

REVIEW ON IMPLEMENTATION OF VITAL PARAMETER BASED REMOTE MONITORING SYSTEM FOR CRITICAL PATIENTS

Miss. Bhumita U. Kakade¹, Prof. Akshay B. Kadu²

¹Miss. Bhumita U. Kakade, Student Dept. Of ENTIC GHRCEM Amravati

²Prof. Akshay B. Kadu, Professor, Dept. of ENTIC GHRCEM Amravati 444603, Maharashtra-India

Abstract - Heart attack is a term generally used for medical conditions like cardiac arrest and atrial fibrillation. Continuous monitoring of vital parameters like heart beat, temperature and blood pressure quick detection. Thus developing a system by TCP-IP Protocol connected to GPRS or GSM modem with quick response, secured and cost of effective health system monitoring become the need of the hour. The proposed vital signs monitoring system is able to clinicians by illustrating the trace of critical body parameters signal, indicating any significant changes to the existing data for the same patient taken during his/her normal condition. This system can provide continuous remote monitoring of patient using vital signs. The simultaneous recording of vital signs allows the parameters and intersignal elaboration that contribute in sending alert messages to the above said receiver.

Key Words: Vital Signs, GPRS Modem, TCP-IP Protocol

1. INTRODUCTION

Field biomedical serves as the boon for human society. But in today's rashly running world people are very careless about their health, due to this cases of heart attacks and deaths due to lack of help are increasing. For this purpose personal medi-kits are best solution. In past, there was joint family system hence patients were able to get medical help within time. But now a day's one may lost his life because of not getting proper help within time. For such heart patients this kit will give an indication to their doctors and they will immediately provide medical help. Whenever heart beat rate of person exceeds more than 72 pulse/min., doctor will try to get an immediate indication and help will be sent as fast as possible.

2. PROCESS

In recent years because of the technological advancement that have been made the central monitoring system are being used in big hospitals. A supervisory computer, a data router and a number of data loggers, kept near the bed of the patient. The patient data are sent to concerned doctor, nurse or the attendant via GSM SMS messaging, in critical condition, to alert them about the situation. Recently much research has been seen in the development area of system to generate the various technologies using telecommunication [1]. Wireless Body Area Sensor Network ECG, SpO₂ wireless vital sign measurement device is applied by researchers for portable and universal monitoring system for continuous measurement of vital signs of chronic diseased patient and emergency patient. By using TDMA method communication between the wireless vital sign and movable gateway device for high reliability [2]. In addition, a biomedical system less severe the deficiencies of mobile instruments generated as a web and android mobile application provides healthcare monitoring and remote monitoring for the medical patients and emergency responders According to [3]. Similar system are [4] a combined network and diagnostics solution for in-house profitable remote monitoring patients. A cluster real time remote monitoring system based on GPS(Global Positioning System) Satellite and GPRS mobile communication technology is developed for medical requirements monitoring of the heart patients and the out of hospital patients real time precise positioning and continuous monitoring [8]. One of the most effective procedure to support recovery of survivors a critical illness after their hospital discharge with regular monitoring in medical condition of the patient [10]. Collected vital signals using wireless medical system and produce computerized decision support of a diagnostic implement of diagnostic and patient monitoring virtually anywhere [11].

3. PROPOSED WORK

The proposed mobile wireless (monitoring) system is shown in Figure 1. The patient and the health care professional (server) can be located anywhere in the globe there is General Packet Radio System network coverage. The patient's Posture, temperature, blood pressure and blood glucose and other vital parameter signs if desired signal can be acquired by the patient himself under follow up scenario for example, or the patient assisted depending on the particular patient's case.

