# TEMPARATURE AND HUMIDITY DETECTOR

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## Abstract

The aim of this project is to develop an autonomous temperature and Humidity detector which detects the temperature and the humidity of the environment. Temperature and humidity information is an important quality index of communication system. A temperature and humidity sensor network is constructed based on Raspberry Pi development platform and temperature and humidity sensor. The temperature and humidity sensor network can monitor the temperature and humidity of the communication system, and then transmit the measured parameters to the remote server in time by IP network, and carry out the corresponding data processing, which can realize the basic security protection of the communication system.

*Index Terms - Work Flow, Circuit Details, Working, Applications, Result , conclusion , Future Scope ,and References.*

## I.INTRODUCTION:

There heating systems that require special attention, especially in winter, when it is necessary to be constant temperature and humidity to have a desired comfort. With a data acquisition board can achieve a system that will allow monitoring temperature and humidity in a room. I used as data acquisition board, a Arduino board. Using a Arduino data acquisition board has the following advantages (https://www.arduino.cc): - is open source; - is easily programmed; - can be used on any operating system; - low cost. Arduino boards can be programmed easily using the Integrated Development Environment (IDE ). This environment is for writing programs that can be loaded on the board (Amariei, 2015).Arduino is found in several variants depending on the sizes and capabilities. The board used for this work is Arduino Uno. The difference between Arduino Uno and other boards is that this board does not use a driver FTDI USB to serial chip, but uses ATmega16U2 microcontroller that is programmed as a USB to serial converter. Measurement and maintaining constant temperature is important in industrial processes. Temperature transducers which are used in electrical measurements are numerous due to a wide range of temperature being measured, and because of the measurement accuracy in a specific area. Humidity is the amount of water vapor which is contained in a sample of air. It is a very important feature of the air both in terms of weather as well as in terms of bioclimatic. Solids and liquids humidity measurement is done using umidimetrelor. They express the water content that is found in materials. In the expression of the humidity, enter the wet material mass and the dry material mass. Humidity is expressed as follows: • absolute humidity: University of Bucharest and University of Craiova 236 (1)

• relative humidity :

$$U_a = \frac{m_h - m_u}{m_{cr}} \; 100 \; [\%] \quad (1)$$

$$U_p = \frac{m_h - m_u}{m_h} \; 100 \; [\%] \quad (2)$$

(2) Humidity measurement is based on the change of physical properties due to moisture. Moisture measurement methods are based on variation in resistivity, variation of capacity or the variation in the degree of attenuation of microwave.

