

IOT BASED AGRI-AUTOMATION USING CLOUD COMPUTING

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Abstract: The Agri-automation is developed with the purpose of investigating the land temperature, humidity and smoke. The Arduino Uno micro controller is used to create the automated greenhouse. Three different sensors like Temperature sensor, Humidity sensor and Smoke sensor are used. The sensors control the two actuators which are LED Light and a Motor. The Light is used to change the Humidity and Motor is used to water the plant. The watering system and the temperature control system is tested both separately and together. The smoke sensor alerts the farmer through sms and the farmer performs respective actions to prevent the field from fire. The test result demonstrates that the temperature could be kept up in the coveted range and the outcomes from the moistness sensor were uneven and in this way decipher as questionable.

Index Terms- Temperature, Humidity, Smoke, Arduino.

I. INTRODUCTION

1.1 Internet of Things

The 'Think' in Internet of Things can be any contraption with any kind of inalienable sensors with the ability to accumulate and trade data over a framework without manual mediation. The embedded advancement in the inquiry interfaces with inside states and the external condition, which in this manner helps in the essential authority process. Pretty much, it is a thought that partners each one of the contraptions of the web and let them talk with each other over the web. It is a creature arrangement of related devices – all of which collects and offer data about how they are used and the circumstances in which they are working. Consequently, every one of claim contraptions will pick up from the experience of various devices, as individuals do. It is endeavoring to develop the dependence in human-I. An architect gives the application a report containing the measures, reason, errors and extraordinary cases dealt with by the fashioner to the analyzer. Yet again, if there is any issue Tester gives it back to the Developer. It takes various underline and along these lines a sharp application is made. It empowers contraptions to be controlled remotely finished the web, along these lines it made opportunities to explicitly interface and arrange the physical world to the PC based structures using sensors and web. The interconnection of these various embedded devices will achieve motorization in all fields and besides enabling moved applications. This is realizing improved precision, viability and fiscal preferred standpoint with lessened human intervention. It incorporates progressions, for instance, sharp networks, splendid homes, sagacious transportation and wise urban groups. Introducing a day, the conditions are incorporated by heaps of it enabled devices which are tenaciously releasing data and bestowing through different contraptions.

1.2 Cloud

Conveyed registering is monetarily keen, safe and scalable, but, affiliation the store by the unpredictable occupation open is a problematic work. Data ease of use infers data is open at whatever point it is incurred. Openness of data increases with broadening in number of duplication of data. Be that as it may, after achieving a specific level of excess, there happens, no improvement in openness. So it is upgraded to find a perfect level of duplication. Openness and replication extent depends upon the center point glitch extent. If dissatisfaction probability is rising above, number of replications of that data are required. So if the center point separate extent isn't as much as less duplication number is imperative for most extraordinary record openness. It logically passes on all as an organization over the web build and as for a customer asks for, for instance, orchestrate, limit, working structure, gear, programming and resources.

II. LITERATURE SURVEY

[1] Real time atomization of agricultural surroundings for social modernization of Indian agricultural system uses ARM7 and GSM and is targeted on atomizing the irrigation system for financial aid of Indian agricultural system. Victimization these methods the condition of the sector will be detected with facilitate of sensors; the connected data is displayed on digital display and transmitted to former/user. The project is enforced by victimization advanced processor ARM7TDMI that could be a thirty two bit small controller, GSM is a vital half because it is to blame for dominant the irrigation on the field and sends data to the receiver through coded signals. GSM operates through SMS s and is that the link between ARM processor and centralized unit system with small controller. The 16X2 show |LCD |digital display alphanumeric display} display is employed to browse the condition of the sector at digital computer itself.

[2] Agriculture sector is evolving with the arrival of the knowledge and communication technology. Efforts area unit being created to boost the productivity and scale back losses by victimization the state of the art technology and instrumentality. As most of the farmer's area unit unaware of the technology and latest practices, several killed systems are developed within the world to facilitate the farmers. However, these skilled systems have faith in the hold on knowledge domain. We tend to propose AN skilled system supported the web of Things (IoT)

that may use the input file collected in real time. It'll facilitate to require proactive and preventive actions to reduce the losses thanks to diseases and insects/pests.

