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Temperature Detection Using Sensor and App

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ABSTRACT: This Paper describes a design of effective security alarm by using a sensor that can monitor an industry, office, home or any public place especially for places where there is nuclear reactor. Generally, in places where temperature monitoring is important at each and every moment, faces a lot of problems due to lack of proper temperature monitoring system. In this project we use Temperature Sensor (LM 35) which senses the temperature of a particular area, a piezo electric buzzer which gets activated whenever a particular threshold temperature is sensed in that area and also we have used an LED that glows, indicating that there is danger. The threshold value of temperature of different areas can be set accordingly so that we are alarmed based on that value. In such areas we can use this model so that it will help us in sensing the danger level of that area and help us in preventing any loss of life. In this model, all the data of temperature are monitored each and every time and retrieved in mobile app through Bluetooth module. At the same time the data can be received in the desktop app as well.

KEYWORDS: Arduino,Visual Studio,LM35 sensor,HC-05,android app,desktop app.

I.INTRODUCTION

Security is a primary concern for each and everyone living in different fields. Security is the degree of protection against danger, damage, loss, and crime. Places where temperature monitoring is important have to be monitored properly with proper accuracy at each and every moment. But Conventional temperature monitoring system is a tedious job and is not always accurate. In our proposed system of design, proper measures have been taken to give the accurate values oftemperature using sensors which senses the temperature of a particular area, a piezo electric buzzer which gets activated whenever a particular threshold temperature is sensed in that area and led starts blinking too. We receive the temperature values continuously in our android mobile app through Bluetooth module. At the same time the data can be received in the desktop version of it which is created by using C# in Visual studio. The temperature values are also stored in the database and can be retrieved by the user for any analysis purpose as and when it is required by using the proper login credentials of the user.

II.HISTORICAL BACKGROUND

Temperature is an important physical factor in industrial and manufacturing companies. As much as important is temperature, so as its monitoring process because a slight change in temperature can alter the entire manufacturing steps. In ancient times, there was no medium to detect the temperature. It was difficult to measure the optimized temperature of a particular area for further processing. It was pretty tough job to analyze what was the required temperature for appropriate production. As a result, industrialist incurred heavy losses. But with the advancement of science and technology, temperature detection has been made possible. Temperature could be detected at a particular instant of time. However, this was not sufficient for manufacturing companies as they required continuous monitoring for safe, secured and accurate processing. This was later made possible with the help of sensors which could continuously detect the temperature. Many advancement in sensors has been made possible by means of technology which offer small dimensions, less power consumption and high reliability. The most recent advancement of sensor technology has been boosted up by high-speed and low-cost electronic circuits which not only provide promising technical solutions but also improve the quality, reliability and efficiency of the products. Later on different interfacing platforms were developed which helped us to interface the data with a software for different analytical purposes.

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III. METHODOLOGY

In this project, Arduino UNO has been used as an interfacing medium for the hardware and software. The LM35 senses the temperature of the surrounding areas where we want to monitor the temperature. It is connected to breadboard and after that the respective pins are connected to Arduino UNO. The Arduino code is done on Arduino software and burnt into the Arduino board. Once the temperature is sensed by the sensor, we use HC-05 Bluetooth module to transfer the temperature data to our mobile and desktop app. After every 1 sec the data is received in our mobile app. The data is also received by windows app. After every few seconds, the data once received is stored in database and we can view the data anytime we want for analyzing. We have a secured webpage which give us a security to our system so that everybody can't access the data that we have stored. Once we login to the system we can easily access the data stored in database and can view the data anytime we want for analyzing. The buzzer that is connected to Arduino produces a sound once the temperature reaches the threshold value. LED also starts glowing, indicating that the temperature is high and we have to be alert to cool down the surrounding temperature and prevent any damage. The LED and buzzer turns off if the temperature goes below the threshold level, implying that we are safe