## II. CIRCUIT DIAGRAM :

When the flame sensors detected the fire, the robot will move to the fire source and send a warning message to the user. Once the robot reached the burning area, it will stop at a certain distance and extinguish the fire by using water.
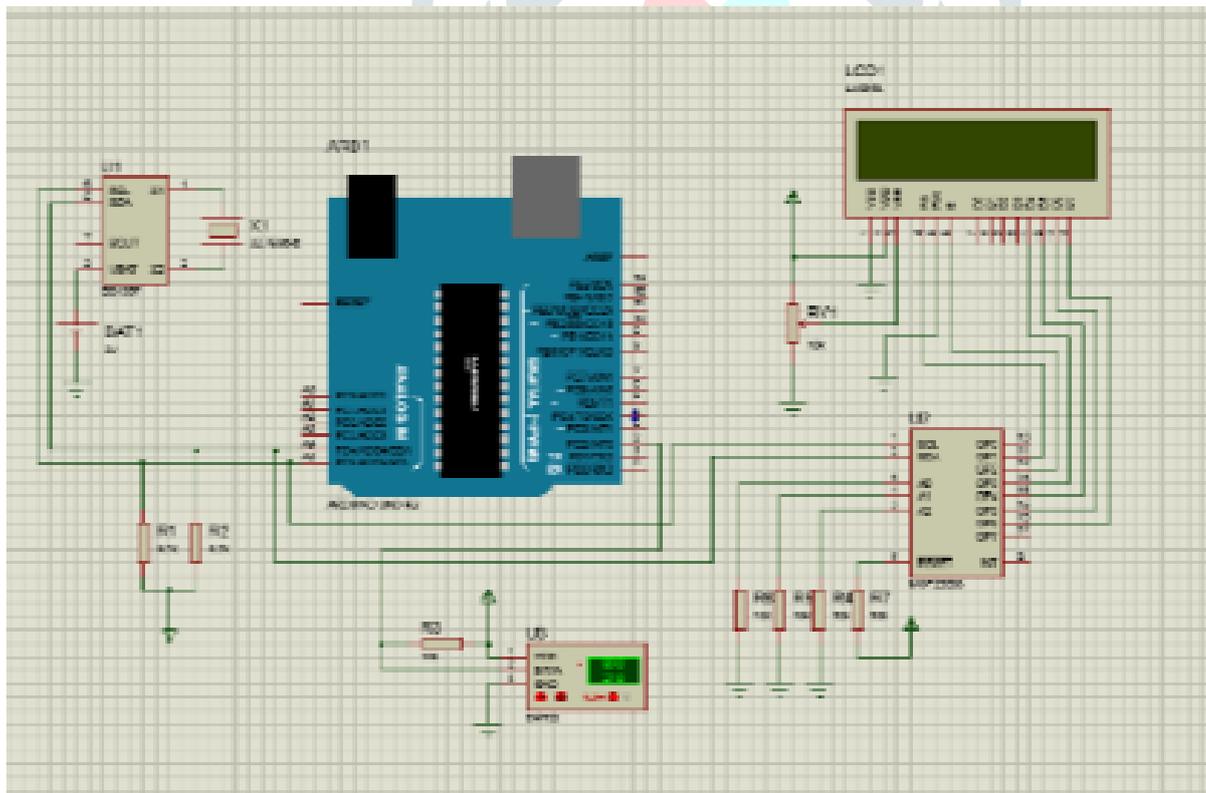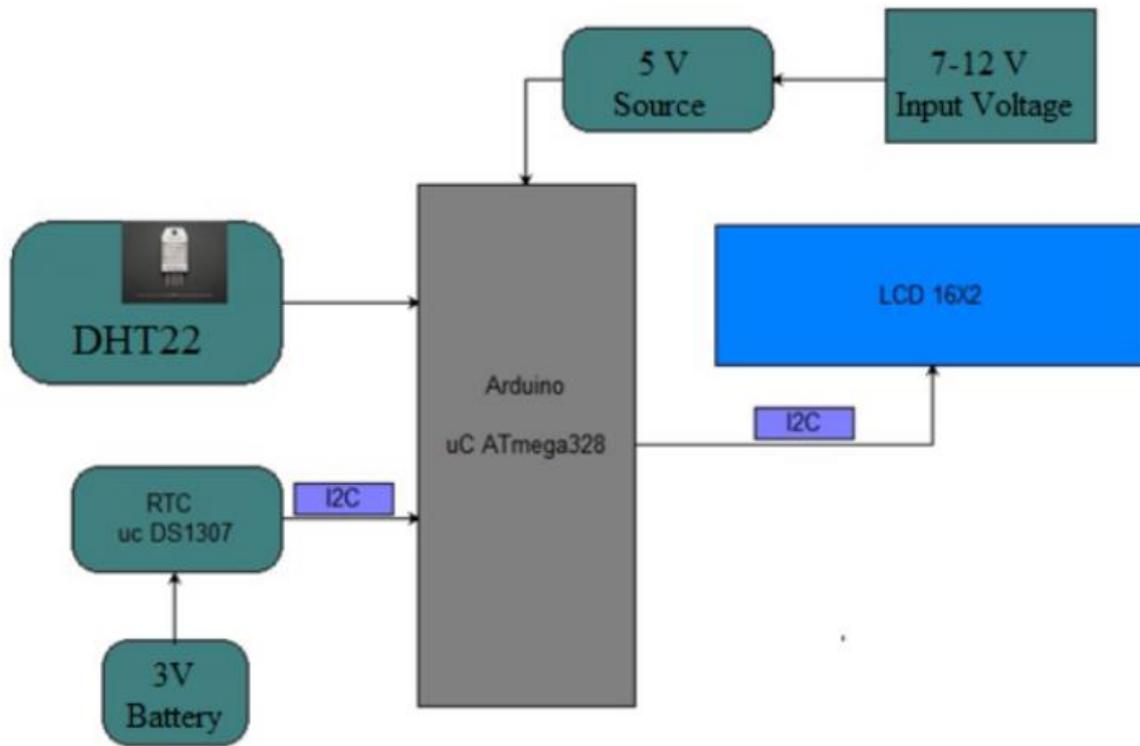