[3] Agriculture plays an important role within the development of agricultural country. In the Republic of India concerning seventieth of the population depends upon farming and one third of the nation's capital comes from farming. Problems regarding agriculture are forever clogging the event of the country. The sole resolution the present} downside is sensible agriculture by modernizing the current ancient ways of agriculture. Thence the project aims at creating agriculture good victimization automation and IoT technologies. Lighter options of this project include good GPS primarily based remote control Automaton to perform tasks like weeding, spraying, wetness sensing, bird and animal scaring, keeping vigilance, etc. second it includes good irrigation with good management and intelligent deciding supported correct real time field information. Thirdly, good warehouse management, which incorporates temperature maintenance, wetness maintenance and felony detection within the warehouse. Dominant of of these operations are going to be through any remote good device or laptop connected to the web and also the operations are going to be performed by interfacing sensors, Wi-Fi or ZigBee modules, camera And actuators with micro-controller and raspberry pie.

[4] Temperature level, soil moisture and water level are monitored according to the readings of these sensors and the pump is switched on to provide adequate water to the fields. Here all the data'sare parsed into the server and are able to monitor the platscontinuou sly and easily able to monitor thehealthhoff arms.

[5] The agricultural system based on Arduino method. The Arduino chip was used in combination with sensors to measure ecological factors, namely the temperature, humidity and soil moisture. The data is sent to the farmer through messages from the cloud based on necessities used by weed detection algorithm. This will be estimated to support for farmers in the order of the state.

III. EXISTING SYSTEM

As this ecological conditions like temperature, stickiness and soil control will be sense by utilizing sensor system and this information all in all send to the rancher by utilizing it, It is giving us a huge stage to break down the various sense all the while framework to limit changes in the parameter that requires for the diverse products Texas Instrument TM 4C1294 this chip has incorporated with interface unit that is called Ethernet Media get to control (EMAC) to associate with another layer. For Network layer Address Resolution convention (ARP) is utilized to complete dynamic steering. For Transport Layer TCP is utilized. Application layer there is Website plan. An IoT framework incorporates of an IoT input gadget, IoT cloud, and IoT yield gadget. The IoT input gadgets will have different info modules joined that can detect what is happening in the earth(E.g., light, temperature, moistness, soil control,co2 control) and have the capacity to transfer information into the cloud.

3.1 ZigBee

ZigBee is one of the for the most part used moved remote progressions for working up correspondence between things for the nursery computerization. ZigBee is a Radio Frequency (RF) trades A standard in perspective of IEEE 802.15.4. A Zigbee based framework, as a general rule contains a Zigbee coordinator and Zigbee center points. The Zigbee facilitator is accountable for making and keeping up the framework. The Zigbee organizer deals with each Zigbee hub, for example, a temperature sensor, humidity, soil control, Co2 control and so on., in the system. All interchanges between Zigbee hubs spread through the facilitator to the goal hub. The most extreme ZigBee information rate is around 250kbps and correspondence range can differ from 100m to 1km contingent upon the yield control.

IV. PROPOSED SYSTEM

The proposed model consists of an Arduino UNO as a main processing unit for the entire system and all the sensors and devices can be connected with the Arduino UNO. The Arduino UNO consists of fourteen digital pins and six analog pins. The sensors can be operated by the Arduino to retrieve the data from them and it processes the analysis with the sensor data and updates in the cloud. The Arduino UNO is compatible to operate electrical devices like motor, LED light.

