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An Analysis of Temperature Tracking System Using Microcontroller

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ABSTRACT: ***In this study, a microcontroller-based temperature sensing and recording system for application in healthcare was developed. One of the characteristics of this system is its ability to continually monitor a patient's temperature while displaying the instantaneous result on a Liquid Crystal Display (LCD) monitor. The research's technique was in The Electrically Erasable Programmable Read-Only Memory (EEPROM) device, which is part of the system and may be connected to a computer over USB, records the temperature observed every 10 minutes. In conclusion, an ATmega16 AVR serves as the brain that directs and coordinates all of the operations of the many modules. It permitted a doctor to take care of other things while keeping an eye on his patient's condition. The temperature tracking system was used to inform some additional questions that were sent to the 100 hospital patients who were online. The responses were then reviewed. This study is being utilised to create new technologies, as well as to upgrade the staff and infrastructure of the hospital.***

KEYWORDS: ***Computer Liquid Crystal Display (LCD), Memory, Microcontroller, Temperature.***

1. INTRODUCTION

A micro-controller is a digital system that controls a specific function in an embedded system. A web server that has a processor, memory and input/output (I/O) components is called a microcomputer. Automobiles, robots, office equipment, medical equipment, different wireless monitoring devices, vending machines, and household appliances are just a few examples of objects that have processors. They are tiny, essentially straightforward personal computers (PCs) without any complex front-end operating systems that are used to control smaller elements of bigger components. Based on this study, we developed a method for tracking one's health. A temperature log is a document that records temperature data. Throughout a time in the log, temperature readings are routinely obtained at regular intervals. Figure illustrates the application of the microcontroller [1]–[4].

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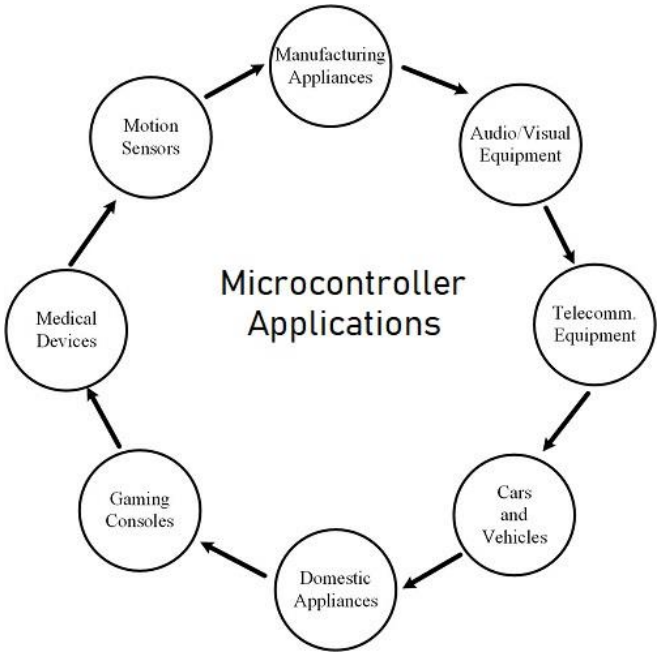

Figure 1: Illustrates the application of the microcontroller [5].

The delivery of clinical history and the general management of medical supplies both depend increasingly on temperature monitoring. The microcontroller's strength is its ability to handle several system designs with ease, save time and energy, and be easily set up. The RF interface jamming and single point of failure of the microcontroller make it unable to collect all data at once. The advantages of employing a microcontroller may be applied to any system, such as parking, hospitals, cars, and so on, and do not significantly affect the environment.

Users may enter exact temperature requirements for any environment, such as a manufacturing process, using the integrated temperature monitoring and control system. In industrial and research applications, embedded systems that employ microcontrollers to monitor and control process parameters are very helpful. This study aims to investigate the viability of real-time temperature monitoring and regulation. An LM35DZ temperature sensor is used to measure the temperature. The ATMega16 AVR microcontroller, which stores the monitoring and controlling software and shows the temperature on an LCD screen, is the brains of this system. Additionally, the system is equipped with the necessary hardware to control temperature when it surpasses or reaches a value greater than the set point [6]–[10].

