REMOTE HEART BEAT MONITORING SYSTEM THROUGH MOBITEL NETWORK

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ABSTRACT

Today mobile phones have become a necessity in human life. Therefore a high competition exists among mobile service providers. Therefore they always try to introduce new additions for customers and to increase the usage of their products. Therefore in this paper a new service was introduced to the mobile service providers, a remote heart beat monitoring system through the mobile network. This remote heart beat monitoring systemprovides a useful tool to patients to assess their own health and manage their personal health information anytime and from anywhere. This design is focused on the people who stay alone at home or suffering from heart diseases. Hardware of the system will sense heart rate of a patient and feed the data to personal computer using serial communication and then send to mobile service provider's server using wireless communication. As future development it is intend to send heart beat value to doctors and get feedback from them andpass it to patients.

Keywords: *Heartbeat, Op-Amps, wireless transmission*

1.0 INTRODUCTION

The concept of this paper is to build upon the integration of wireless communications intomedical applications to revolutionize the personal healthcare. The main objective of this study is to build a wireless heart beat monitoring system using GSM Technology. Remote heart rate monitoringis seen as an effective and low cost method of providing immediate care as it allows for continuous as well as emergency transmission of patient's information to the doctor or healthcare providers. In the recent decade advances in development of mobile health monitoring devices has further enhanced the quality of life[1]. Under this concept, patients are no longer bound to a specific healthcare location where they are monitored by medical instruments.Without a convenient wireless patient monitoring system, the doctor cannot give full attention to the patients at all the times. This

system enables the doctors to remotely monitor multiple patients' condition simultaneously.

Main intention of this study is to introduce a new system to mobile service providers in Sri Lanka. Remote patient monitoring will not only redefine hospital care but also work, home, and recreational activities. This new system will enable doctors to monitor patients on a regular basis and also this brings additional benefits for the patient, saving time in traveling to the local doctor

2.0 EXPERIMENTAL

2.1 Preparation of heart beat monitoring device
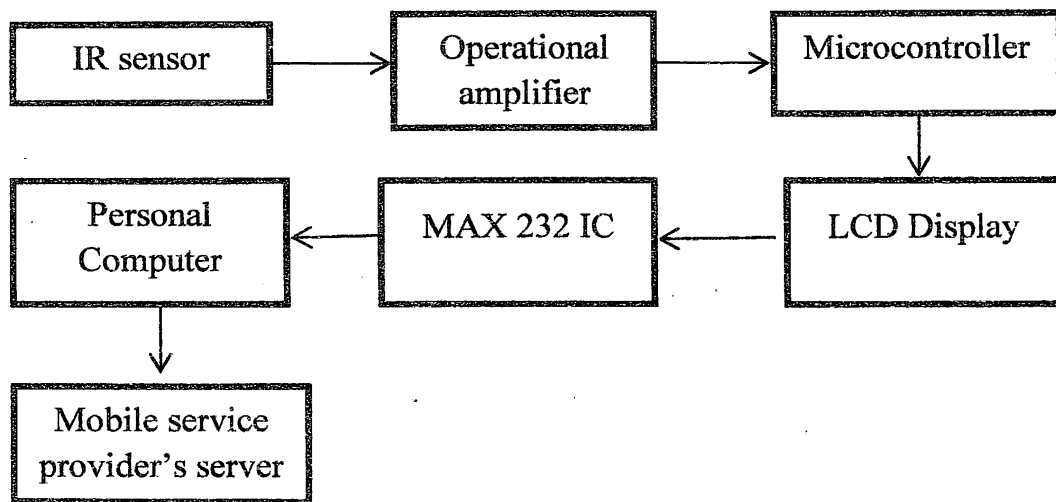

Figure 1: Block diagram of remote heart beat monitoring system

The main task of the study was to build a device to detect heart beat rate of a patient. Heartbeat detecting device was created using an IR sensor. The heart beat sensor designed detects the heartbeat by sensing the change in blood volume in a finger artery while the heart is pumping blood. It consists of an infrared LED that transmits an IR signal through the fingertip of the subject, a part of which is reflected by the blood cells. The reflected signal is detected by a photo diode sensor. The changing blood volume with heartbeat results in a train of pulses at the output of the photo diode, the magnitude of which is too small to be detected directly by a microcontroller. Therefore, a two-stage high gain, active low pass filter was designed using two op-amps to filter and amplify the signal to appropriate voltage level so that the pulses can be counted by a microcontroller. After that the heart rate is displayed on a LCD display.The LM358 dual op-amp with the gain of each

filter stage is set to 101, giving the total amplification of about 10000 to amplify the signal of IR sensor. A 1μF capacitor at the input of each stage wasused to block the dc component in the signal. Some testing was carried out to measure accurate value of the series resistor for the IR diode by using 470k potentiometer in series with the IR diode[2].

3.0 RESULTS AND DISCUSSION

The first section of theheart beat monitoring sensor was developed using TCRT5000 IR sensor[3] and LM358 op-amp[4].The potentiometer was kept in series with the IR diode. After placing a fingertip over the sensor assembly, the potentiometer was slowly varied till the output of LEDs blink with heartbeat. Then this sensor output was connected to 16f877pic microcontroller and the heart beat rate assigned todisplay on LCD display. This heart beat value was fed to a personal computer using max232IC and that value was send to mobile service provider's server using a dongle. This IR sensor based heartbeat rate monitoring system is a low cost solution. The cost of remote heart beat monitoring system was 1200 rupees. There are many sensors to detect heart beat rate but they are costly normally 7500 rupees[5].

4.0 CONCLUTION

In this study, a low cost wireless heart beat monitoring system wasdeveloped to monitor the patient's condition increasing the efficiency of patient's data monitoring procedure. This system is very useful to every one especially for heart patients. As the future development, it is intended to develop the part of sending heart beat rate to a doctor and get feedback from him and finally inform the feedback to patient via a SMS. This can also be further expanded to remotely monitor other health functions.

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