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Review Article

Temperature Detection System implementation

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Abstract
This essay was inspired by the large number of people who die every year from high fever illnesses. The temperature detection system is typically used to measure an object's temperature based on the infrared waves that the object emits without actually touching it. It also calculates the environment's average temperature. The development of dependable and affordable monitoring systems that can be used by businesses, organizations, institutions, schools, and individuals to identify patients with higher temperatures and stop the spread of disease are now possible thanks to recent advancements in microelectronics and electronic gadgetry. In this study, a temperature detecting system is used to identify individuals who may have high body temperatures, which could lead to high fever or perhaps COVID-19. There are two LEDs in the system. The second led will glow green if you place your hand or an object in close proximity to the temperature sensor, indicating that the sensor is scanning the thing. Instantaneously, it turns crimson. It indicates that the object has reached a higher temperature than was necessary. The second led, who is constantly lit in red, indicates that everything is fine with the system. The system's status is constantly displayed on the LCD.

Keywords: LEDs, Temperature (MLX90614) Sensor, Arduino, IR Sensor, Liquid Crystal Display. Patients, Doctor.

INTRODUCTION

The parameter that is measured the most frequently is temperature. The physical, chemical, and biological worlds are all impacted in various ways by its full force. People have long known intuitively what temperature means: snow is cold and a fire is hot. As man tried to work with metals during the bronze and iron ages, more knowledge was acquired. Some technical processes call for some degree of temperature control, but in order to manage something's temperature, you must first be able to measure it. The measurement of temperature was fairly simple about 260 years ago. The first known thermometer was created in 1592 by a scientist by the name of Galileo. It was an air thermometer, made of a protracted tube to which a glass bulb was fastened. This bulb was heated while this tube was submerged in a cold liquid to expand the air inside. Some of this air escaped as it continued to expand. The amount of air that was still present in the tube decreased as the heat was removed, which caused the liquid to rise and reveal a change in temperature. This type of thermometer is very receptive, but it is affected by the changes in atmospheric pressure. In the year 1714, another scientist named Daniel Gabriel Fahrenheit invented both alcohol and the mercury thermometer. Fahrenheit's mercury thermometer comprises a capillary tube, which after being filled with mercury, is heated to increase the mercury and eject the air from the tube. This tube is then sealed, leaving the mercury free to contract and magnify with the temperature changes. Though this mercury thermometer is not as subtle as the air thermometer, by being sealed it is not pretentious by the atmospheric pressure. Mercury normally freezes at a temperature of -39°C, so it cannot be used to measure a temperature below this point. Alcohol, on the other hand, freezes at -113 °C (Celsius), allowing much lower temperatures to be measured. Late in the 18th century, a scientist named Anders Celsius realized that it would be profitable to use more common adjustment allusions and to rift the scale into 100 additions instead of 96. Anders chose

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to use zero degrees as the boiling point and 100 degrees as the freezing point of water. The previous years of the 1800s were very effective in this area of temperature measurement and perception. William Thomson (later Lord Kelvin) presumes the presence of an absolute zero. When sunlight was spread into a color swath using a prism, he noticed an increase in temperature when moving a blackened thermometer across the spectrum of colors. William Hershel found that the heating effect increased toward and beyond the red, in the region we now call "infrared. He measured radiation effects from candles, fires, and stoves and derived the similarity of light and radiant heat. In the year 1821, T.J. Seebeck discovered that a current can be produced by unequally heating two junctions of two dissimilar metals, the thermocouple effect. T.J. Seebeck assigned constants to each type of metal and used these constants to compute the total amount of the current flowing. Likewise, in the year 1821, Humphrey Davy discovered that all metals have a positive temperature coefficient of resistance and that platinum could be used as an excellent temperature detector (RTD). These two discoveries marked the beginning of serious electrical sensors. The 19th century saw the introduction of the bimetallic temperature sensor. These types of thermometers contain no liquid but operate on the principle of unequal expansion between two metals. Since various metals expand at different rates, one metal that is bonded to another will bend in one direction when heated and will bend in the opposite direction when cooled. This bending motion is transmitted, by a suitable mechanical linkage, to a pointer that moves across a calibrated scale. Although not as accurate as liquid in glass thermometers, BiMets are hardier, easy to read, and have a wider span, making them ideal for many industrial applications. The 20th century has seen the discovery of semiconductor devices, such as the integrated circuit sensor, the thermistor, and a range of non-contact sensors. Likewise, Kelvin was finally rewarded for his early work in temperature measurement. The increments of the Kelvin scale were changed from degrees to Kelvins. We no longer say "one hundred degrees Kelvin," but rather "one hundred [1] Kelvins." The "Centigrade" scale was changed to the "Celsius" scale, in honor of Anders Celsius. The 20th century also saw the refinement of the temperature scale. Temperatures can now be measured to within about 0.001°Cover a wide range, although it is not a simple task. The most recent change occurred with the updating of the International Temperature Scale in 1990 to the International Temperature Scale of 1990 (ITS-90) [1]. Nowadays, health monitoring is a global challenge in people's lifetimes. The comfort of life lies in a healthy condition which is affected by environmental and surgical facts. The measurement of human body temperature is very important in order to acknowledge the health status of that person. Installing or mounting a temperature detection system that will measure the body temperature of an individual or object is very important nowadays because of the rising rate of deaths in the world today as a result of various kinds of sickness that are related to high body temperature. The system will measure the temperature of an object or individual. If it is above the expected temperature range of a normal human being that is not ill or feeling well, it will sound an alarm and display the information on liquid crystal display that you should see a medical doctor. The table below shows the expected body temperature.

