

IOT Automation Project on Telecom Network Environment Monitoring Using Arduino SBC

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ABSTRACT

A recent huge interest in Machine-to Machine communication is known as the Internet of things (IOT), which is mainly used for exchanging the data. Internet of things involves connecting physical devices to everyday objects.

This work shows the design and execution of real time monitoring temperatures and humidity in Telecom network Electronic soft switch rooms. The sensors used to detect/identify unauthorized movement and any person/object being within a certain range to critical network elements and to give an alert when ever any one approaching nearby hazardous elements like Battery and power supply .

Arduino UNO is the frequently and mostly used open - source micro controller board based on the ATmega328P micro controller, which is developed by Arduino.cc. The board is equipped with digital and Analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board features 14 Digital pins and 6 Analog pins. It is programmable with Arduino IDE (Integrated Development Board) via a type B USB cable.

Keywords: Internet of Things , Telecom Network Environment , Sensor , Arduino , Arduino IDE , USB Cable, Microcontroller.

INTRODUCTION

Telecom Network monitoring systems were previously implemented, controlled and monitored with the help of manual intervention. In industrial application, controlling of certain applications involved both machine automation and manual help but lack of proper monitoring systems leads to inaccurate measurements and poor analysis of acquired data for prediction.

The proposed system keeps track on the parameters such as temperature, humidity, gas content with the help of the real time sensors. These parameters are continuously monitored by an open source platform called Thingspeak for an interval of every 2 minutes. and counter- measures can be taken after the observation of the parameters. Data can be monitored using Thingspeak web page and end-user. The sensors in the proposed system collect the data such as the temperature, humidity, pollution level. The Wi-Fi network helps in the process of sending the collected data to the open source platform, Thingspeak. Through the application/Thingspeak, the user will understand the status of his/her own house or office.

LITERATURE WORK

Ajay et al. [1], Many currently using humidity sensors are constructed based on a porous sintered body structure ceramics and utilize the ionic type humidity-sensing principle. By water adsorption on the ceramic surfaces, their electrical properties would change and this change encompasses the resistance, capacitance or electrolytic conduction depending upon the sensor type [2]. According to our study, there are many research efforts which make utilisation of various wireless sensors for achieving environment monitoring applications. IOT provides the connectivity between computers and other physical devices such as vehicles and buildings, embedded with sensors and network connectivity that enable reading from sensors and actuators [3].

In our study we use Arduino which is a simple-to-use hardware and software based on open-source prototyping platform, Originally Arduino was created as tool for fast prototyping, aimed for students without any background in electronics and programming. Later, the Arduino board started to change to adapt to new

challenges [4], which is also called as an Integrated Development Environment platform. Here Arduino is connected to your personal computer through USB cable, by which the code gets dumped into Arduino board. Arduino uses ATmega microcontroller.

Sensor that is connected to Arduino board is DHT11 Sensor, which measures both temperature and humidity. In order to measure humidity this sensor has two electrodes with substrate placed in between them. So when humidity change occurs, the conductivity of the substrate changes or the resistance between these electrodes changes. This change in resistance is measured and the IC which is present helps the microcontroller to read it. Temperature sensor uses a Negative Temperature Coefficient Thermistor for measuring. The temperature range of DHT11 sensor is 0-50 degrees Celsius. Range of humidity sensor is 20-80%. The operating voltage of DHT11 sensor is from 3-5 volts. Maximum current used for measuring is 2.5mA [5].

PROPOSED METHOD

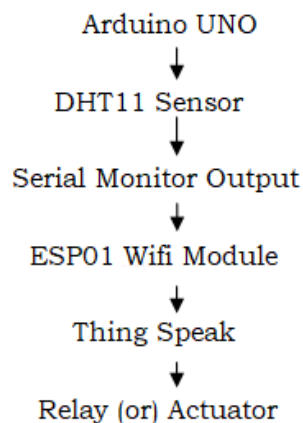
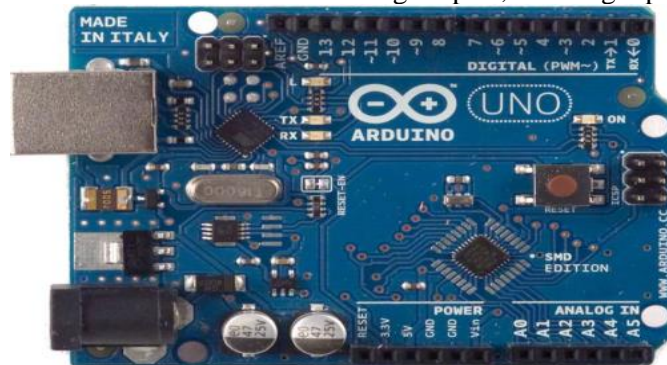


