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ANDROID BASED BIOMEDICAL SIGNAL MONITORING SYSTEM

Prof.Priti W. Pawde*, Prajakta Narwade, Shraddha Miskin
* Associate Professor (H.O.D.), ENTC Engineering, BCER, Akola, India
Student, ENTC Engineering,BCER,Akola,India
Student, ENTC Engineering,BCER,Akola,India

ABSTRACT

Telemedicine has reduced the human effort by replacing wired infrastructure with wireless infrastructure. This paper based on body area network (BAN). sensors are attached to the human body and connected to microcontroller. Sensor measure the values of temperature, heart rate and this values are send to the android Smartphone. Android application takes the value compared it with threshold value that are already set in application if abnormalities occur then message will send to the doctor and patients relative. In this paper we present low cost, web based system for transmission of various bio-signal, so that bio-signal acquired from the sensors can be transmitted from phone to the web server, so that doctor can analyses the signal of their patient properly even at outside the hospital.

KEYWORDS: Biosignal, Android OS, Eclipse,

INTRODUCTION

At present heat diseases, blood pressure is the serious diseases that may threaten human life. The aim of this technology is to reduce the number of cables and wires which may be hazardous.biomedical field serves as the boon for human society. But in today's rashly running world people careless about their health[3]. Cases of heart attacks and deaths due to lack of help are increasing. For this purpose personal medi-kits are best solution[3].

Few years ago, there was joint family system hence patients were able to get medical help within time[3]. But now a days one may lost his life because of not getting proper help within time. For such patients this kit gives indication to their doctors and they immediately get medical help. Whenever beat rate of person will become more than 72pulse/min., doctor get immediate indication and help will be sent as fast as can[3].

The purpose of this project is to measure the heart beat and other parameter like temperature and inform to the doctor and patients relative through SMS[2]. The objective depicting the implementation of a low powered and low cost heart pulse rate and body temperature monitor that will provide an accurate reading of one's heart rate and temperature is highlighted in our project[2]. The medi-kit will be portable and easy to use[3]. In this project we are going to acquire the various bio-signals by using portable medical devices and this devices are connected to the patients mobile phone, we create an android application in our mobile phone so that the various bio-signals that are connected to the mobile phone are transmitted from phone to the web server and doctor can analyze that signal on web server[1], also the massage is send to the specialized doctor as well as one of the family member of that patient if the Signals are not proper. In this paper we show the development of android application for patient mobile.

BIOLOGICAL SIGNAL

Heart rate

Heart rate, or heart pulse, is the speed of the heartbeat measured by the number of poundings of the heart per unit of time typically beat per minute (bpm).

The normal resting adult human heart rate ranges from 60–100 bpm. Bradycardia is a slow heart rate, defined as below 60 bpm. Tachycardia is a fast heart rate, defined as above 100 bpm at rest. When the heart is not beating in a regular pattern, this is referred to as an arrhythmia. These abnormalities of heart rate sometimes indicate disease. Smartphone can also be use as an acquisition tool of the heart rate and

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temperature while respiration rate and blood pressure can be estimated by using heart rate data[2].

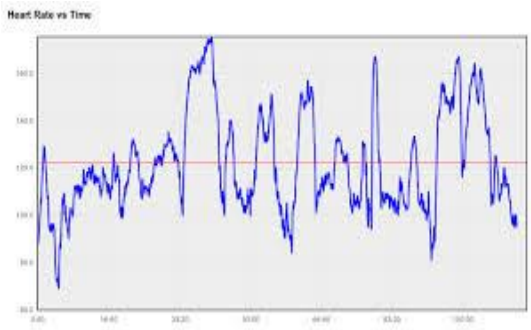

Fig.1 heart rate

Temperature

Body temperature [13]is a measure of the body's ability to generate and get rid of heat. When you are too hot, the blood vessels in your skin expand (dilate) to carry the excess heat to your skin's surface[13]. You may begin to sweat, and as the sweat evaporates, it helps cool your body. When you are too cold, your blood vessels narrow (contract) so that blood flow to your skin is reduced to conserve body heat[13]. But it is necessary to remain body temperature normal ie 38^0 c