LITERATURE REVIEW

Each temperature sensor's range is allocated, and simulation is carried out in LabVIEW. Different colors are used to illustrate and plot the combined results. The temperature ranges for the thermistor, resistance temperature detector, and LM-35 are, respectively, 50 °C to 100 °C, 101 °C to 650 °C, and 651 °C to 850 °C. By changing the assortment of each detector in the simulation studies, it was clear that across a wide range of temperatures, the simulated setup presented reasonable results and the individual sensors were spontaneously nominated to perform in their dispense ranges. As a result, this device can normally monitor temperatures between -50 °C and around 1000 °C using the indicated approach [2]. This research presents a tangible time-based observation of the body temperature using an embedded platform. The microcontroller controls the gathering of tangible time information. The transmitting of intuited information from the instigated LM-35 and MLX-90614 temperature sensors to the online portal is accomplished through the ESP-Wi-Fi buffer. The podium is wirelessly linked to a monitor and displays the actual time information of positioned S1 and S2 sensors, respectively, in both the outdoor and indoor environment. This positioning elucidates the properties of advancement in the temperature readings, which differ due to other environmental features such as a barometer, blood pressure, humidity, and heart rate that are not considered in this research. According to the findings of the study, the average temperature change from S2 is approximately 150 °C. However, the day-to-day checking of the body temperature can preclude people from developing threatening hypothermia, fever, and hyperthermia illnesses [3]. Resistance temperature detector linearization has been executed in LabVIEW, using feedback and divider voltage compensation methods. A two-parameter model for resistance temperature detectors was studied and implemented to simulate and implement linearization procedures within a predictable temperature assortment from 0 °C to 500 °C. The linearization error was estimated to be less than 0.5°C. An evaluation with a resistance RTD without linearization signifies an enhancement of around twenty-five percent, which is very imperative for industrial applications like thermal compensation and room temperature measurement [4]. His research aims to design and locally produce a Smart Body Temperature Detector that is capable of activating an alarm for temperatures that exceed 38°C, while the set aims are too decisive for the cost of local production without compromising efficiency, produce, calibrate, and validate [5]. A tentative design of a resistance temperature detector based on low-temperature sensors was designed with an electroplating technique on the variant of the concentration of the solution and the electrode distance. The greater the concentration of the solution, the layer formed by the electroplating process, the thicker it gets. The electroplating can increase the resistivity of the thin layer of the sample [6]. study on thermal camera usage for contactless monitoring of

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the laboratory animals' temperature. Experiments were implemented in the laboratory conditions by using a commercially available thermographic camera, the Testo 885 thermal imager. For video processing, he proposed the method of detecting animal position in the thermal video record (ROI), choosing the precise points in the ROI, and reckoning temperature for them. This suggested system was tested on the experimental thermal information of rats [7]. The contactless infrared irradiation method was applied by carrying out thermal imaging and point measurement techniques with the use of pyrometers to determine the spatial and temporal temperature distribution in wire-based electron beam AM. The emissivity was calibrated by thermocouple readings and geometric boundary conditions. Thermal cycles and temperature profiles were recorded during deposition; the temperature gradients are described and the associated temperature transients are derived. In the temperature range of the + field, the cooling rates fall within the range of 180 to 350 °C/s, and the microstructural characterization indicates an associated expected transformation of '+ with corresponding cooling rates. As a result of the temperature gradient and the formation of the', local disorientation was observed within as a result of the temperature gradient and the formation of the' [8]. The purpose of this research is to achieve a protocol for temperature determination with a high spatial resolution of the order of the micromanometer dimension by manipulating Raman spectroscopy on anisate powder. As multiple signals are present in the Raman spectrum of titanium dioxide, the choice of the actual Raman mode to be used has been made based on its sensitivity to temperature. The ratio between Stokes and anti-Stokes signals of the same Raman mode has been investigated as a function of temperature (T), excitation wavelength, and input power. The control of the temperature is obtained by using a temperature controller, which is assumed to also serve as a reference for the determination of the absolute temperature. The performance of the temperature sensor is examined in the wavelength range 488.0–647.1 nm, to identify the best excitation wavelength in terms of reaching the highest sensitivity, and in the temperature range 283–323 K, which is essential for biological applications. The work will demonstrate that a different calibration constant is necessary for different wavelengths and Raman modes. The calibration constants, determined in this work, have been tested on a titanium dioxide-based test sample, obtaining results with high sensitivity and low uncertainty and opening the way to the use, in the future, of titanium dioxide-based new biosensors [9]. The thermometer designed in this research uses the microcontroller as the control core of the research, and it accomplishes accurate contactless temperature measurement and identity mask recognition for the measured person by using the identity recognition component and temperature detection module. The system uses the MLX90614 module and laser distance measurement component to complete the contactless temperature measurement for the human body through the process of distance reimbursement. By using a deep learning system, the K210 module is used to deep learn and extract facial features from the member pictures, and finally, determine the identity of the subject and carry out epidemic prevention detection [10, 11].