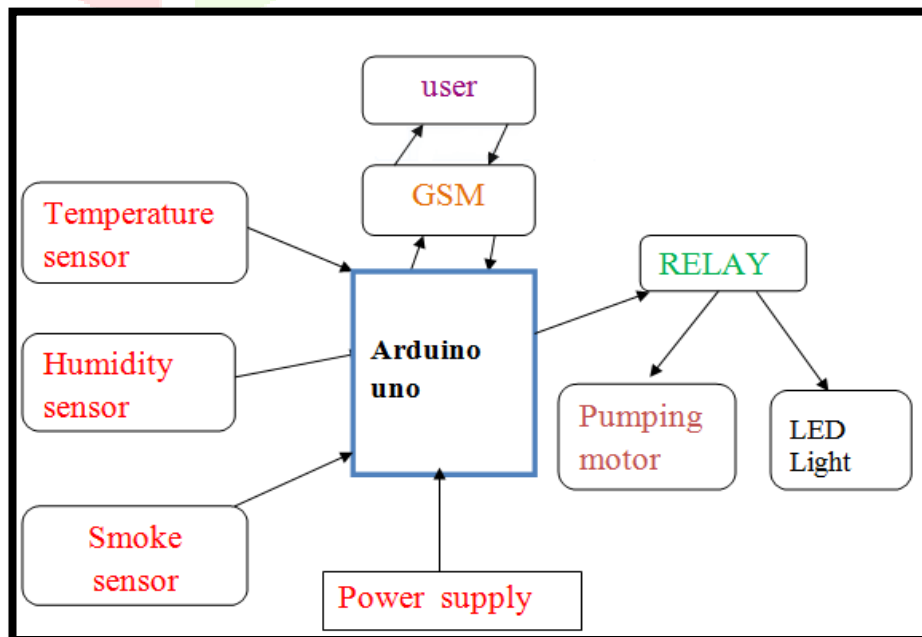


Fig.1 Block diagram of Proposed System

4.1 Block Diagram Explanation

The proposed system is using the GSM module; this can be used to transfer the temperature, humidity and smoke level message to the farmer. The farmer sends the instruction to GSM then it can be sent to Transistor Transistor Logic. These can be used to convert the message to understand the Arduino. The TTL is present in between GSM and Arduino. relay has been used to on/off the motor and LED light. A relay is an electrically operated switch. A type of relay that can handle the high power required to directly control an electric motor or other loads is called a conductor. Solid state relay management, power circuits with no moving elements, instead victimization a semiconductor device to perform the change. The transformer is employed to manage the electrical devices. It is often DC isn't passed, it's been reduced the provision then passed to electrical devices. The Temperature device, wetness device and smoke device are senses land. The total amount of water vapour in air is defined as a measure of humidity. Relative humidity is calculated because when there is a change in temperature, relative humidity also changed. The temperature and humidity changes occur before and after irrigation. The temperature and humidity sensor can also be used in greenhouses. GSM is used to transfer messages to farmers. The farmer then controls, electrical devices like Motor, LED light is shown in the Fig.1.

4.2 ADVANTAGES

- Time is saved.
- Manual Work is reduced.
- Higher performance.
- Flexibility.

4.3 HARDWARE REQUIREMENTS

- Temperature Sensor
- Humidity Sensor
- Smoke Sensor
- Relay
- GSM
- Arduino
- TTL
- Motor
- LED Light

4.3.1 Temperature and Humidity Sensor

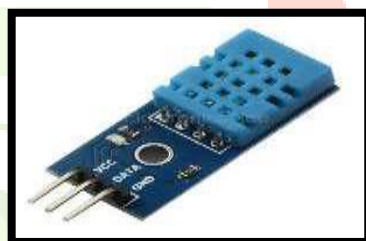
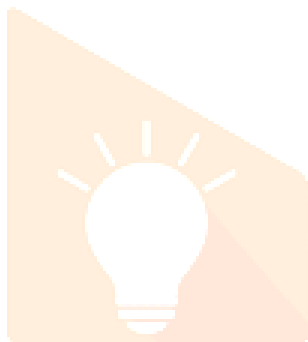
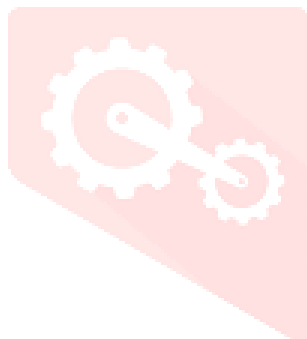


Fig.2 Temperature and Humidity Sensor

It is a coordinated circuit sensor that can be utilized to gauge the temperature in the nursery. It gauges and shows the temperature values intermittently. Humidity sensor is utilized for detecting the vapors as a part of the air. The adjustment in RH (Relative Humidity) of the environment would bring about show of qualities. DHT11 and voltage is +5V. It has been taking the input Temperature and Humidity in surroundings and produce a output in the for of Digital signal using the units Temperature in Celsius and Humidity in percentage is shown in the Fig.2

4.3.2 Smoke Sensor



Fig.3 Smoke Sensor

A smoke detector could be a device that senses smoke, usually as an associate indicator of the fireside. Business and residential security devices issue a signal to a fire indication, control panel as part of a fire alarm system, while household detectors, known as smoke sms,

generally issue a local audible or visual from the detector itself. The smoke sensor model is MQ135 and voltage is +3.3V. It has been taking the input is Alcohol and Dangerous gas like Carbon monoxide. It will produce a output in the form of Analog signal and units percentage is shown in the Fig.3

4.3.3 Relay



Fig.4 Relay

A relay is Associate in Nursing electrically operated switch. Several relays as Associate in Nursing magnet to automatically operate a switch, however different in operation principles is used, similar to solid-state relays. The relays square measure used wherever it's necessary to manage a circuit by a separate low-power signal, or wherever many circuits should be controlled by one signal. The primary relays were employed in long distance telegraph circuits as amplifiers: they continual the signal coming back from one circuit and re-transmitted it on another circuit. Relays were used extensively in phone exchanges and early computers to perform logical operations is shown in the Fig.4