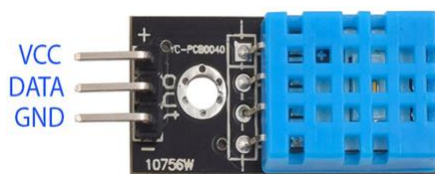
Fig 1: Flowchart of Proposed System

In today's day to day, life engineers play a crucial role and became the greatest part of our society. The aim of this proposed project is to provide security and privacy using IoT and automation which is being expanded because of straight forwardness through smart phones, internet, and wireless communication. The aim of this project is achieved by programming an embedded system (microcontroller). These embedded systems are used for implementing specific task. The quality of services is getting improved by automation and Internet of Things.

Arduino UNO: It is an open source software, which uses an ATmega microcontroller. Connect Arduino to PC on which code is written with a USB cable. It has 14 digital pins, 6 analog inputs.



DHT11 Sensor: DHT11 Sensor has both humidity and temperature sensing components for measuring. It has thermistor to measure temperature and two electrodes with substrate between them for humidity measurement. So as the humidity changes, the conductivity of the substrate changes or the resistance between these electrodes changes. This change in resistance is measured and processed by the IC which makes it ready to be read by a microcontroller.



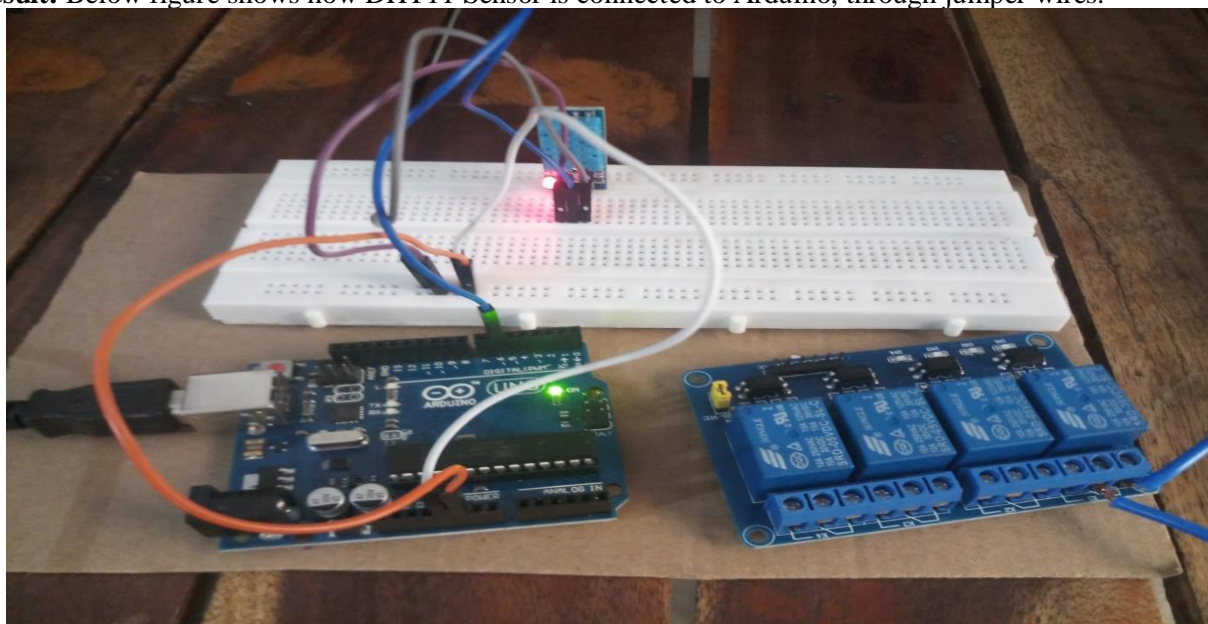
ESP01: ESP01 is a Wifi module which is used to connect Arduino to internet. We use THINGSPEAK to see how temperature, humidity values are varying with the help of graphs.