SYSTEM DESCRIPTION

Aim of this project is development of biomedical signal monitoring system which include telemetry system[1]. This system also contain web server and web database from which readings of patient can easily seen by doctor[2]. The block diagram of proposed system is shown in fig:

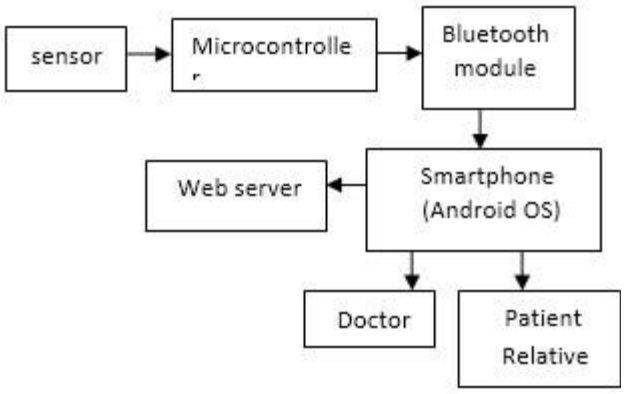

Fig 2: Block diagram of proposed system

This system consist of two part hardware part and software part[2]. It provide doctor to monitor the patient outside of the hospital. In this the hardware consist of microcontroller, sensors and Bluetooth Device HC05 and software containing an android application which receive the various parameter values and compared it with threshold values which are set in smart phone application. If the human readings are find to be below or above than threshold then it will immediately sends message to the doctor and patient's relative. Message contain patient's vital parameter.

Android OS

Android [6] is a Linux based operating system that is builds for smart phone and tablet devices. It is an open source OS. One of the merits of developing for android is the cheap and easiness of the development environment. The Android software development kit [SDK] and tools are provided free of charge from the developer's site (http://developer.android.com). While developing android applications, Tools from the SDK [5] can be invoked through command Line or the ADT.

In this project, the Eclipse [4] IDE is used for the application development .The ADT (Android Development Tools) is Eclipse plug-in that is recommended for developing android applications since it offers direct invoking of tools during application development. Android applications are written in the Java language, compiled into byte codes which will be converted to a .dex file (Dalvik executable file) using the dx converter. This will further be com-piled in to android package file (apk file), that can be installed on the android devices the application will work as shown in the following diagram.

Flow chart:

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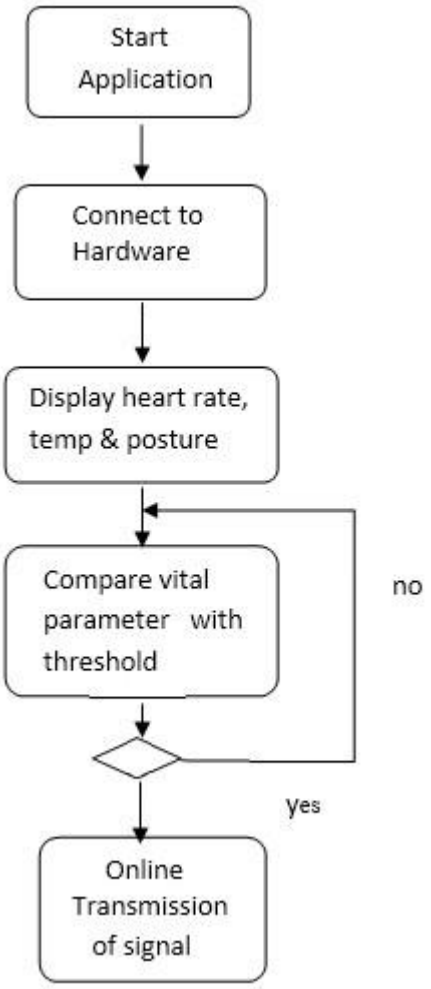

