F/M Electrocardiography Monitoring

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Purpose

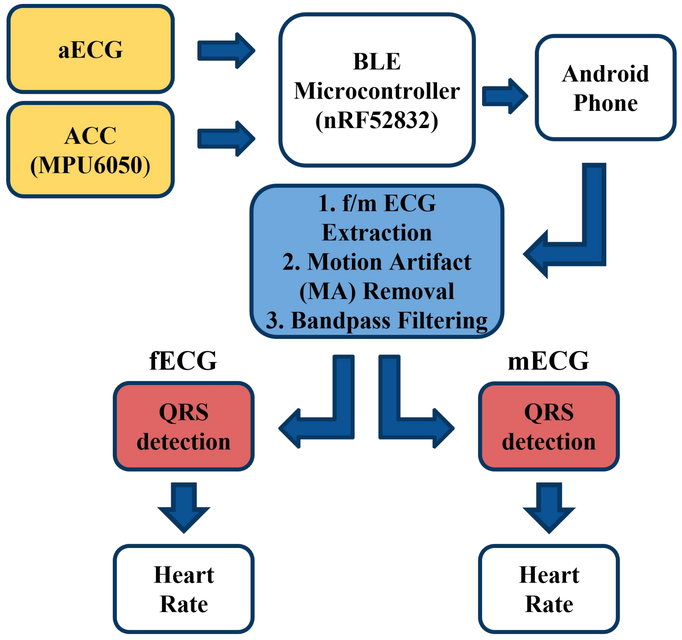
The purpose of the f/m Electrocardiography (ECG) monitoring is to develop a low cost, non-invasive system that monitors both the mother and fetal electrocardiogram readings. The project aims to acquire and display these signals in real time on an android device.

Approach

1. First we will obtain the abdominal ECG data, and then transfers data wirelessly through a BLE system-on-chip toward an Android device.
2. The raw data is filtered and the noise is removed.
3. We also use embedded accelerometer to collect motion data.
4. After that, we extract both the fECG and mECG from the aECG.
5. Finally, calculate and display heart rate for both fECG and mECG.

Background

For decades, ECG monitoring has been widely used as a method for vital-sign monitoring for heart rate performance. However, fetal ECG (fECG) monitoring requires a fetal scalp electrode to be applied after rupturing the gestational sac membrane. Due to the risks of the procedure, it can only employed in limited clinical circumstances during labor. This device aims collect the fECG data and be integrated as an abnormal skin patch or inside a garment to comfortably assess the health condition of the fetus.



Progress

- Week 5: Started F/M Electrocardiography Monitoring with brief introduction
- Week 6: Discuss with Tai Le of a schedule for following weeks
- Week 7-8: Understand the bluetooth technology, circuit design, and code
- Week 9-10: Improve from initial design of one input channel to three input channel

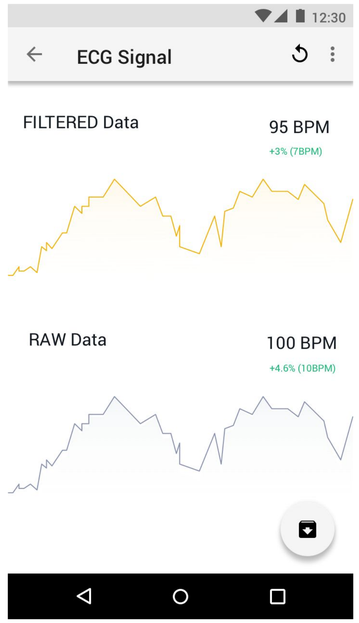


Figure on the left:

The updated User Interface design to read the ECG signal. It contains both the raw ECG data and the filtered ECG data (noise removed).

Team Organization

Hardware	Software
Eric Yeung & Seth Cournoyer	Chenxi Yang & Canyon Riley
Design Improvement	Bluetooth and UI Design improvement
LTspice XVII	Javascript/C & Keil uVision

Contact

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