A. BLOCK DIAGRAM

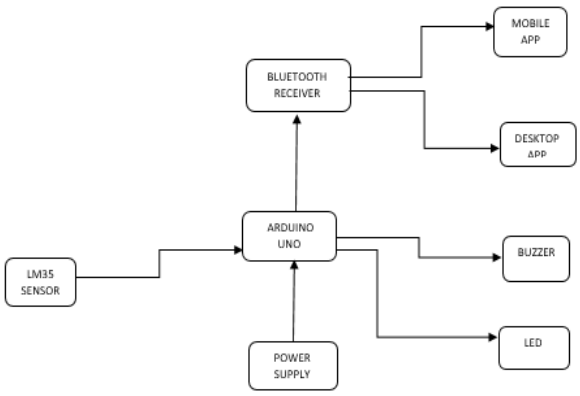

Fig 1: Block diagram of temperature Detector

The total designing part of the system consists of two main parts which includes the hardware module and the software interface design of web-based applications.

IV. HARDWARE CIRCUIT AND ITS WORKING

The hardware comprises of microcontroller Arduino UNO, LM35 sensor, Bluetooth module HC05, LED, breadboard, jumper wires and piezo-electric buzzer. In order to set up the circuit, we first connect the +Vs to +5v of our Arduino board. Vout is connected to Analog0 or A0 and GND with GND on Arduino. The Analog to Digital Converter (ADC) converts analog values into a digital approximation based on the formula ADC Value = sample * 1024 / reference voltage (+5v). So with a +5 volt reference, the digital approximation = input voltage * 205. The buzzer is connected. The pin 8th from Arduino board is connected to red wire of the buzzer and the black wire of the buzzer to ground on the breadboard. For the Bluetooth connection, GND is connected to GND, RX to TX, TX to RX of Arduino and VCC is also connected. If the temperature crosses the threshold value, then an LED glows for which we connect an LED.

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Fig 2: Connection of the hardware

V. INTERFACING OF THE HARDWARE WITH THE SOFTWARE

The Arduino is now connected to PC or laptop and then the code is run into the Arduino IDE platform, we compile it and then flash the code into the Arduino. Once the Arduino code is burnt into the Arduino UNO, then only power up is required to run the prototype. The code once uploaded, the sensor will sense the temperature and send the data to our mobile or desktop app through Bluetooth module. Once the Android app is opened, it checks for the Bluetooth connection and then using the proper authentication it gets connected to the HC-05. Once the connection is established between them, the data will be sent continuously to the app. At any point of time if the particular threshold limit of temperature is crossed, the buzzer gets triggered for 5 secs and after that goes off. Along with the buzzer, an LED is also connected so that it glows if the temperature crosses the limit which implies that it can cause any damage to the nearby surroundings

Simultaneously, we can receive the data in our desktop app also. The desktop app isdesigned through C# in Visual Studio. Once the app is opened, it checks for the hardware connections and if there is proper connection the data are received in the app continuously. Alongwith the desktop app, a webpage is also designed. The Web Page is designed through HTML, CSS, PHP and MySQL. In the web page initially we can see the Homepage opens which is having a Login Page. The user should enter the details like username and password correctly. Once the entered details are matched and authenticated, the user is logged on to the web page and is then redirected to the temperature logger page. On clicking, the temperature data is displayed by fetching from the database which was stored previously using MySQL. These stored data can be retrieved and used for any analytical purpose.

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A. ***FLOW CHART***

This is the flow chart which represents the entire idea of what is being done in the temperature detector.

