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A PATH FOR HORIZING YOUR INNOVATIVE WORK

CARDIAC FAILURE ALERT SYSTEM USING WEARABLE SENSOR NETWORK WITH GSM MOBILE AND GPS

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Abstract: All of we know that now a days the use of wireless devices has been drastically increased due to revolution in wireless technology, in addition to that peoples are more addicted to use internet, this wireless technology can be more efficiently used for monitoring patients in real time, hence we are giving try to develop a system which will use wireless technology for real time patient monitoring. Here in this paper we will discuss the design of the system which will monitor the patient in real time.

Keywords: Cardiac Failure Alert, GSM Mobile, GPS

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INTRODUCTION

Now a days the use of internet has been drastically increased in every field because it has number of advantages of online system, the one and most important reason behind this is, it reduces the time required for the work.[4] So this project is proposed to save the time required for providing the medical assistant for the cardiac patient, those who are having the history of the heart disease by providing real time monitoring to patient through the use of internet by using wearable sensor network, this proposed project will also help to locate the person remotely with use of GPS from his GSM mobile. [3] This project will not only locate and track the patient but also will send the alert message to the mobile ambulance and to the closest relatives of the person in case of any emergency. The goal behind developing the system is mainly to save the peoples those who are suffering from heart problems and to provide them medical assistance. In our India most of the senior citizen are living alone in their home as their offspring are busy in due to work load or a employment issues, and as we know with increase in the age factor of the person the threat of stroke also increases and it will be difficult for the person who is elderly and living alone to overcome the situation. So to overcome this problem we are proposing a real time patient monitoring system as explained in above paragraph. This facility is enabled due to the development in the mobile computing, wireless sensor network and distributed computing it very easy to develop such kind of system which can be able to monitor the elderly anytime anywhere. Biomedical sensors are playing very vital role in the development of such systems for specially the elderly suffering from diabetes, high blood pressure or heart disease .this system can not only monitor the patient but also it is one secure intelligent system for transmitting medical results to doctors. Wireless sensor network provides the useful method to remotely acquire and monitor physiological signals without the need of disrupting the patient's normal life. We intend to develop a real time patient monitoring system. It can monitor the old people anytime and anywhere. Through vital physiological data monitoring, accidents perception, real-time emergency response and other functions, our system will reduce sudden accidents and life-threatening. It is convenient that the elderly can have access to medical care at home. At the same time, we feature auxiliary functions which cater for the need of the elderly without anyone accompanied or health professionals as their life assistant.[11] Therefore, the system acts as not only remote health monitoring system, but also the life assistant.

2. SYSTEM REQUIREMENT

For designing the real time patient monitoring system first of all we have to know what are the advantages of real time patient monitoring system over the existing systems what parameter

we are considering for monitoring, so that we can build the specific system. At present there so many systems are in use for patient monitoring which we have already discussed and from that discussion we came to know that there is not a single system which is giving you real time data of patients. Designing such system is possible by using the combination of hardware and software. For designing such system we need heart beat sensor, temperature sensor, microcontroller, GSM modem, GPS receiver Also we require Mikro C software for coding the microcontroller, then we requires TCP/IP data login module for monitoring the patients. By using the wireless sensors we can design a mobile patient monitoring system we can keep the real time record of patients physiological parameters, GSM modem will be used for transmitting the alert signal to care takers of the patients and they can find the patient by using the GPS receiver attached with the patient. Detail design and the working of the devices we will discuss below.

Hardware requirement

- Atmega128Microcontroller
- GSM modem
- Heart beat sensor
- Temperature sensor
- GPS receiver

- **Software requirement**

- Mikro C
- Windowa Xp/ Windows 7
- TCP/IP and UDP Data logger module

For making the circuitry we required above mentioned hardware and software components, which are discussed in detail in designing part

3. PROPOSED SYSTEM

In this project we have focused on the Real time monitoring of the patient by combined use of wearable sensors with GSM modem and GPS which transmit the parameters (Bit rate and

Temperature) by using GPRS to the monitoring station. So as to provide emergency help to the patient