## III. WORKING :

A simultaneous temperature cum humidity measuring sensor (DHT11) was used to develop a smart monitoring system. The signal from the sensor was acquired into the Arduino development board. A decision making algorithm was implemented in the microcontroller to activate the GSM module when either the temperature or the humidity or both gets out of the present range in the neighbouring environment of the sensor. The GSM module was programmed to send an SMS to a predefined mobile number (incorporated in the Arduino program) immediately after activation. Once the GSM module is activated, the next activation will happen only after 10 minutes. A moratorium period was kept to prevent continuous messaging. The moratorium period will allow the user to contact the supervisor of the instrument and/or

controlled environment chamber to rectify the problem with in a specified time. If the problem is not taken care of within 10minutes, the second message will be sent. The process will be continued until the environmental chamber conditions are brought back to the predefined conditions or the device is inactivated.

TESTING

Testing of the device

Case 1: The normal temperature range in the program was set as36 °C and 38 °C; i.e., when the temperature is within the specified range the messaging service will not be activated. The temperature in the orbital shaker incubator was kept at 37°C. To simulate the malfunctioning of the device, the temperature of the chamber was increased using the user interface of the chamber. This resulted in the subsequent increase in the temperature and simultaneous decrease (due to the increase in the temperature) in the humidity as perceived by the DHT11 sensor. This resulted in the activation of theSMS module. The device was capable of continuously transmitting the data to the base station by wireless communication protocol.

Case 2: To test the ability of the device in sensing the environmental condition, a hot iron was kept in the vicinity of the device. The parameters of the device were kept same as in the case1. As the time progressed, there was an increase in the temperature of the iron, which in turn, resulted in the increase in the temperature as perceived by the DHT11 sensor. As the temperature was increased, the SMS module was activated.


The different hardware components, temperature, and humidity sensor, LCD screen, micro SD card Indicators and LCD screens are powered through Arduino UNO, 9 Volt output (Shirsath et al., 2017 ).

1.  USB Type B Cable

USB type B connectors officially referred to as Standard-B connectors, are square with either a slight rounding or large square protrusion on the top, depending on the USB version. USB Type-B connectors are supported in every USB version, including USB 3.0, USB 2.0, and USB 1.1. The second type of " B" connector, called Powered-B, also exists but only in USB 3.0

2.  Adaptor

An (electrical) adapter is a device that converts attributes of one electrical device or system to those of an otherwise incompatible device or system. Some modify power or signal attributes, while others merely adapt the physical form of one electrical connector to another.

3.  DC Power Jack

A DC connector (or DC plug, for one common type of connector) is an electrical connector for supplying direct current (DC) power.

4.  9-V Battery Connector

The battery has both terminals in a snap connector on one end. The smaller circular (male) terminal is positive, and the larger hexagonal or octagonal (female) terminal is the negative contact. The connectors on the batter y are the same as on the load device; the smaller one connects to the larger one and vice versa.

5.  9-V DC Battery

The 9-V battery format is commonly available in primary carbon-zinc and alkaline chemistry, in primary lithium iron disulfide, and rechargeable form in nickel-cadmium, nickel metal hydride, and lithium-ion.

6.  Controller

Arduino Uno board is used as a controller which is based on ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), a 16 MHz ceramic Resonator, a USB connection, a power jack, an ICSP header and a reset button (Krishnamurthi et al., 2015). Arduino board is programme d via Universal Serial Bus (USB), implemented using USB-to-serial adapter chips such as the FTDI FT232 (Kale and Kulkarni, 2016). Arduino program is written by interfacing the board with a computer in order to create a programming user interface area to startup controlling tasks properly (Mahmood and Hasan, 2017).

7.  DHT11 Sensor

DHT11 capacitive humidity sensing digital temperature and humidity module is one that contains the compound that has been calibrated digitally to signal output of the temperature and humidity sensors (Manghnani et al., 2017). The sensor includes a capacitive sensor, wet components, and a high-precision temperature measurement device, and connected with a high-performance 8-bit microcontroller. The product has excellent quality, fast response, strong anti-jamming capability, and high cost (Kale and Kulkarni, 2016).

