TI India Analog Design Contest 2011

Interim Report – November, 2011

Part A

1	Name of your College	Netaji Subhas Institute of Technology, University of Delhi			
2	Name of the Project	Cost Effective Health Log Manager			
3	Team Number	106			
4	CMT Paper	209			
5	Details of the participants		Name	Branch	Semester/Year
		1	Nivedita Arora	VIIth Semester	Information and Technology Engineering
		2	Shanjit Singh Jajmann	Vth Semester	Electronics and Communication Engineering
6	Details of the mentor(s)	Name: Dhananjay V. Gadre Associate Professor ECE Division, NSIT Contact No: - +919968357499 Email ID: - dhananjay.gadre@gmail.com			
7	Date on which you received the components	12th September, 2011			
8	Has your report been read and approved by your mentor?	Yes			
9	Have all the members of your team contributed to this report?	Yes			

Part B

1. Introduction to the Project

The number of diseases like diabetes ,blood pressure, obesity etc. are on a rise due to modern sedentary lifestyle .The primary aim of this project is to make people aware of the potential benefits of leading a healthy life by helping them easily analyse their day-to-day medical records over a continuous period of time. Smartphone today have become ubiquitous. With emergence of smart phones and cloud based applications in the market, data is being stored online for easy and stable access of information to users or group of users. The project is aimed at automating the system of storing the patient health record such as weight (BMI) and temperature, pulse rate as measured by digital devices directly on the cloud .The recorded data is transferred using Bluetooth from medical instrument to mobile which in turn sends data to the user medical profile on the server by accessing GPRS. The patient's medical records can be monitored by doctor regularly without the hassle for the user to update his account manually. The project can be extended to monitor other parameters like blood pressure and glucose levels. The project is aimed at providing low cost medical support in Indian rural villages and hospitals by providing instant update to the doctor about patient health and emergencies.
Intention:
The purpose of project is as follows-

a) The readings from various medical instruments can be saved in SD card of mobile in the form of charts/graphs and a complete database of the User's medical record can be uploaded on server and hence shared with the Doctor or the Hospital.
b) A person following an exercise or a gym routine can keep track of his health status over a sustained period of time to find out the change. This uses the accelerometer of phone to count the number of steps taken and calories burnt.
c) Doctors and family members of the individual can be notified by an email/ sms in case of an emergency i.e. when the reading of patient is dangerously high a certain set of people will be notified.
d) The collected medical record of a large no. of people over a certain period of time can be used for health related research and surveys.
e) The project can be extended to monitor other parameters like blood pressure and glucose levels.
f) Extend the health log system to low end mobile phones where data is collected using low cost hardware sensors externally attached phone to transfer data using smses.

Today there already exist many health care firms which offer services of remotely collected user related health data using devices which connect directly interact with the remote server of the hospital and accumulate data. Owing to the low cost custom-made design of the project where existing components need to integrated with each other, the secondary aim of this project, when totally completed would be to compete with such services in terms of high device costs, sustained reliability and openness of accumulated data to organisations (keeping the privacy of the individual in mind).