4.3.4 GSM



Fig.5 GSM

The GSM module is used to send ansmsto the user cell phone,When the temperature,Humidity and Smoke is Detected by the sensors.Ardrino send a signal to the GSM module in which one of the tasks is to send the text sms.Gsm module requires one sim card and is capable to accept any type of network.It works with 12V dc supply.It has a unique identity number like our mobile phones have,with the help of Gsm to sms and also send a voice message.The Messages are saved in the Arduino memory is shown in the Fig.5

4.3.5 Arduino



Fig.6 Arduino

Arduino could be a fashionable ASCII text file development board for engineers and manufacturers to develop physics comes with a simple means. It consists of each a physical programmable development board (based on AVR series of microcontrollers) and a chunk of software package or IDE that runs on a laptop and accustomed write and transfer the code to the microcontrollerboard.The different types of arduino boards like Arduino Uno, Arduino Pro Mini, etc.Some serial Arduino boards contain a level shifter circuit to convert between RS-232 logic levels and transistertransister logic level signals.CurrentArduino boards are programmed via Universal serial bus implemented using USB to Serial adapter chips such s the FTDI FT232.The arduino model is UNO and processor is Atmega 328 and Flash memory is 32K ,SRAM is 2K and EEPROM is 1K is shown in the Fig.6

V. MODULE DESCRIPTION

Sensing Land Dryness and Smoke
 Fire indication
 Automatic Flow of Water
 GSM Module

5.1 Sensing Land Dryness And Smoke

The total amount of water vapour in air is defined as a measure of humidity. Relative humidity is calculated, because when there is a change in temperature, relative humidity also changes. The temperature and humidity changes occur before and after irrigation. The temperature and humidity sensor can also be used in green houses. The use of remote sensing techniques for the study of forest fires could be a subject that started already many years past and whose prospects are increasing as new sensors were incorporated into earth observation international programs and new goals were reached supported the improved techniques that are introduced. In this way, three main lines of work can be distinguished in which remote sensing provides results that may be applied on to the topic of forest fires: risk of fireplace, spreading, detection of hot spots and the institution of fireplace parameters and, finally, devising of affected areas. The Temperature and Smoke are detected victimization Sensors. These methods have been performed within the sensing Land xerotes and smoke [8].

Fire Indication

When the Smoke will be detected Smoke Sensor Higher output voltage has been indicated. Otherwise Lower output voltage has been indicated. A smoke sensor is a device that senses smoke, typically as an indicator of fire. Commercial and residential security devices issue an indication to a fireplace indication, instrument panel as a part of a fireplace warning device, whereas house detectors, referred to as smoke SMS, typically issue a neighborhood wearable or visual from the detector itself [6].

5.3 Automatic Flow of Water

When the user sends the message to IoT devices. It can be automatically flow the water to the land. The watering system underwent two tests to analyze the reliability of the system. The first test was to examine whether the circulator pump gives the same amount of water each time to determine the reliability of the pump. The second test was about measuring the soil moisture level at the same spot during a long period of time. If the moisture level is stable around the same value the sensor could be seen as reliable [7].

5.4 GSM Module

The GSM module is used to send an SMS to the user cell phone, when the temperature, humidity and smoke is detected by the Sensors. Arduino sends a signal to the GSM module which one of the tasks is to send the text SMS. GSM module requires one sim card and is capable to accept any type of network. It works with 12v dc supply. It has a unique identity number like our mobile phones have. With the help of GSM to SMS and also send a voice message. These messages are saved in the Arduino memory.

VI. RESULTS AND DISCUSSION

The major contributions of this manuscript are as follows. The design and implementation of large scale and long term CO₂ monitoring sensor network is discussed. A low cost sensor deployment strategy with guaranteed performance which addresses the sensor deployment problems in the existing models has been proposed. Hardware implementation of this model has been done and the parameters are periodically monitored with few sensors [9].

VII. CONCLUSION

IoT and cloud computing collectively makes a system that control greenhouse effectively. The sensors senses all the environmental parameters and transfers the data to the user via cloud, which helps farmers to improve the cultivation without any manual intervention and also protects the farm in case of fire. All observations and experimental tests prove that this project is a complete solution to field activities and irrigation problems. Implementation of such a system in the field can definitely help to improve the yield of the crops and overall production [10].

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