MATERIALS AND METHODS

Table I below shows the materials used in this research

S/N	Names of components	Number used
1	Liquid crystal display	1
2	Arduino Microcontroller	1
3	Buzzer	1
4	IR Sensor	1
5	Switch Button	1
6	Light Emitting Diode	1
7	Battery	3
8	Connections	29

Methods

In this research, a temperature detection system is implemented. When you power the system, it will first display the title of the research. After some seconds, it will then display the temperature of the environment. The infrared sensor is used to detect and measure infrared radiation in its surrounding environment. Infrared is invisible to the human eye as its wavelength is longer than that of visible light. Active infrared detectors emit and detect infrared radiation. Active infrared sensors have two parts: a light-emitting diode and a receiver. If the object comes closer to the sensor, the infrared light from the light-emitting diode reflects off the object and is detected by the receiver. The temperature sensor detector is used to measure the temperature of an object without any physical contact with it. Thus, the temperature (MLX90614) sensor calculates the temperature of an object by measuring the amount of infrared energy emitted from it. Two LEDs are used in the research. The first one is used to show or indicate the system is active, while the second one will not go high until the required or expected temperature is above the temperature required in people. The buzzer will also go off, showing that the patient or individual's temperature is above the required human being's temperature. The LCD used in

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the research shows the overall status of this research. The Arduino is used as the brain of the whole research in which all commands are given from it.

Results

The below images are the results obtained from the implemented system.

Fig.1. The title of the research

Fig.2. The process of heating the temperature sensor using heat/fire

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Fig. 3. The system has finished reading the temperature of the object/fire

Fig.5. The system displays the amount of temperature it detects, which is above the required human temperature

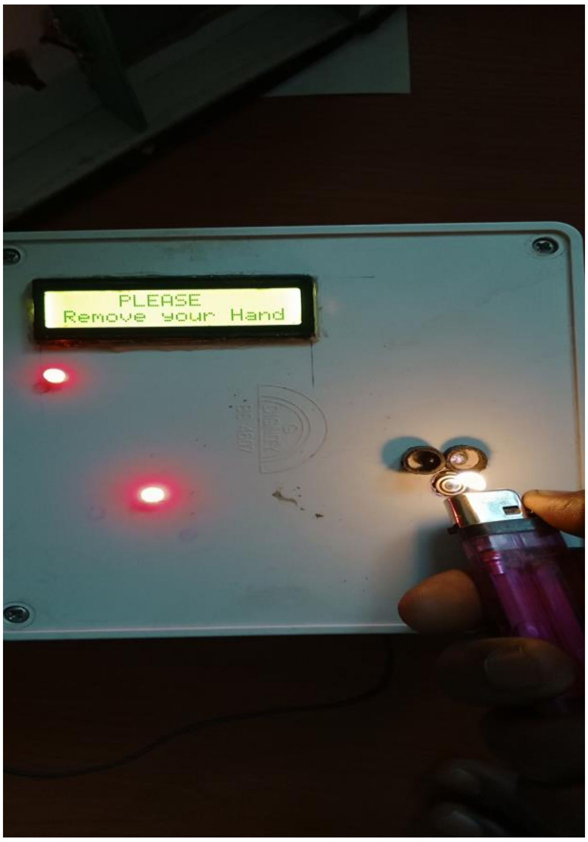

Fig.4. After the system has finished (temperature sensor) has been heated, it will ask you to remove your hand or the heating object

Fig.6. The system showing the temperature detected is not good

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Fig.7. The system is instructing you to see a doctor because your temperature is above the expected or required temperature

CONCLUSION

This research aimed to generate awareness concerning the measures and actions individuals can take in day-to-day life due to the increase in deaths in the world today. The paper discussed the impact of using the temperature detection system and reviewed some studies relating to temperature detection systems; it highlighted the challenges faced and the impact of installing them in our homes, industries, organizations, markets, institutions, and offices [11].

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