

Health Monitoring System

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I. Abstract:

In this paper, we are proposing an advancement of the already designed health monitoring system by using a heart beat rate, respiratory rate and ECG monitor system. It offers the advantage of portability. The paper focuses on: how microcontroller board is used to analyze different data/ input from patients in real-time, how to use data from different sensors, heart beat rate, respiratory rate and ECG and fire an alarm in case of any emergency or abnormality faced by the patient. This is very useful for future analysis and review of a patient's health condition.

This system can also be useful in controlling and monitoring a patient's health and/or athletic people's health for a long time period. The program reads, stores and analyses the rate of heart beat signals, respiratory rate and ECG signals continuously. Hardware and software architecture is tailored to a single-chip microcontroller-based device, thus minimizing scale. Also all the process parameters within an interval selectable by the user are recorded online.

The first tests were encouraging.

II. INTRODUCTION

In the field of health surveillance systems, the most crucial and critical people are aged 40 years and above. The people aged above 40 years tend to show more health issues than users below 40. But continuous monitoring of critical parameters, commonly, heart rate, respiratory rate and ECG from a remote location is very difficult. In a hospital, the health care persons and professionals such as nurses and/ or doctors have to check and monitor the health of each and every patient physically, due to which continuous monitoring is not possible.

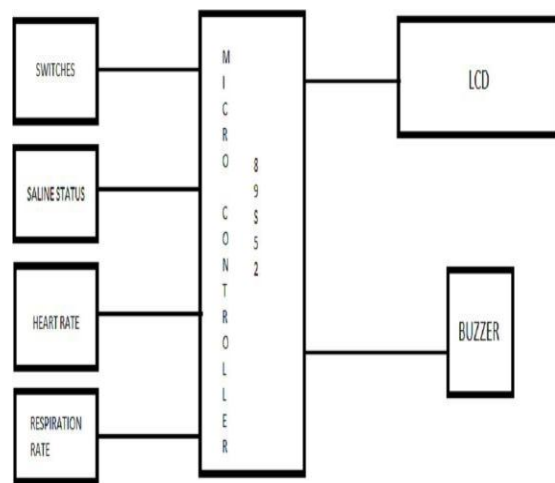
Thus, any critical situation is very difficult to be found unless the health care persons and professionals check the patient's health continuously. This may be an issue for the doctor, who has to take care and provide health services to many in the medical facility. To keep alert, connected and to track critical and emergency health conditions, a health monitoring system of heart rate, respiratory rate and ECG is studied and drawn up in this

paper. In the next category, the proposed system is explained with the help of block diagram. In the next to next category the hardware is presented for the above mentioned set-up. The implementation is mentioned in section IV. Then results are mentioned in section V. Conclusions and justification is drawn at the end.

III. PROPOSAL

The proposal presents a methodology of health monitoring which gives people continuous service. The health surveillance system of heart rate, respiratory rate and ECG consists of three sections, one for the patient section, one for the operating system section, and the third for the communication unit. Heart rate, Respiratory rate and ECG signals are calculated with the help of the heart rate sensor, respiratory sensor and ECG sensors respectively, and afterwards processed by a microcontroller, AT89S52. The information is used by the microcontroller to alert the hospital person by firing an alarm in case of crisis or abnormal situation . It can help the doctors in diagnosis of serious health issues and can improve the efficiency, efficacy and quality of health management. When the measured heart rate, respiratory rate or ECG exceeds the normal range or if the pulse calculated is unusual or irregular, it activates an alarm.

IV. HARDWARE



A. Respiratory Rate Sensor

The breathing rate sensor contains the novel piezoelectric technology of PMD while the lobe contains the electronics and the rechargeable batteries. When applied to the skin of the patient, the single use Sensor translates and outputs the breathing deflections into the Lobe as a varying low voltage signal.

The groundbreaking Sensor Engineering of PMD Solution contributes to a range of clinical applications and is a curre.



B. Heart Beat Sensor

The Pulse Sensor provides an easy means of studying heart rate. This sensor tracks blood flow through a clip, which can also be used between a thumb and index finger on a fingertip or on the skin.