8.  Resistor

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current ☐ow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses.

9.  LCD Screen

Liquid crystal display (LCD) is a screen to display alphanumeric characters. 16 x 2 LCD is used as a user interface. Here, 16 x 2 refers to the 16 characters in 2 lines in the module (Sipani et al., 2017).

10.  Trimmer Potentiometer

A trim pot or trimmer potentiometer is a small potentiometer which is used for adjustment, tuning, and calibration in circuits. Trim pots or presets are normally mounted on printed circuit boards and adjusted by using a screwdriver.

11. LED Bulbs

A LED lamp or LED light bulb is an electric light for use in light fixtures that produces light using light-emitting diode (LED).

12. Jumper Wires

Jumper wire is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them –simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering. Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment.

13. Micro SD Card Module

The micro SD card module is a simple solution for transferring data to and from a standard SD card. The pinout is directly compatible with Arduino, but can also be used with other microcontrollers. It allows for adding mass storage and data logging to the project. This module has a serial peripheral interface (SPI) interface which is compatible with any SD card, and it uses 5V or 3.3V power supply which is compatible with Arduino Uno.

14. Printed Circuit Board

A printed circuit board (PCB) is a predesigned copper track on a conducting sheet which mechanically supports and electrically connects, electronic components using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate. The pre-defined tracks reduce the wiring thereby reducing the faults arising due to lose connections. Simply place the components on the PCB and solder them.

### IV. APPLICATIONS:

It can be used for measuring humidity and temperature values in heating, ventilation and air conditioning systems. Weather stations also use these sensors to predict weather conditions. The humidity sensor is used as a preventive measure in homes where people are affected by humidity.Offices, cars, museums, greenhouses and industries use this sensor for measuring humidity values and as a safety measure.

### V. CONCLUSION:

In conclusion, Temperature and humidity measurement is essential to taking control of your environment. This functional system, in terms of hardware and software, enables us, temperature and humidity measurement of an enclosure. Also, this system monitors the time.

University of Bucharest and University of Craiova 240 Arduino is an open-source prototyping platform based on easy-to-use hardware and software. The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users. Uncertainty in temperature and humidity measurement can come from various causes. It depends partly on the instruments, which might suffer from drift, short-term "noise", limited resolution, and so on. Calibration uncertainty needs to be taken into account. If the condition being measured is unstable, this too contributes to uncertainty in the result – for example, temperature changes can cause uncertainty in relative humidity values (http://www.npl.co.uk/upload/pdf). The accuracy of measurement system is0.5°C for temperature, and respectively, 2% for moisture. Results were displayed on an LCD. This LCD can display 16 characters on two lines. They were created and displayed on LCD three symbols: a symbol for displaying temperature measuring unit (degree), a temperature icon symbol and a moisture icon symbol.

### VI. REFERENCES:

1.

Michael Margolis, Raspberry Pi Cookbook, O'Reilly Media Inc., 2012.

2.

*DHT11 digital temperature and humidity sensor module user manual v1.0 Harbin Aosong Robot Technology Co. Ltd.*, vol. 10, 2010.

3.

Massimo Banzi, Getting Started with Raspberry Pi, O'Reilly Media Inc., 2009.

4.

Chen Bidong and Tan Meiiuan, "Exploration and Research Raspberry Pi+ Arduino prototype system based on smart home[J]", *Smart Factory*, vol. 06, 2016.

**5.**

Yuvong Ma Yaiie, Peng Panlai and Liu Zhivang, "Design of a Remote Monitoring and Alarming System[J]", *Process Automation Instrumentation Automation Instrumentation*, vol. 06, 2016.

**6.**

Wen-Tao Li, Tang Ouan, Wu Miao, Lian-Shan Li, Cui Shuang, Hui-Iia Long, et al., "Design of Alpha Spectrum Measurement Equipment Based on Raspberry Pi[J]", *Nuclear Electronics & Detection Technology*, vol. 03, 2015.

**7.**

Zheng Shiiue and Xu Hong, "Design and implementation of remote monitoring system based on Raspberry Pi[J]", *Microcomputer & Its Applications*, vol. 19, 2014.