.

GSM technology also used in our project. In our project GSM module is used to receive the status from android app.

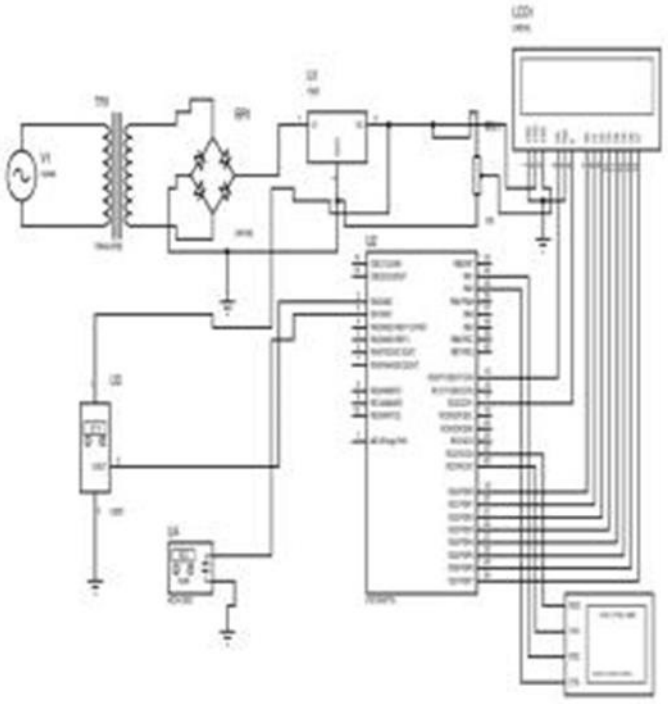
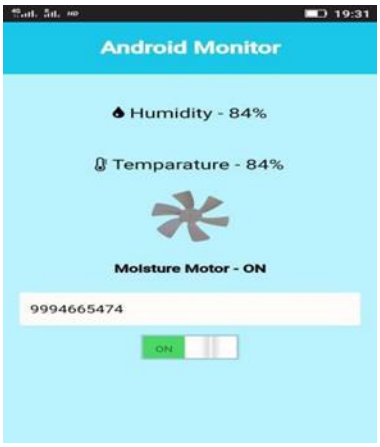


Figure 2. Circuit Diagram of the Proposed System

RESULT AND FUTURE ENHANCEMENT

"Smart farming: IOT based smart sensors agriculture stick for live temperature and moisture monitoring" has been designed toward the implementation of IOT in agriculture system and all over Control and database is collected over a sensors. The systems overall block diagram is identified and the circuit diagram is verified.



Currently with the IOT various factors like humidity, temperature, moisture of soil and the date of irrigation are well maintained with this project. Further as a implementation and development of this project we can integrate drones with the developed application and use them for fertilizing the land and various other uses.

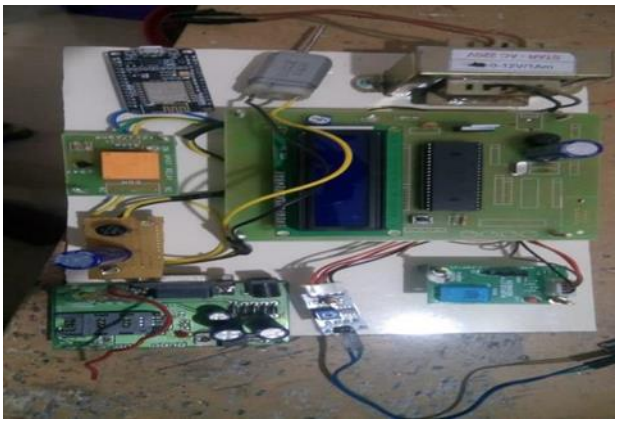


Figure 3. Developed Hardware Assembly

Advantages of Proposed System

- Wireless communication is more convenient and user friendly then wired communication and it is not need to require the physical presence of person at the location
- Smart mobile application for continuous monitoring and control.
- It show notification for water irrigation and emergency purpose.
- It can be access in long distance also.

REFERENCES AND FOOTNOTES

[1]. “Towards a GSM Enabled Remote Monitoring Medical System”, D. Tshali , M. Sumbwanyambe 2018.
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