This project has following phases

1. Attaching the sensors to patients body

2. Sending the IP address of the monitoring system to patients GSM

3. Monitor the patients on monitoring system using Data logger.

4. Compare the parameters with normal parameter.

5. Find the location using the latitude and longitude from the received parameter of GPS unit

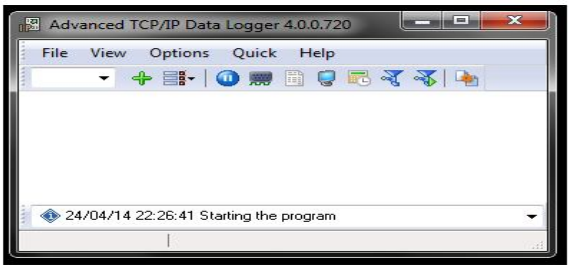
6. If the received parameters are crossing the normal range then send alert message to ambulance unit and to the familiars of patients.

4. System implementation

In implementation part we have to make the following connections, after coding the microcontroller LCD will display the bit rate of human heart. When a finger is put in the sensor, it displays the beats per minute (BPM) rate. The pulse signal is applied to the P1.0 input of U2 that is AT89S52 (Can be any 8051 type) which is monitored by the program whenever this input goes high. Internally to U2, there is a counter which counts how many 1ms intervals there are between two high going heart beat pulses. This number is then divided by 60,000 and the result is the pulse rate. For example, if the pulse rate is 60 BPM (beats per minute) there will be a pulse every second. The duration of one heart beat will be one seconds or 1000 x 1ms. Dividing 60,000 by 1000 will give the correct result of 60 which is shown on the display. If there is invalid result (BPM>200) it is invalid and waits for next cycle. The code does not average reading, but shows instantly. To steady reading averaging of 10 past values can be implemented.

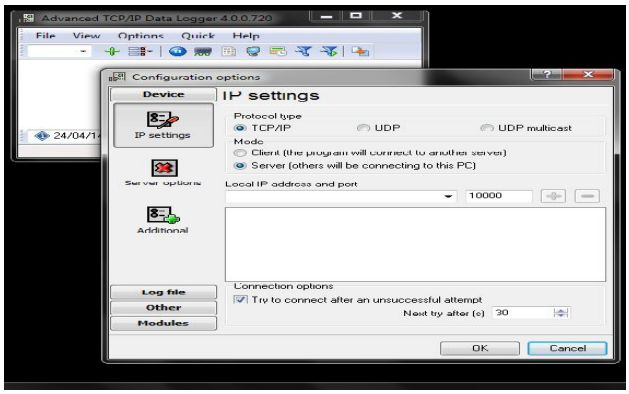
The output is sent to the monitoring station by using the UDP connection, this UDP connection is useful only when we are transmitting the output to the single place, in case of multiple places we have to use the TCP/IP connection. The Screenshots of data logger are show below. For getting the output on the data logger do the following procedure.

STEP 1 : open the advance TCP/IP data logger software



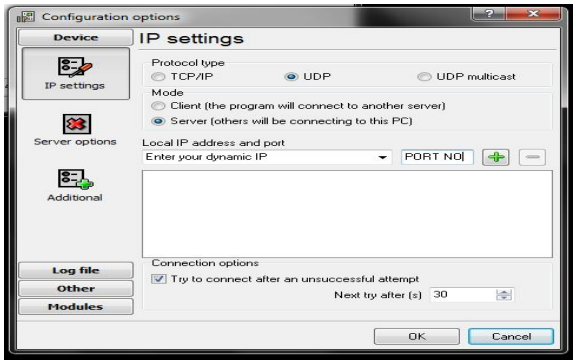
Screenshot 1: Main

STEP 2: Click on the Plus symbol



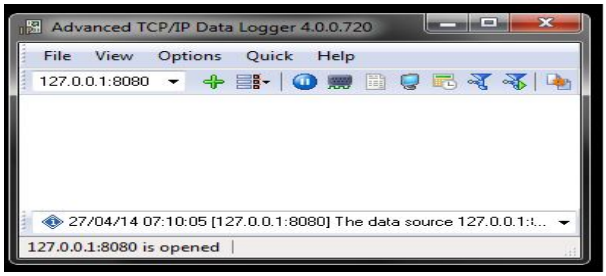
Screenshot 2: IP setting

STEP 3: after opening the screen shown in screenshot 2 select UDP and enter your dynamic IP address along with the port no. which is shown in the following screenshot



