

Automatic monitoring and controlling system-using Internet of things (IoT) for Poly houses

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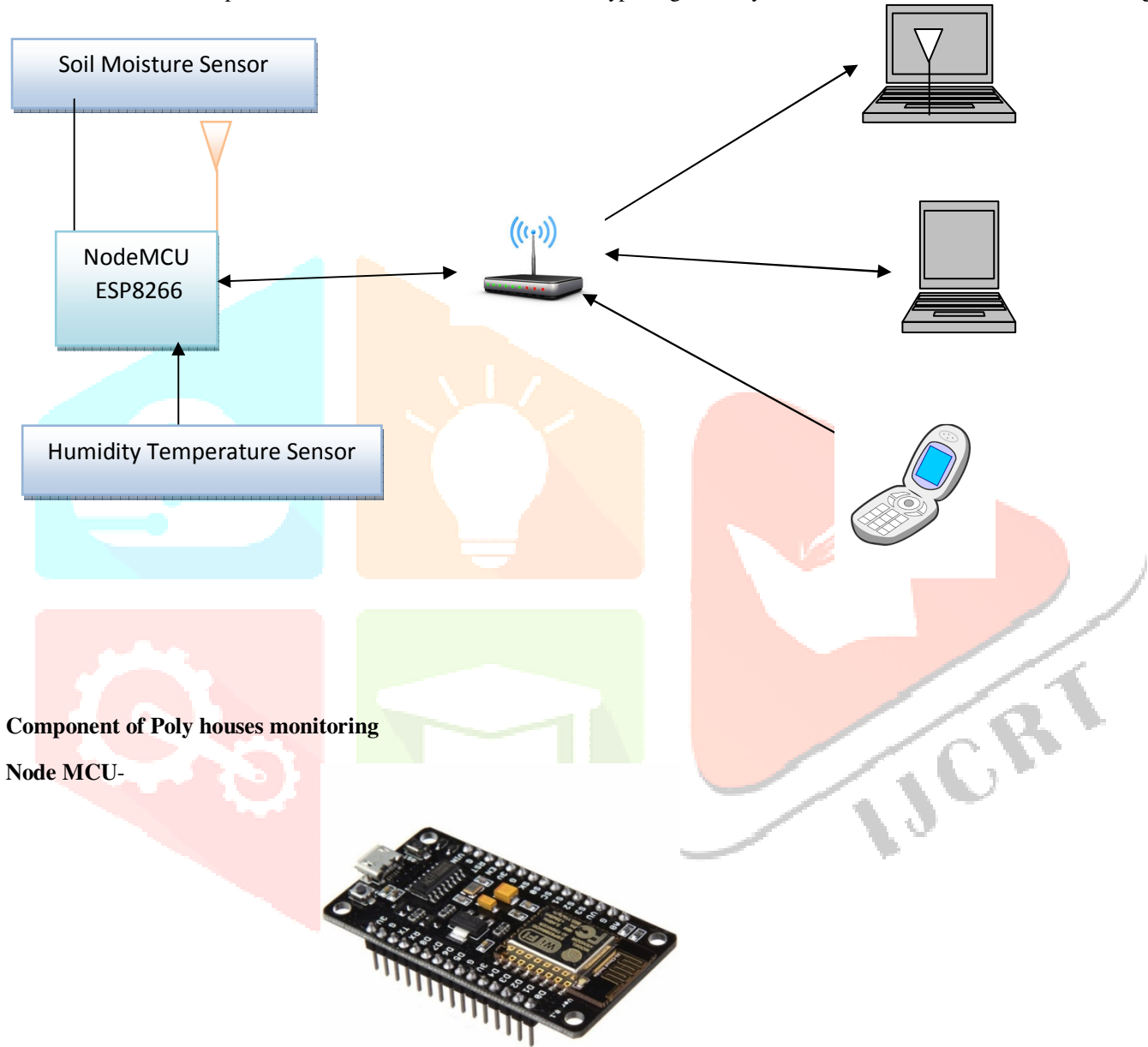
Abstract- The aim of this paper is to design a poly house monitoring based on the IoT. A poly limits, a message will be sent on mobile app through wifi router. Temperature and humidity are controlled by humidity and temperature sensors and a fogger used to control the same. The irrigation of agriculture field is carried out using automatic drip irrigation, which house is a covered area where plants grow and cultivate. There are some important parameters to be monitored inside the poly house are temperature, relative humidity and soil moisture. The temperature, humidity and soil moisture are sensed by NOD MCU. If any condition crosses certain operates accordingly so as optimal amount of water is applied to the plants.