1.1.Temperature Is Split Into

The electrically erasable programmable read-only memory (EEPROM) and the system's power supply unit are both linked to the ATmega16 AVR microprocessor. The real-time clock is also linked to the microcontroller portion (RTC). That is further linked to the speech chip, the LCD, the computer interface, and the liquid crystal display. An interface in computing is a common boundary between two or more distinct modules of a computer system that facilitates information exchange. Exchangeable items include programming, desktop computers, network adapters, people, and combinations of these. Another component of the weather monitoring system would be a transceiver GSM technology, which is a peripheral that makes it easier to move a device using GSM cellphones and tablets. The ATmega2313 is a computer with a restricted set of instructions that is meant tare do easy tasks. This device also has a PS/2 keyboard adaptor connected. IBM was the company that created the PS/2 (Personal System/2)

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ports, often known as the input device ports. This is used to connect a memory touchpad to an IBM-compatible computer. The six-pin tiny DIN socket known as the PS/2 connection is still compatible with all Arrow computers through.

The study presents and analyses the formulation and construction of an atmega328 security alarm utilizing GSM technology. The author used an approach in which two microcontrollers and various network adapters as in the recommended security system's light-emitting diode (LED), liquid crystal display (LCD), buzzer, and cellular technology (GSM) module ensure dependable functioning. Finally, a mobile phone is connected to the computer through Wireless headphones to operate the system. A manual keypad is also an option for locking or unlocking the system. To build software that manages the system while still keeping all security functions, a Compiler Code Vision AVR is employed. As result, the findings of the real circuit demonstrate proper functionalities while also confirming trustworthy security at a low cost.

As technology progresses, things get quicker and cheaper for us. Safety mechanisms are gradually replacing manual methods. The author used a unique method in which they collected data from consumers and stored it in the cloud. The findings reveal various aspects of this research, such as the fact that cloud data is open to all and that anybody can use it in their research or job. In conclusion, the microcontroller 8085 performs admirably in terms of gathering and analyzing data for system design in this research.

Automatic home appliance control is in high demand all around the world. Energy is consumed by interfering with our day-to-day busy schedules in this energy-saving era if automation wireless capacity-controlled devices are used. The author applied methodology in this paper and it shows a microcontroller-based wireless home appliance control circuit, this method suggests the creation of a system that will enable remote control of devices as well as home security without the presence of the property owner. The results show amongst the most appealing characteristics of the system is the incorporation of a wireless control system for a load. In conclusion, an app-based security system is also integrated with the speed controller, providing effective security for applications from unexpected users. To finish the research, power and performance computations are performed.

Our research demonstrates that a microcontroller and temperature logging-based system can be an effective tool when utilized correctly in any system. In this case, the system is temperature management, and a microcontroller with RAM (Read-only memory) is used. The installation of a wireless control system for a load is one of the most enticing features of the system, according to the results. Finally, an app-based security system is connected with the speed controller, ensuring that apps are protected from uninvited users. Power and performance computations are completed to complete the investigation [11]–[13].

2. DISCUSSION

In this study, the author spoke about the temperature tracking system that hospitals would employ to track their patients' body temperatures. The system is also linked to a GSM (global system for mobile communication) modem, allowing users to access the data through a mobile device. The LM35 analogue temperature sensor is the central component of the circuit. If the temperature is 38 degrees Celsius, for example, an ATMega 16 microcontroller plus a sensor will provide an output voltage of 38 x 10 millivolts, or 380mV. An integrated analogue to digital converter (ADC) in the AT Mega16 is utilised to transform the data necessary to transform the analogue output voltage of the LM35 into a digital voltage, a 10-bit proportional digital value suitable for the microcontroller. Numerically, the LM35's output is connected to

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pin 23 of the microcontroller's analogue input, where direct current (DC) manipulates it as required and displays the results on an LCD.

The study uses a variety of instruments, but we focused primarily on the key elements, such as the GSM modem, LM 35 temperature sensor, and AT Mega 16 microcontroller. The LM35 is a temperature sensor for control mechanisms with proportional energy output measured in degrees Celsius. The LM35 Detector doesn't need any further calibration or clipping to attain standard accuracies. Figure 2 shows the GSM modem that is utilized in this study's messaging system as the reception and transmitter portion. The AT mega microcontroller features 40 pins, an 8-bit advanced microcontroller with around 131 instruction sets, 16 kilobytes of flash programmable memory, and 1 kilobyte of ram (random access memory).

