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Human Body Temperature Detection Using Wireless Health Monitoring System

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Abstract- Nowadays, the health care sensors are playing an essential role in hospitals. An automatic wireless health monitoring system is used to measure patient's body temperature and heartbeat by using embedded technology. The proposed system uses the temperature sensor. These sensors mainly involves in monitoring the condition of the patient. In this project, a wireless communication system is designed and developed for remote patient monitoring. The primary function of this system is to monitor the temperature of a patient's body, and display the same to the doctor through RF communication. In hospitals, where patient's body temperature needs to be constantly monitored, is usually done by a doctor or other paramedical staff by constantly observing the temperature and maintaining a record of it.

Keywords: Body Sensor Monitor, Vital Parameters, wireless sensor network..

I. INTRODUCTION

In this project we start with introduction to embedded system which is a microcontroller-based, software driven, reliable, real-time control system, autonomous, or human or network interactive, operating on diverse physical variables and in diverse environments and sold into a competitive and cost conscious market. Its characteristic, Its application and classification various Hard ware components used for the project and explanation of each of the following components brief of which is given below.

Transformers: convert AC electricity from one voltage to another with a little loss of power. Step-up transformers increase voltage, step-down transformers reduce voltage. Most power supplies use a step-down transformer to reduce the dangerously high voltage to a safer low voltage.

Voltage Regulator (LM 7805): It is three-terminal positive regulators are available in the TO-220/D-PAK package and with several fixed output voltages, making them useful in a Wide range of applications. Each type employs internal current limiting, thermal shutdown and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output Current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

Rectifier: A rectifier is an electrical device that converts alternating current (AC), which periodically reverses direction, to direct current (DC), current that flows in only one direction, a process known as rectification. Rectifiers have many uses including as components of power supplies and as detectors of radio signals.

Filter: Capacitive filter is used in this project. It removes the ripples from the output of rectifier and smoothens the D.C. Output received from this filter is constant until the mains voltage and load is maintained constant. However, if either of the two is varied, D.C. voltage received at this point changes. Therefore a regulator is applied at the output stage.

Microcontroller AT89S52: The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip.

Temperature Sensor (DC1621): A sensor is a device which receives and responds to a signal or stimulus. Here, the term "stimulus" means a property or a quantity that needs to be converted into electrical form. Hence sensor can be defined as a device which receives a signal and converts it into electrical form which can be further used for electronic devices. A sensor differs from a transducer in the way that a transducer converts one form of energy into other form whereas a sensor converts the received signal into electrical form only.

RF Communication: RF communication works by creating electromagnetic waves at a source and being able to pick up those electromagnetic waves at a particular destination. These electromagnetic waves travel through the air at near the speed of light. The

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wavelength of an electromagnetic signal is inversely proportional to the frequency; the higher the frequency, the shorter the wavelength.

Frequency is measured in Hertz (cycles per second) and radio frequencies are measured in kilohertz (KHz or thousands of cycles per second), megahertz (MHz or millions of cycles per second) and gigahertz (GHz or billions of cycles per second). Higher frequencies result in shorter wavelengths. The wavelength for a 900 MHz device is longer than that of a 2.4 GHz device.

II. RELATED WORKS

This work is mainly carried out in order to analyze the background of the current project which helps to find out flaws in the existing system and guides on which unsolved problems we can work out.so the following topics not only illustrate the background of the project but also uncover the problems and flaws which motivated to propose solution and work on it.

Arms, S. W., Townsend, C. P., Galbreath, J. H. and Newhard, A. T, he stated that Wireless health monitoring system (WHMS) has drawn considerable attentions from the research community as well as industry during the last decade. Numerous and yearly increasing research and development efforts have been posted in the literatures [1].

Callaway, E. H, In this he limited this effort to include only some of the very recent related works. Real time mobile healthcare system for monitoring the elderly patients from indoor or outdoor locations has been presented. A bio-signal sensor and a smartphone are the main components of the system [2].

Celebi, M, He stated that the data collected by the bio-signal sensor are transmitted to an intelligent server via GPRS/UMTS network. The system is able to monitor the mobility, location, and vital signs of the elderly patient from a remote location [3].

Chang, P. C., Flatau, A. and Liu, S. C, He started his working with Windows Mobile based system for monitoring body parameters has been presented. The proposed system consists of a body sensor network that is used to measure and collect physiological data. Bluetooth has been used to transmit data from the sensor network to a mobile device. The reliability and robustness of the proposed system has been verified by the authors [4].

Chase S, He show that the proposed system is able to monitor the physiological data of patients under mobility condition. A complete wireless body area network (WBAN) system has been designed . The proposed system uses medical bands to obtain physiological data from sensor nodes [5].

Churchill, D. L., Hamel, M. J., Townsend, C. P. and Arms, S. W, The author has chosen medical bands in order to reduce the interference between the sensor device and other existing network devices. To increase the operating range multi-hopping technique has been used and a medical gateway wireless board has been used in this regard [6].