Keywords- NOD MCU, sensors, IoT, ESP8266 Wi-Fi modem

INTRODUCTION

The rising demand for crop production and quality has significantly increased the utilization of high quality greenhouse. The increased population demands for large amount of crop production. We can cultivate the crops which need some specific environmental conditions in the greenhouse. This project describes the design and implementation of a wireless sensor networks for greenhouse environment monitoring. The Wireless Sensor Network (WSN) is one of the most significant technologies in this century. In this paper we will present an overview of the IOT phenomena as well as its applications on greenhouse. IOT is a vision of a world in which most objects are connected; transmitting updates about their performance so the people who use them to do things more intelligently. The basic concept behind the IOT is that virtually every physical thing in this world can also become a computer that is connected to the internet. In this project the sensor will sense the vital parameters of the environment. The sensed values will be displayed on an LCD display. The sensors are connected to the microcontroller. The analog sensors connected through an ADC. The message will be send to the registered number through GSM. The motor will be ON automatically if the soil moisture is less. Microcontroller is a computer present in a single integrated circuit which is dedicated to perform one task and execute one specific application. It contains a processor core, memory and programmable input/output peripherals. The microcontroller used here is the P89V51RD2 which is an 8bit 8051 compatible microcontroller. GSM Modem is a specialized modem which accepts a SIM card and operates over a subscription to mobile operation, just like a mobile phone. AT commands are used to control the GSM modems. Sensor is a device whose purpose is to detect a corresponding output. The specific changes may be in the light, heat, motion, moisture, pressure, or any one of a great number of other environmental phenomena. An android app is installed in the receiver mobile, since once the message received the predefined voice recorded in the will be played. So the people can receive the message in their own language. Modern technology, such as telecommunication and internet, mobile for the particular message is a vital element of all modern human activity. No other technology has made such an impact on modern society. Internet and web based services form one of the core foundations of a successful information technology based society. The web is not only used to gain visibility, share information, sell products and conduct business, but it can also be used to improve the way we design engineering systems, manufacture them and test the final products. A balanced and justified usage of internet facilities can lead to reduction in design cycles and subsequent improvement of overall quality [1]. Computer based data acquisition, web based experiments and virtual instrumentation and control applications have been an active area of interest in recent years [2-3]. The work reported by Regtien et al. [4] exemplifies the magnitude of interest in web-based systems on measurement techniques. Simultaneously, we have seen the exponential growth in mobile telephony in the last decade. It is natural that internet and mobile technology are going through a phase of fusion. India is the second largest mobile market in the world after China, with over 490 million subscribers in the mobile market according to the latest figures provided by Telecom Regulatory Authority of India [5]. In the context of large developing countries like India, it is increasingly becoming clear that mobile telephony coupled with internet services will prove to be one of the most efficient systems for penetration of services, products and knowledge. Mechanization and modernization of agriculture must infuse these two technologies so as to make considerable impact. Agriculture and allied sectors contributes 24% of the total GDP and some two-thirds of Indian population depends on rural agro-related employment [6]; slow agricultural growth is a concern for policymakers. Poorly maintained irrigation systems and universal lack of good extension services are among the factors responsible. Access of farmers to markets is hampered by poor roads, rudimentary market, infrastructure, and excessive regulation. Indian farmers also face several other challenges such as small land holding, intermittent power supply, poor yields due to reliance on inefficient methods of farming,

too much reliance on natural phenomena such as rainfall and lack of knowledge of modern methods of agriculture. Poly house farming is an alternative new technique in agriculture gaining foothold in rural India and can be successfully employed for niche areas of agriculture. Most Indian farmers cannot afford such high costs but group of farmers and co-operatives can use such systems. Farmers do require expert guidance to use this new technology of Poly house farming. This methodology of farming reduces dependency on rainfall and makes the optimum use of land and water resources; typical gains may be three times those of traditional farming.



Component of Poly houses monitoring
Node MCU-

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. The term "NodeMCU" by default refers to the firmware rather than the dev kits. ... It uses many open source projects, such as lua-cjson, and spiffs.

Transistor-

A transistor is a semiconductor device used to amplify or switch electronic signals and electrical power. It is composed of semiconductor material usually with at least three terminals for connection to an external circuit.

Resistor-

Registers are data storage devices that are more sophisticated than latches. A register is a group of binary cells suitable for holding binary information. A group of cascaded flip-flops used to store related bits of information is known as a register.

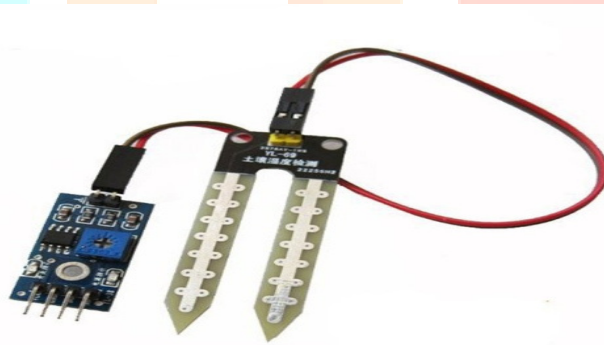
Diode-

A diode is a specialized electronic component with two electrodes called the anode and the cathode. Most diodes are made with semiconductor materials such as silicon, germanium, or selenium. ... The fundamental property of a diode is its tendency to conduct electric current in only one direction.

PCB-

A printed circuit board (PC) mechanically supports and electrically connects electronic components using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate. Components (e.g. capacitors, resistors or active devices) are generally soldered on the PCB.

Soil Moisture Sensor:



Soil Moisture Sensor, Accurately detects amount of moisture content in soil and outputs serial data at 9600 bps. Also outputs Analog voltage as per level of moisture in soil.

Humidity Moisture Sensor:



The DHT11 is a basic, low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and interface is a digital signal on the data pin (no analog input pins needed). It's fairly simple to use, but requires careful timing to grab data. The only real downside of this sensor is you can only get new data from it once every 2 seconds, so when using our library, sensor readings can be up to 2 seconds old.

Software Used-

ARDUINO WEB EDITOR (IDE). ... The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. It runs on Windows, Mac OS X, and Linux. The environment is written in Java and based on Processing and other open-source software.

Conclusion

Web is changing the way we take measurements and distribute results. Many options exist for publishing reports, sharing data and remotely controlling applications. We can incorporate the web into many aspects of farming. Internet based application for control and monitoring of a Poly house farm has been successfully developed and demonstrated. At present, initial cost is major concern. However, on one side, cost of such systems is decreasing at a rapid pace. Moreover, the cost can be justified in co-operative community farming paradigms. The system is also typically suited for India as well as other developing nations where farming is a major source of income and needs continues attention. The system can be expanded and implemented in other agro-based industries like Floriculture, Horticulture, Poultry farming, Dairy farming, etc

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