Wireless ECG Software
Interim Report

by

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Group: 12

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Background/Motivation:

A wireless ECG device that can monitor a person anywhere at anytime is a very valuable tool. If someone has a heart attack or other heart irregularity and they are unable to call for an ambulance, the wireless ECG can use their smartphone to send an alert to a nearby

hospital. They can then be tracked down using the GPS built into the phone. Not only will a device like this directly save lives, it will also save even more lives indirectly.

Currently, if someone has a heart attack that requires a trip to the hospital, there is no ECG data outlining what happened leading up to the heart attack. If a person is being constantly monitored then this data can be captured and studied. This could provide doctors and researchers with valuable information to help proactively detect and prevent heart attacks before they happen. Unless a person is already in the hospital being monitored by an ECG then there is no current way to capture this vital data.

The Project:

The proposed project is to design the software side of a wireless ECG device that can interact with a smart phone. The intent is to allow a person to be monitored at all times and contact the necessary party (hospital, family member, etc.) in case of a medical emergency. The ECG data can either be stored directly on the phone or sent to a medical facility to be reviewed later by a doctor.

There are three main milestones to designing this piece of software:

1. Establish the nature of the signal we're receiving. Determine how to read the received signal.

2. Research how to analyze the signal after receiving it. We will need to determine what indicates an irregularity and what is a normal safe heartbeat.

3. Determine the appropriate response depending on the results. If there is an emergency we will need to contact a nearby medical facility. If not, we will need to determine what to do with the resulting ECG data.

Alternatives:

There are a number of alternatives to consider when dealing with the data received.

1. Send all data and store it at the medical centre.

2. Only send vital data to medical centre. Store other data on device or discard it.

3. Store all data on the device to be reviewed at a medical centre later during a meeting/ checkup.

Deliverables:

- Filter design - collaboration with hardware team.
- Algorithm design - how to handle and interpret the data.
- Signal processing methods - how we will determine if there is a heart irregularity.
- Overall program design - what it's supposed to do and how it will do it.

Workplan:

- Research ECG signals, what they look like and what the data represents, and categorize irregular signals
- Research what data the phone will be recieving, how signal is represented after being transmitted through bluetooth
- Determine filtering parameters to clean up signal
- Develop algorithms to process signal and determine if there is an irregularity, should data be sent to a doctor or is there an emergency and should ambulance be called.
- Determine what course of action should be taken depending on the irregularity detected
- Determine the amount of data required to save the signal to the phone and determine the length of time we can record the signal for before internal storage is filled.

Log book grade (25%): _____
Report grade (75%): _____
Total Grade (100%): _____

Supervisor's Comments:

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Supervisor's name (Print) Signature Date

Notes for the supervisor:

1. Please return the marked hard copy to Prof. Tao Lu by Monday, October 23.
2. Attached additional pages for comments if necessary.