2. System Requirements

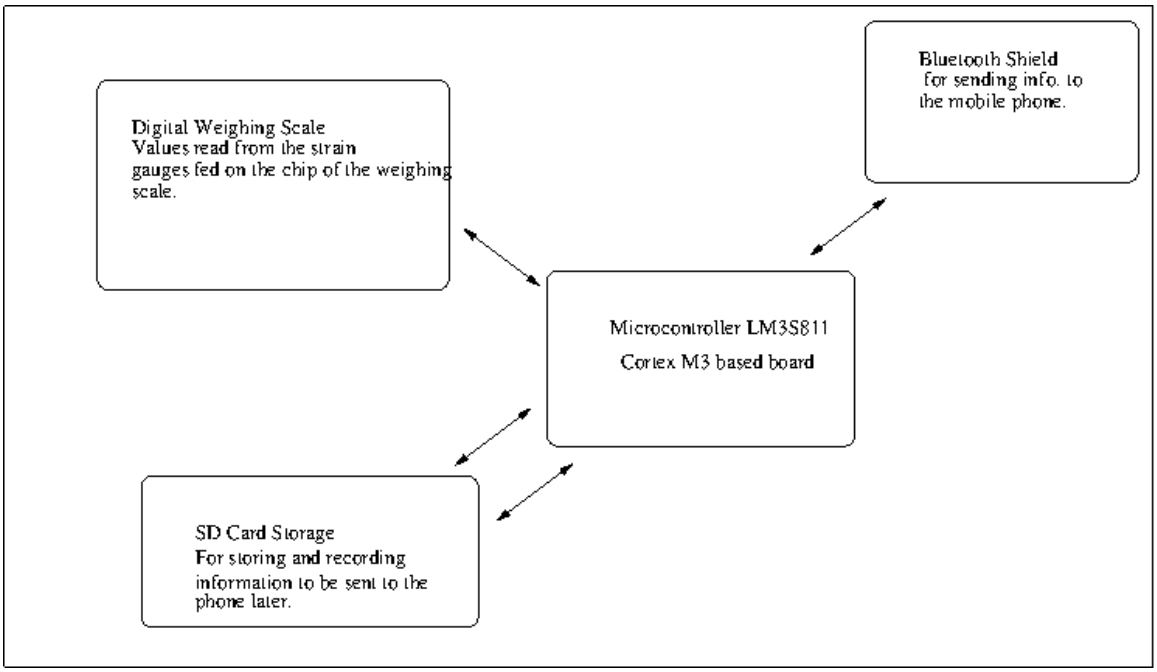
a. What TI parts are you using?
1) EKC-LM3S811 with CodeSourcery Tools
2) TLV2475A

b. What non-TI parts are you using?
Bluetooth shield (BlueLINK - Bluetooth Module (5V Serial UART), rhydolabz)
A Digital Weighing scale

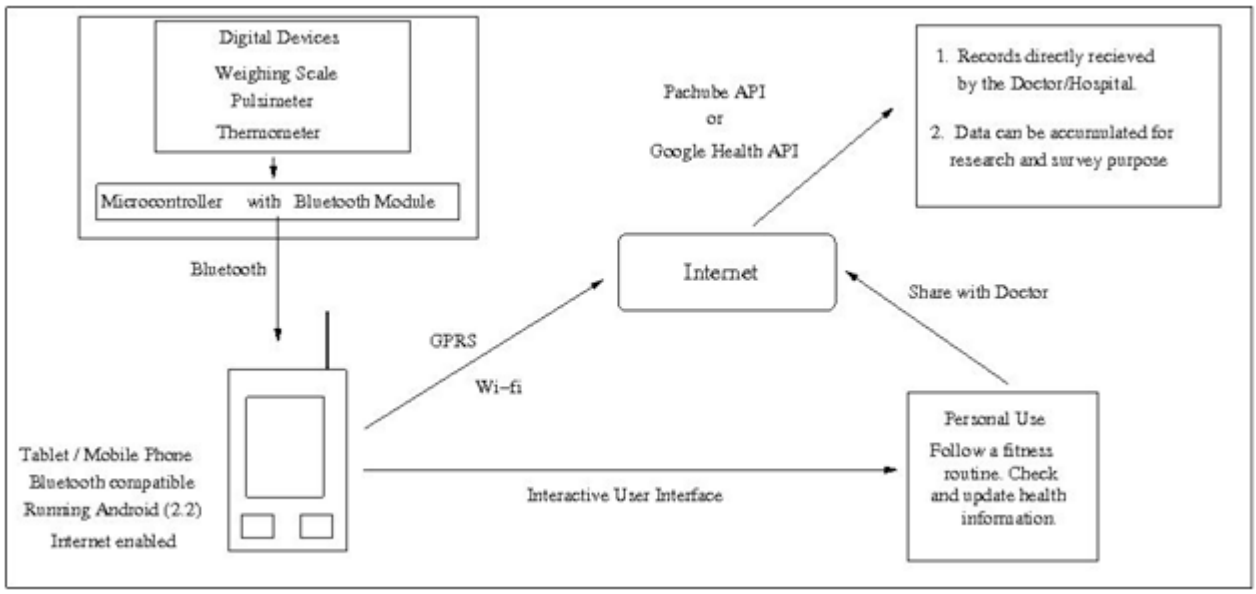
c. What TI software are you using?
CodeSourcery Toolchain with EKC-LM3S811

d. What non-TI software are you using?
Eclipse integrated with Android SDK for Android Application Development