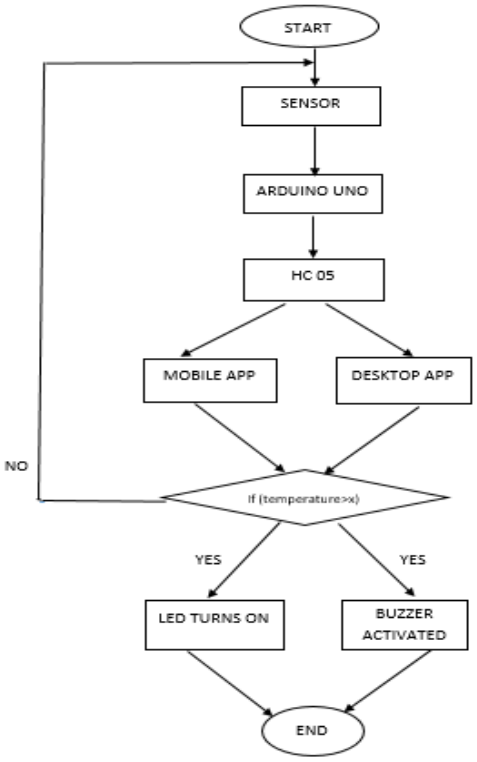

Fig 3. Flowchart of the model

VI.RESULTS

The output data from the LM-35 sensor has been received in the controller and after that it is also received in our android app using HC-05 as medium of communication between Arduino and Android App which we can see in the below figure:

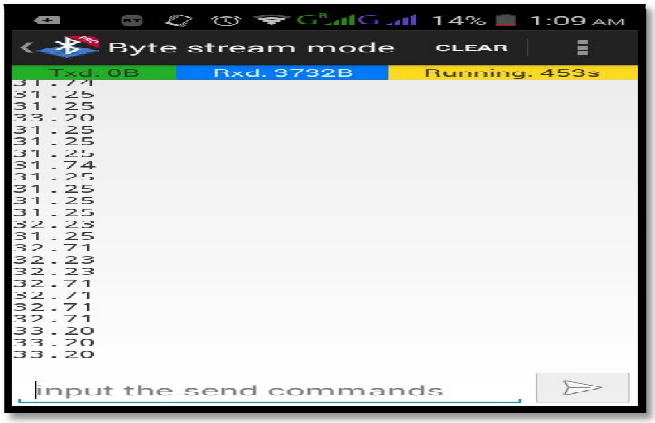

Fig.4.Temperature data on Android App

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The above figure shows the retrieved temperature data from the sensor. The data will be collected and will be monitored continuously and if it crosses the threshold value , the buzzer will be turned on automatically.
Besides these, the data is also retrieved on the desktop simultaneously with a time delay which is shown bellow. After retrieving these data are stored in the database for analytical and also for the processing purposes.The temperature data login page has been shown below. For proper security purposes login page is designed to aces the data so that only the authorized user can access the data.Using the correct user name and password, we can click sign button which will take us to the data logger page.