Heart rate varies from person to person. For an adult person at rest 72 pulse per minute is accepted. Athletes who are active have usually lower heart rate compared to less active citizens.

Kids tend to have faster heart beat rates (about 90 per minute), but there are major variations too. In totality, the heartbeat sensor can be used just like any other sensor connected to a device.



C. Microcontroller(AT89S52)

The microcontroller in use is AT89S52. The Microcontroller reads different sensors, here, heart beat sensor, respiratory sensor and ECG signals. The processed output is then used for analysis, if any sensor reading is not in the normal range then an alarm triggers ON. The same data is also sent to the LCD screen. The programming of the microcontroller is performed using Embedded C, a language of middle level controller modules.

High-efficiency, Low-power Microchip, 8-bit Automatic Voltage Regulator(AVR) reduced instruction set computer (RISC) microcontroller blends 256 KB of ISP flash memory, 8 KB of SRAM, 4 KB of EEPROM.

It has 86 Input/ output pins for general purpose, 32 registers for general purpose, real-time clock, 6 versatile mode timer and counters, PWM, 4 USARTs, 2-wire byte-oriented serial interface, 16-channel 10-bit Analog/Digital converter, and on-chip debugging JTAG port.

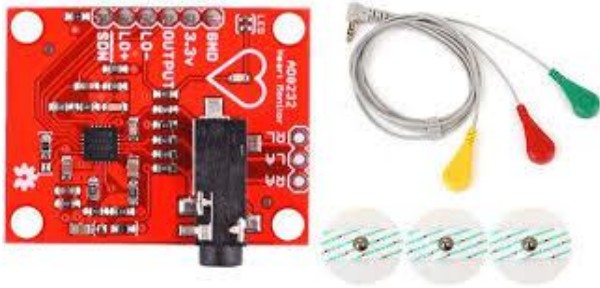
At 16 MHz the system reaches a 16 MIPS throughput and operates between 4.5-5.5 volts.



D. ECG Sensor

The module AD8232 cuts out 9 IC connections to which pins, wires, or other connectors can be soldered. The necessary pins to connect with a microcontroller or other

development board are SDN, LO+, LO-, OUTPUT, 3.3V, GND to run this display. Custom sensors can be mounted and used with the help of RA (Right Arm), LA (Left Arm), and RL (Right Leg) pins. A Driven indicator light is also present which pulsates to a heartbeat rhythm.



V. IMPLEMENTATION

This project presents a system that provides a continuous service for people to monitor their health. Heart rate, respiratory rate and ECG is measured with the help of the heart rate sensor, respiratory rate sensor and ECG sensor respectively and are then processed by a microcontroller, AT89S52. The processed data is then studied by a microcontroller. Finally the analysed data is sent to the LCD. The data is displayed on the LCD continuously and in case of any emergency and abnormal situation alarm is triggered. It can help the doctors in diagnosis of serious health issues and can improve the efficiency, efficacy and quality of health management.

VI. RESULT

In this paper, through the hard work of our colleagues and our respectable mentor, we have shown a health monitoring system, which not only measures the different parameters of the body but also displays it and fires an alarm in case of any abnormal situation.

VII. CONCLUSION

In this paper, through the hard work of our colleagues and our respectable mentor, we have shown a health monitoring system, which not only measures the different parameters of the body but also displays it and fires an alarm in case of any abnormal situation. We have implemented the hardware and have analysed the output.

VIII. REFERENCES

1. Sensor System and Health Monitoring Jiuping Xu, Lei Xu, in Integrated System Health Management, 2017
2. J.R Cheng, R.M Xu, X.Y Tang, V.S Sheng, C.T Cai, An abnormal network flow feature sequence prediction approach for DDOS attacks detection in big data environments. *Comput. Mater. Continua.* 55:, 95–119 (2018).
3. C. Takenga, R. Berndt, O. Musongya et al., "An ICT-based diabetes management system tested for health care delivery in the african context," *International Journal of Telemedicine and Applications*, vol. 2014, Article ID 437307, 10 pages, 2014.