The AT Mega 16 microcontrollers and the LM35 temperature sensor serve as the foundation of this system, and all of the data used in this study was obtained from the cloud. The author also conducted an online survey with nearly 100 members of the hospital staff, the results of which are displayed below, to gather additional information. In the software implementation part, the author developed the assembly code for sensing temperature, modifying it in accordance with the user's requirements, and displaying the temperature on the liquid crystal display (LCD) module [14]–[17]. The software includes reading different readings from the sensor, converting analogue values to digital values, displaying the temperature on the 16X2 LCD, and a programmer for controlling action depicts the percentage of the temperature monitoring equipment that is or is not useful to hospital staff and patients. Nearly 40% of respondents think the temperature tracking system is useful to them, 30% think the measurements it provides are reliable, 20% think it's easy to use, and 10% think the chances of mistake in the system are very low. 40% of people feel the temperature system is easy to use, 30% think it is energy-efficient, 20% think it is quite exact, and 10% think anybody with some basic knowledge can operate it. 30% of respondents disagree, whereas 70% of respondents think temperature tracking devices are useful for hospitalized patients. It reveals that the output voltage is 0.7 mini volts at 90 degrees Celsius and 0.05 mini volts at -10 degrees Celsius. Figure 2 embellishes the infrastructure of the microcontroller.

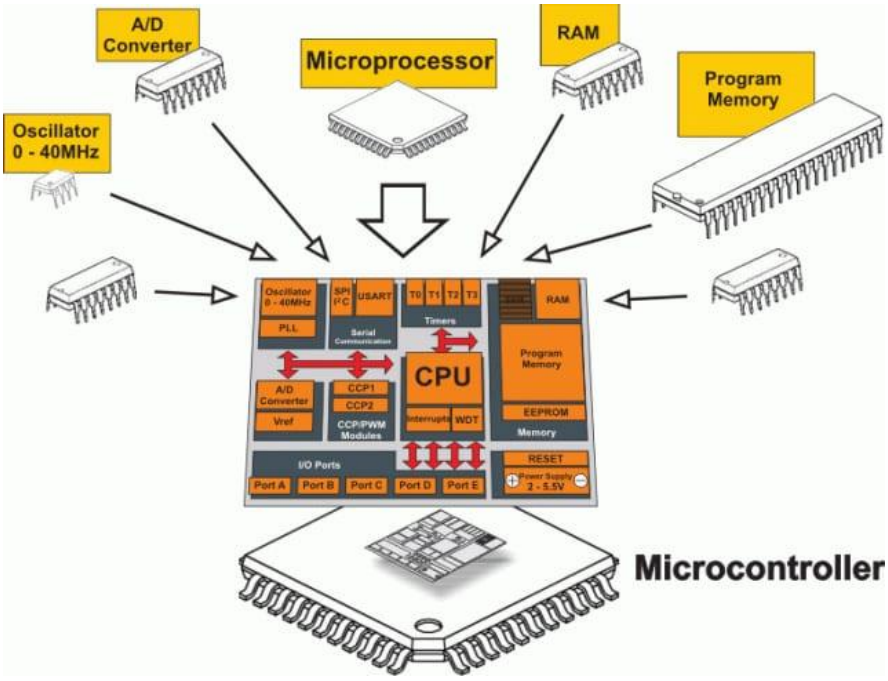

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Figure 2: Embellishes the infrastructure of the microcontroller [18].

3. CONCLUSION

This study has successfully built a system that should be very helpful in the delivery of healthcare in India. It is designed to help control a patient's temperature while they are a patient in the hospital or to monitor the temperature of various medical procedures. Such as food storage and the preservation of medications. The design meets standards since it can monitor temperature continuously, and it continuously sends an SMS message when a preset temperature is exceeded. The biggest disadvantage is that the accuracy of the measured value may be within 0.5oC, which is a major restriction. Whether we investigate several sensors and raise the ADC resolution, we can determine if there is still room for improvement. The LM35 sensor will be used since it will be directly attached to the patient's body to monitor his vital signs. The temperature has been described as unfavorable. Future development will include a remote sensor. A technology that can track the patient's temperature without having to touch them should be looked at.

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