Eclipse

Eclipse is an integrated development environment (IDE). It contains a base workspace and an extensible plug-in system for customizing the environment. Written mostly in java, Eclipse can be used to develop applications. The Eclipse Web Tools Platform (WTP) project is an extension of the Eclipse platform with tools for developing Web and Java EE applications[12]. It includes source and graphical editors and APIs to support deploying, running, and testing apps. For many Java developers, Eclipse (IDE) is a choice. The reasons for using Eclipse comprise rich Java Development Tools (JDT) support and a plug-in architecture that allows tight integration of third-party functionality. An Android[12] project contains all the files that contain the source code for your Android app. The Android SDK tools make it easy to start a new Android project with a set of default project directories and files. Following Figure shows the Eclipse development environment, which is used for display and manipulating information in view

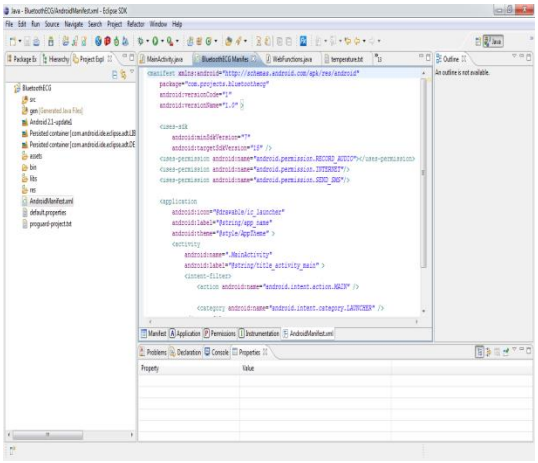

Fig :3 Eclipse development environment

Steps for developing android application:

Steps for Android application in Eclipse IDE using the ADT plug-in and run it with an Android Virtual Device are as follows:

Android [14]applications are primarily written in the Java programming language in eclipse software. The Java source files are converted to Java class files by the Java compiler. The Android[14] SDK contains a tool which converts Java class files into a .dex (Dalvik Executable) file. The .dex file and the resources of an Android project, like images and XML files[14]. They are packed into an .apk (Android Package) file. So finally whole Android application (*.apk* file) will be created and deployed.

Download and install the eclipse-java-luna-SR2

Download and Install the Android SDK (android-sdk_r24.1.2-windows)

Download and Install the ADT-23.0.4 Eclipse plug-in

Create an Android Virtual Device (AVD)

Create an Android Project with Eclipse

Run the Application in the Android Virtual Device

RESULT

In this paper we got the results for generation of android application that will transmit the various biomedical signals to the web server. For this paper we create database for various biomedical signals as input for application to run.

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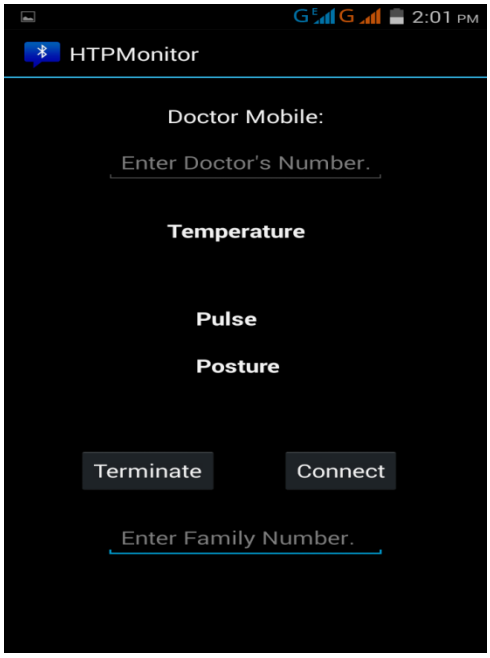
The application looks like this on the above screen



Above fig shows the GUI of application

CONCLUSION

In this paper our idea is to design android based patient monitoring system with features of storing the readings of biomedical parameter in web database. We have implemented acquisition and analysis of three biomedical signals using android Smartphone because of this no need of the patient to visit at the hospital and doctor can easily check the details of patient whenever required. If any critical situation occur, the application send a message to the doctor and patients relative and send data to web server.this will be a useful tool for doctor and nurses.

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