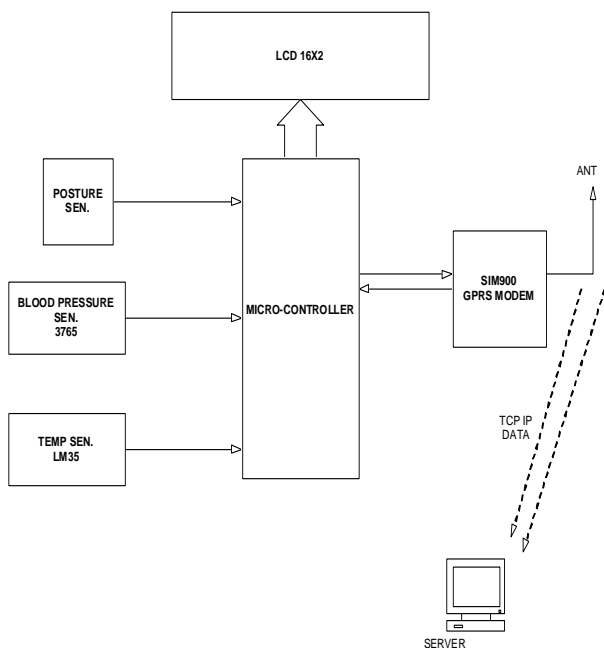


Fig 1: Block diagram of implementation of vital parameters

A. Body Temperature Sensor

LM 35 Pin Configurations

The LM35 sensors are precision integrated circuit temperature sensors, whose output voltages are linearly proportional to Celsius degree temperature, rated to operate over a -55° to +150°Celsius temperature range, while the LM35C is rated for a -40° to +110°C range (-10° with improved accuracy).

B. Blood Pressure Measurement

For this project, the transmission is used on the finger to obtain the signal. A light-to-voltage optical sensor, TSL250RLF is select to measure the light transmitted through the finger. A linear regression is determined and systolic BP is estimated from that relationship.



Fig 2: Blood Pressure Sensor

The module should be connected to GSM or GPRS network and then by using TCP-IP Protocol some commands to query the GSM network registration status whether the module has been attached to the GPRS network. The mobile phone in turn transmits a series of email that contains the acquired data to the server unit by communicating with the GPRS network. The Client Unit is comprised the vital-sign signals module of acquisition and mobile phone. The core of the signal acquisition module is an AVR Processor The microcontroller acquires the amplified and conditioned signals, and then performs the interface with the mobile phone. The functioning of this device is based on the truth that the blood circulates for every heartbeat that can be sense by using Light Emitting Diode. Depending upon the rate of circulation of blood the heart beat per minute is calculated. This calculated value is communicated to the person through a GPRS modem interfaced to it and then by using TCP-IP protocol it gives the information to the server.

Table1. Comparison of Base Papers

S r n o	Parame ters	Base Paper 1st	Base Paper 2nd	Base Paper 3rd	Base Paper 4th	Current Paper
1	Method Used	GSM-SMS Messagin g	TDMA Communi cation	Web and Android Mobile	GPS Satellite and GPRS Mobile Communic ation	TCP-IP Protocol
2	Monitorin g System	Stable Monitorin g	Portable Monitorin g	Mobile is used as a web(Port able)	Real-time Monitorin g System	Wireless Internet Portable
3	Reliabilit y	Better Reliable	High Reliable	High	Very High	Perfect Reliable
4	Efficienc y	50% efficient	65% efficient	80% efficient	85% efficient	Can be 90% efficient

The measurement of movement of body is made with the help of tilt sensor and accelerometer and the processing and analysis of movement is done with the help of microcontroller. The graph shows the percentage of falling people which is likely to increasing every year.

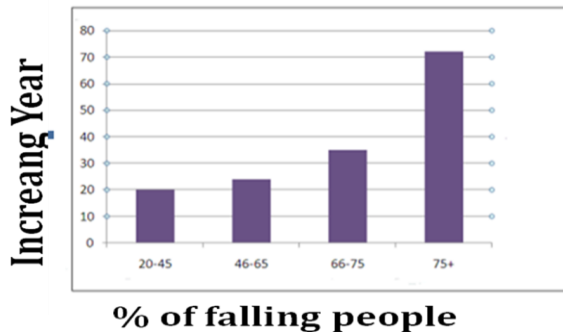


Fig 3. % of falling people which is increasing every year

The consequences of falling lead to sudden death or may lead to severe harm to the person or the patient which can be listed to a few as follows:

- 30% of home-dwelling elderly (65+) fall each year
- 0-20% of elderly people fall recurrently(at least twice within 6 month)
- Mean incidence of fall is about 650/1000 persons years
- 860 older people (65+) died because of fall-related accidents.

4. CONCLUSION

Wireless intelligent system on vital parameter based remote monitoring have made possible a new generation of noninvasive, personal medical monitors applicable during abnormal activities. There are many ongoing researches on heart monitoring system as well as various vital parameters using GPRS and wireless internet technology. The TCP-IP Protocol is defining, to send the data to the server, applying an efficient internet protocol based on growing parameters. By applying this system is justified by the efficiency of the monitoring system and the large numbers of parameter are used.

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BIOGRAPHIES



Miss. Bhumita U. Kakade
Student of M.E(Electronics and
Telecommunication)
G.H.Raisoni college of
Engineering and Management
Amravati.



Prof. Akshay B. Kadu
M.E (Electronics and
Telecommunication)
G.H.Raisoni college of
Engineering and Management
Amravati.