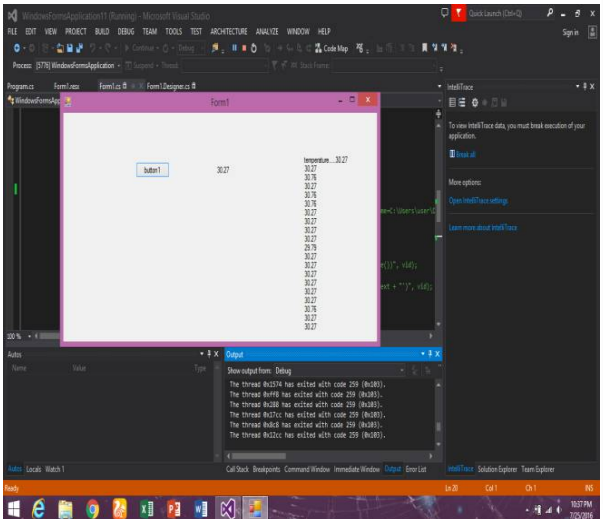

Fig. 5.Desktop App result

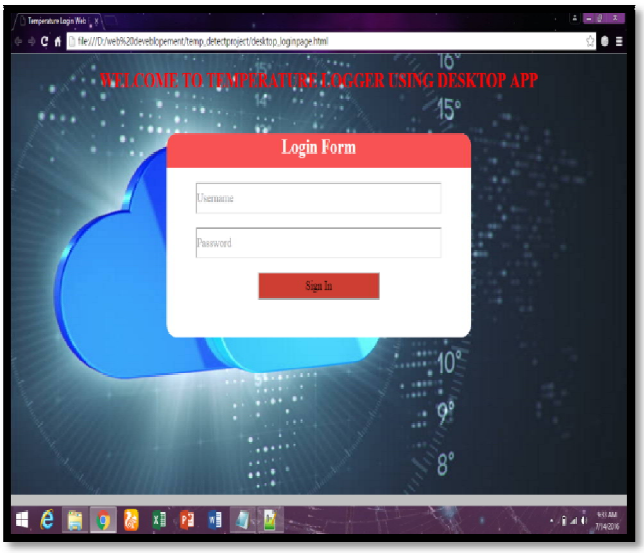

Fig 6. Login Web Page

With proper authentication using username and password we can login. Once we login to this page, we may use the "click me" button which will fetch the data and display the data from the database which was stored earlier.The data retrieved can be used for any analytical purposes or for any other study purposes. Also the graph can be plotted which can be used in the future design works.

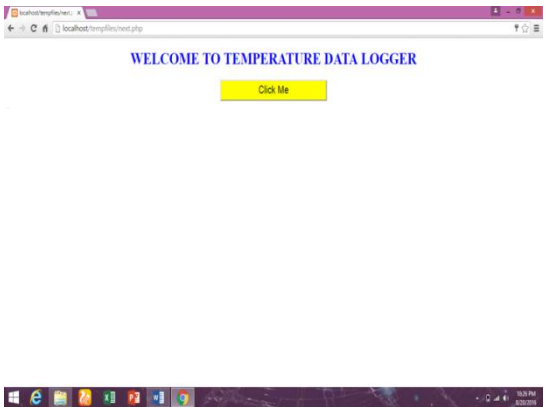

Fig 7.Temperature Data Logger Page

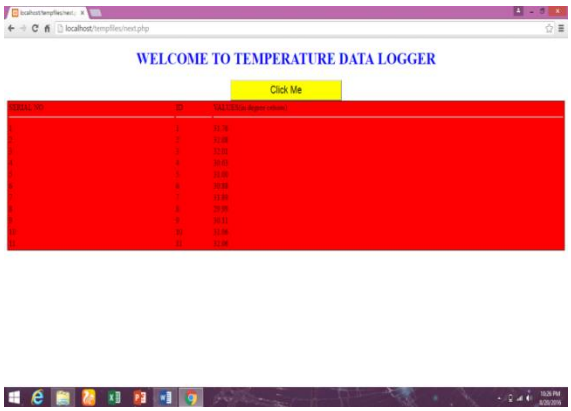

Fig 8.Stored and retrieved Data

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VII. FUTURE WORK

In this project, proper care has been taken while building the prototype in such a way that the cost doesn't remain high and also the system works properly. It can be improved further in future by making it more dynamic. In this paper, we have discussed how the temperature data are received in the desktop app as well as android app and how we store the data in the database and fetch them as and when required. The storing of data in the database can be made more dynamic by using a WiFi shield as a hardware component and then do the required coding to fetch the data automatically and store them in database. This will reduce the manual effort of storing the data and also make the system more efficient and reliable. GSM technology can also be used in this device so that in case of any emergency, SMS can be sent to that particular person or authority.

VIII.CONCLUSION

This paper proposes a low cost, secure, and a reliable temperature detector. The approach discussed in the paper is novel and has achieved the target of detecting the temperature accurately and displaying the same in the android app as well as the desktop app. Also it features the storage of temperature values in the database and accessed by proper login credentials for any analysis purpose. The proposed methodology is very much effective as the system will be available for 24*7 and so it is safe, secure and reliable as compared to the other previously existing models. The proposed system is better from the scalability and flexibility point of view than the existing models. Hence, we can conclude that the required goals and objectives of the temperature detector system have been achieved and is successfully implemented.

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