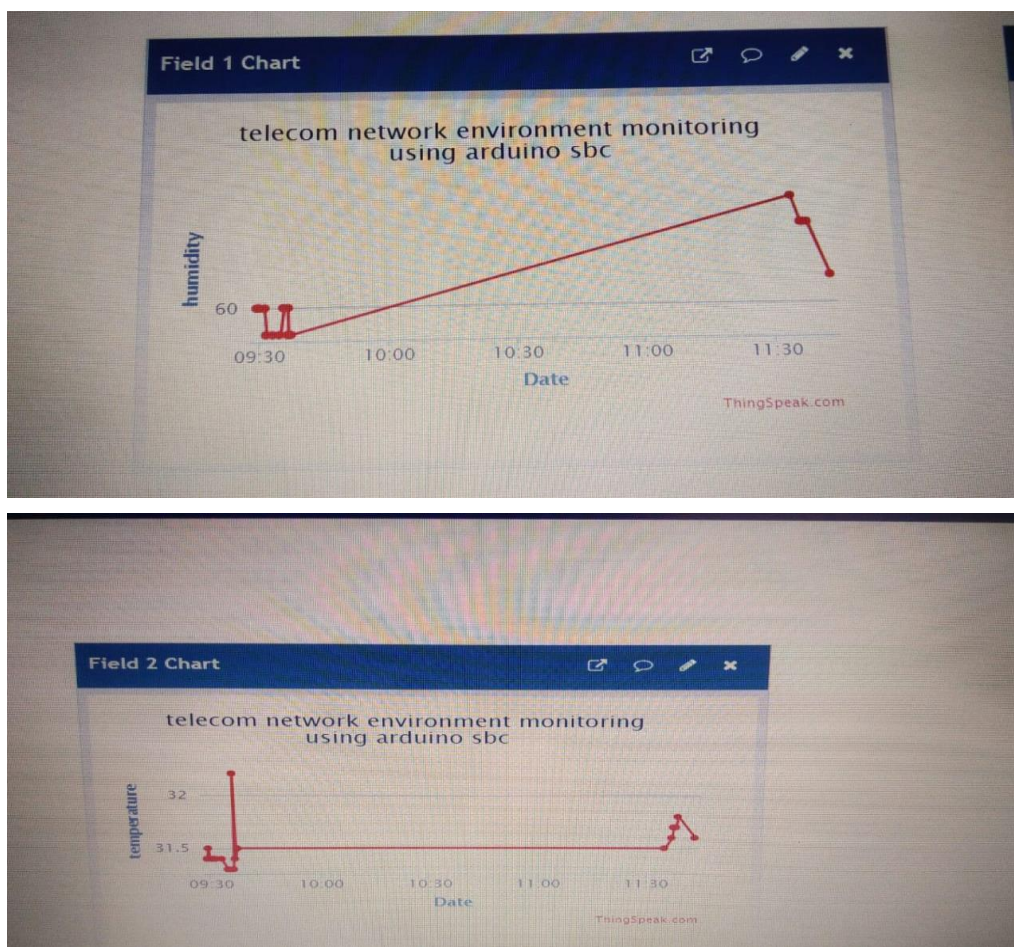
Relay: Relay has three terminals NC, C, and NO. Where C is common, NC is normally close and NO is normally open. If you want HIGH signal to turn on relay, use NO terminal. If you want HIGH signal to turn off relay, use NC terminal. Depending on conditions we give, relay will ON and OFF. We can connect bulb, alarm etc. as an indicator.



Result: Below figure shows how DHT11 Sensor is connected to Arduino, through jumper wires.



Below graphs show the ThingSpeak outputs of humidity and temperature.



CONCLUSION

This monitoring system of environment provides many benefits; for example, as monitoring services for remote areas. The various wireless sensors used for performing IoT-based solutions in environmental monitoring were designed, developed and analyzed.

- We connect arduino board to arduino software (PC) through USB cable.
- When we execute code, we see output on serial monitor.
- Graphical representation of output on ThingSpeak.
- Through relay we connect bulb for an indication.

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