3. Overview of the Hardware Design



4. Overview of the Software Design



The various stages of the data transfer as shown by Fig. 1 are,

1. **Digital Device and Microcontroller interaction:**
The input to the microcontroller can be provided in two ways,
i) Use existing LCD output terminal points (going to the 7 segment displays) of the devices as input and program the microcontroller to use them appropriately.
ii) Tap the voltage amplified signal which is proportional to the measured quantity and represents it. Use this voltage as the input of the microcontroller.

2. **Microcontroller and Mobile/Tablet device** (using Bluetooth)
For this we would be using a Bluetooth module (Arduino bluetooth shield). Both the phone (Java Language) and the microcontroller (C Language) will need to be programmed appropriately. We will be using Amarino Library (http://www.amarino-toolkit.net/) to connect the microcontroller to the phone via Bluetooth and exchange data.

3. **Mobile/Tablet device and the use**
The data can be accumulated and stored and presented in form of charts/graphs to the user using a friendly UI on the mobile/tablet device. This data will be uploaded on the server:
The Pachube API (http://api.pachube.com/, http://code.google.com/p/pachubelibrary/) serves as a generalised tool to present data in a easy to understand form.It stores the Real-time data (Continuous series of readings) from the device on to the server .Thus this can be used to extend the concept of project to medical devices like ECG. This data can then be made public or kept private depending on the user's preference.

5. Early Results

a. **Results/observations of component testing**

b. **Any system redesign you had to do**

c. **Any early results on your hardware system**
Obtained varied voltage for different loads tested, proper calibration yet to be done. Setup the Codesourcery toolchain and read the floating point values using LM3S811. Able to store values in the SD Card.

d. **Any early results of software simulation, etc. –**
will try and get screenshot (cnt say 100% as exam gng on)

6. *Challenges*

a. **Non-technical challenges**
The hack for the weighing scale, required proper opening of the weighing scale keeping into mind that the display on the scale uses a small conducting strip to join with the onboard chip.

b. **Technical challenges**
Getting the Codesourcery Toolchain for the LM3S811 setup on ubuntu and burning the .bin file to the board. Reading external values from the pins and storing them into the SD Card.

7. *Team Members*

Nivedita Arora –

1) Made test application to export random data obtained from bluetooth module to android mobile phone .The same data was transferred on the pachube server using pachube api https://pachube.com/.Realtime export of data was achieved .

2) Retrieved the data from pachube and showed it in form of tabular form for the user according to his profile.

The above application will be extended to realtime weight updating app for android phone. The Bluetooth module will connect to the phone which will upload the data to server as well as save it in its database using Sqlite which can be used for later use.

Shanjit Singh Jajmann–

Hacking into the weighing scale, and using TL082 with the LM3S811 board to record readings to an SD Card and then pushing them to the Bluetooth shield for transferring to the android phone.

8. **How much time are you spending on your project every week?**
4-5 hours a week

9. **What is the earliest date by which you can have your project completed? (Please be realistic – please talk to your mentor).**
10 January, 2012

10. How do you plan to test your finished project?

The testing requires saving medical data for each user on his/her phone by connecting it to Bluetooth module on the weighing scale and send it to server. Thus, we will be connecting the weighing scale with various android phones available in the college lab to successfully connect and transfer data.

11. What is the earliest date by which you can complete your project report? (Please be realistic – please talk to your mentor.)

20 January 2012

12. Each team will be expected to make a short video to demonstrate the working of their project. What is the earliest date by which you can complete the video of your project and upload it to YouTube?

20 January 2012