SMARTPHONE-BASED INTELLIGENT HEALTHCARE HANDHELD MONITORING SYSTEM

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Introduction

Health issues have become the most concerned topic for people who live a city life. Among all vital signals from our human body, Pulse Oximetry is one of the latest and practical signals which contain information like Oxygen Saturation Values in blood and Heart Beat Rate. They are helpful for patients who require continuous monitoring.

Aim and objective:
- to develop and implement an intelligent healthcare handheld monitoring system which contains a pulse oximeter and a smartphone base
- to measure patient’s heart rate and blood oxygen saturation
- to provide useful and low cost healthcare services
- to enable users to realize their heart activities

Several Achievements have been developed in the System:

Hardware
- Construction of Pulse Oximetry circuit board for connecting the low-cost finger pulse sensor, Bluetooth module and Smartphone to obtain an accurate PPG signals.
- Low cost Finger Pulse Sensor is assembled.
- Bluetooth Pulse Oximeter Product is integrated in the system

Software
- Implementation of Algorithm in Smartphone to calculate Heart Beat rate and Oxygen Saturation value by Pulse Oximetry Signal obtained.
- A Symbian program for communicating with the sensor product / low cost sensor for data collection, analysis and storage.
- A VB.Net program for allowing data transmission between the serial port and the USB Bluetooth adapter.
- A smartphone monitoring GUI program.
System Block Diagram

Path 1
Low-Cost Finger Pulse Sensor

Path 2
Bluetooth Pulse Oximeter

PPG signal

The sampling and amplifying circuit

The voltage shifter circuit

Digital signal

Bluetooth Module

The analog to digital and sampling circuit

Smartphone

PPG signal monitoring

Old User Record

New User info Input

Heart Beat Rate Display

Hardware and Software
The waveforms of AC Red Channel of Pulse Oximetry. After calculation with algorithm, Heart Beat Rate and Oxygen Saturation value can be obtained.

The waveform of PPG Signal can be shown on the GUI of Smartphone Program.

The integrated PPG signal Processing circuit board is implemented.