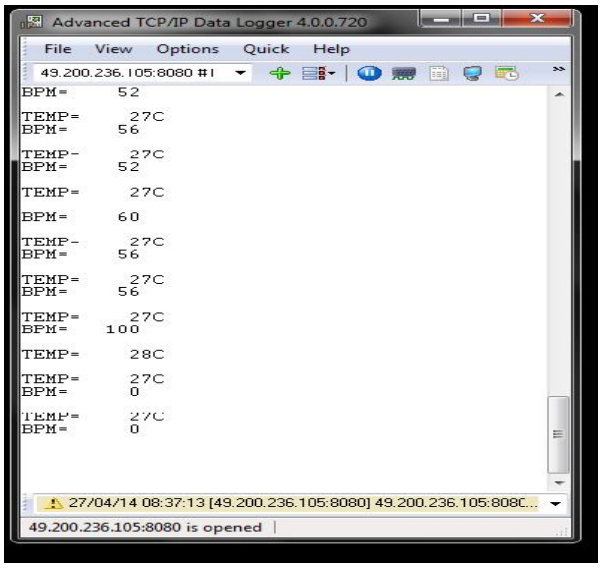
Screenshot 3: IP addition

STEP 4: In step 4, after entering IP address and port number add that configuration by pressing the plus symbol. And then press ok, after pressing ok we will get again first screen with entered IP address and the port number.



Screenshot 4: Enabling Communication

STEP 5: Now just press play symbol and you will get your output which is shown below. Here you can see the temperature as well as the bits per minute of the patient.



Screenshot 5: Output

- **Complete System Architecture**

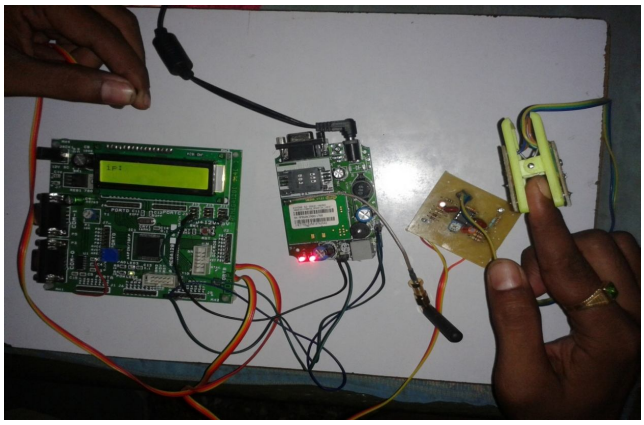


Figure 1 : Complete system

5. CONCLUSION

Real time patient monitoring system using wearable sensor network with GSM mobile and GPS is a system which can not only dynamically monitor the elderly anytime anywhere and automatically alarm to the emergency centre in the emergency situation, but also play a role in acting as a living assistant. At the same time, this system also acts as the personal health information system which allows doctors to view current and history condition of the patient. Additionally, the medical guidance that includes the communication platform and the medical knowledge database is designed to serves as the real-time medical guidance for the patient, which is unique compared with other monitoring systems. Moreover, this system takes into account the role of family and friends, which make it possible that they can cooperate with doctors to take care of the patient in better way. Therefore, this system will not only play an essential role in assisting living, but also bring the development in healthcare. It is the initial stage of the system. In which we have implemented basic functions of our system. The future work for the improvement of the system will mainly focus on the following aspects. Firstly, the user interfaces. In addition, the function as the medical guidance should be improved. We tend to use other artificial intelligence technology to optimize and improve this function. Thirdly, we attempt to propose the idea of the regional emergency service while only the emergency centre is designed in the first stage. When detecting the emergency of one subject, the system will alert to the regional emergency centre to which the subject belongs. As the regional emergency is near the place of the subject and it realizes the task-sharing of the emergency centre, the rescue work can be more efficient.

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