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HUMIDITY AND TEMPERATURE DETECTOR

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Abstract: ***Every year the boilers used for producing electricity are refining petroleum are being spoiled due to unpredicted raise in temperature at the boilers and the refining efficiency is low due to humidity in the air which can be adjusted, but the cost of implementing such a device is too costly. Hence, the unbiased aim of our work is to provide a low cost result for temperature and humidity monitoring used for engineering, research laboratory, workshops, industries and house-hold uses. In this paper a low cost embedded system based temperature and humidity monitor is built using AVR ATmega32 Microcontroller and DHT11 (Temperature and Humidity Sensor). This solution is decently based on electronic and sensingwhich provides highlyaccurate and less fault outputs.***

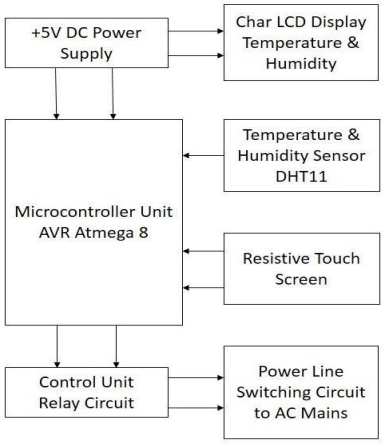
Index terms: Temperature Sensor, Humidity Sensor, Temperature Monitoring

I. INTRODUCTION

Temperature and humidity monitoring system has wide use in practical world of machines that are ruined due to temperatures. It also effects agro and pharmacy based industries.The present paper pronounces the scheming of an temperature cum humidity monitoring system. This project is capable of forewarning the people . Furthermore, the device can sense the humidity level. The need of such project is on high demand at agricultural, pharmacy and industries .All these fields, requires a precise monitoring method for the temperature and humidity. Any variation from the actual environment may lead to huge (agricultural, pharmacy and industries) losses. The designed device helps in monitoring and displaying the value to user ahead of the damage. The prevention may be done on time. The designed idea is implemented by us in different scenarios to test and is executed successfully.In the present scenario the temperature and humidity sensing is so wide in demand. So this project is about designing a temperature and humidity sensor to provide a low cost solution for engineering, research laboratory, workshops, industries and house-hold uses. An AVR ATmega32 microcontroller is implemented and a DHT11 sensor circuit are interfaced together based on our idea.

II. PROJECT AIM AND FOCUS

The model works as similar to an embedded circuit. The circuit works with a standard +5V D.C. power supply with reference to ground. A sensor module interfaced with microcontroller circuit continuously read the actual temperature and relative humidity of the environment and these values are sent to the display unit for the LCD display's first row. On the other side, a resistive touch screen is used to set the desired values of temperature and relative humidity manually and these values are sent to the display unit for the LCD display's second row as well used for the control section to control the overall process. If there is no manual values are set, then it will display only current temperature and relative humidity of the environment. The model works as a real time device. The microcontroller working frequency is 12 MHz, which is clocked by external crystal.



III. PROBLEM SOLUTION

A. Development of the device

The device was developed using DHT11 (temperature cumhumidity sensor) [7]. The sensor was connected with anArduino UNO microcontroller development board [8]. Aprogram was made in Arduino sketch to acquire the signalfrom the sensor. The acquired signal was processed and inrangetemperature and relative humidity thresholds wereincluded in the program. The GSM module, connected withthe Arduino UNO, was activated in the event of any deviationfrom the in-range parameters of the temperature and/orrelative humidity [9]. The activation of the GSM moduleinitiated the process of sending an SMS to the predefinedmobile number, reporting the current temperature and relativehumidity. Additionally, the connection from the sensor wasprovided to a second Arduino development board. A program was made in the Arduino UNO sketch to acquire the signal inthe microcontroller. The wireless module wasserving as the transmitter unit.

IV. WORKING AND IMPLEMNTATION

A simultaneous temperature cum humidity measuringsensor (DHT11) was used to develop a smart monitoring
system. The signal from the sensor was acquired into theArduino development board. A decision making algorithmwas implemented in the microcontroller to activate the GSMmodule when either the temperature or the humidity or bothgets out of the present range in the neighbouring environment ofthe sensor. The GSM module was programmed to send anSMS to a predefined mobile number

(incorporated in theArduino program) immediately after activation. Once theGSM module is activated, the next activation will happen onlyafter 10 minutes. A moratorium period was kept to preventcontinuous messaging. The moratorium period will allow theuser to contact the supervisor of the instrument and/orcontrolled environment chamber to rectify the problem withina specified time. If the problem is not taken care of within 10minutes, the second message will be sent. The process will becontinued until the environmental chamber conditions arebrought back to the predefined conditions or the device isinactivated.

V. TESTING

Testing of the device

Case 1:

The normalgenric temperature range in the program was set as36 °C and 38 °C; i.e., when the temperature is within thespecified 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, thetemperature of the chamber was increased using the userinterface of the chamber. This resulted in the subsequentincrease in the temperature and simultaneous decrease (due to
the increase in the temperature) in the humidity as perceivedby the DHT11 sensor. This resulted in the activation of theSMS module. The device was capable of continuouslytransmitting the data to the base station by wirelesscommunication 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 device was able to wirelessly transmit the data to the base station.

VI. CONCLUSION

The temperature and humidity monitoring system explained in this paper has the benefits of more speed, accurate values, easy monitoring. Wireless networking scheme based on AVR provides a beneficiary hardware equipment handling, and can be further developed easily for high end necessities. Low-cost handset simplifies. As this project needs less power the design can be remodelled for solar based implementation also .Can be expanded to other ranges and the sensing accuracy can be monitored using computer and the values can be used to control these values automatically.

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