Culler, D. E. and Hong, W, This has been used to connect the sensor nodes to a local area network or the Internet. By using Internet the healthcare professionals can access patients' physiological data from anywhere at any time. Many health monitoring systems use wearable sensors that produce continuous data and generate many false alerts [7].

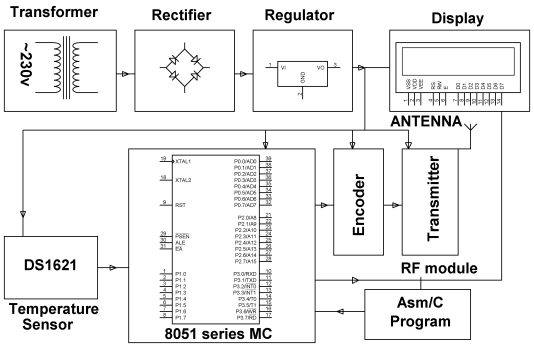
Elgamal, A., Conte, J. P., Masri, S., Fraser, M., Fountain, T., Gupta, A., Trivedi, M. and El Zarki M, These authors stated that some systems become unsuitable for use in clinical practice. To solve this problem some machine learning approaches have been proposed In these approaches data generated by the wearable sensors are combined with clinical observations to provide early warning of serious physiological changes in the patients. The effectiveness of these approaches has been tested at Oxford University Hospital [8].

Ewins, D.J, He proposed that system can successfully combine data acquired from the wearable sensors. Combining these data with manual observations the clinical staff makes important decisions about the patients. Cloud computing has been incorporated in a healthcare system [9].

Glaser, S.D, He wrote "Some real-world applications of wireless sensor nodes". The authors have proposed a cloud based intelligent healthcare monitoring system (CIHMS) for providing medical feedback to a patient through cloud. The proposed system can obtain adequate data related to patient's disease and deliver the data to a remote location by using cloud computing devices [10].

III. BLOCK DIAGRAM

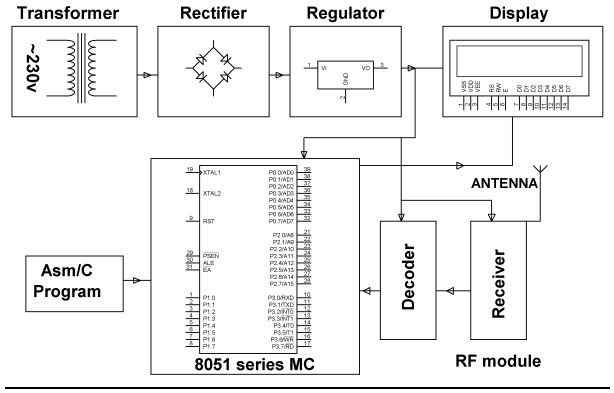
A. Transmitter Side:



The Transmitter will acquire values of physical parameters and will perform digital conversion of them for further processing. This digital data is then transmitted into air using RF module by the μC. Thus it is not necessary to keep the board close to PC rather the transmitting unit can be placed at a far place within the range of RF module. The job of receiver unit is to receive those incoming values from air and to transfer

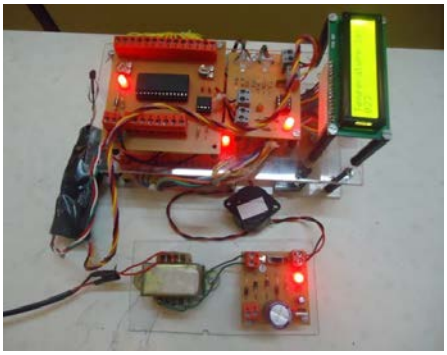
into PC with the help of serial communication with COM Port.

B. Receiver Side



The VB6 based software will display the data (Voltage values) of all channels in real time & will store them into database for future reference.The graphical and many more analysis on the stored data can be performed later on interactively. The Software is also designed to monitor the values of those physical parameters so as they are always in the range of predefined limits i.e. Lower Limit & Upper Limit. This can be achieved by monitoring the incoming data of each channel and by comparing it with both the limits. If the value does not reside within the range then the software will give command that there is some abnormalities in the patient body. That will alert the doctor so that he can immediately take the necessary action to normalize the patient.

IV. RESULTS



When she/he can power on the circuit , all the LEDs on PCBs are glowing, indicating that circuit is working properly . Here there is a use of the industrial temperature sensor i.e. DS1621 which gives us room temperature in 0C. That temperature is displayed on the LCD.

V. CONCLUSION

Wireless technology is emerging as a significant element of next generation healthcare. This system is portable and easy to use, Promotes comfortable and easy implementation so it is cost effective. We have analyzed the patient health monitoring temperature of humans using temperature sensors and the same will be displayed to the doctor through RF communication. The hardware is implemented and output is studied.

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