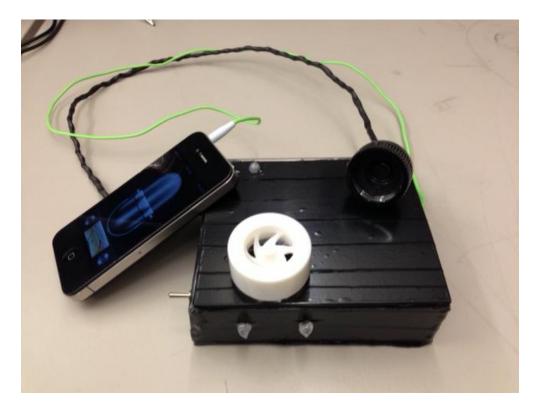


#### **Personal Electronics Stethoscope (PES)**





#### Outline

- I. Introduction
- 2. System Overview
- 3. System Specifications
- 4. Business & Marketing
- 5. Time & Budget
- 6. Future Work
- 7. Conclusion
- 8. Question



## Introduction

#### **Company Background**

- 5 People group
- Electronics or System Background
  - -Real Yuen (CEO)
  - -Guntae (Ray) Park (CFO)
  - -Jungjoo (Daniel) Lee (CMO)
  - -Seven Yao (CTO)
  - -Chao Yang (Jesse) (COO)



#### Introduction

#### Heart Attack/Heart Disease

- About 600,000 people die/year
- Around 46% of them from hidden heart disease







#### Introduction

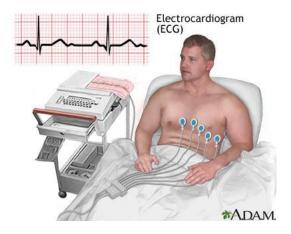
#### Method on the market

- Traditional/Electronics Stethoscope
- ECG Diagram

#### Disadvantage

- Only for doctor
- Not portable







# System Overview

# Product

Personal Electronic Stethoscope (PES)

 Combination of electronics stethoscope and smart phone apps



#### **Target Customer**

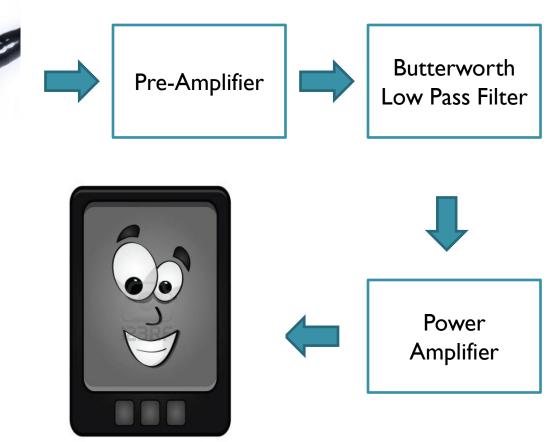
• People over 22



# System Overview

#### **Block Diagram**







# Benefits

- Monitor the heart beat anytime
- Contact to doctor/family immediately
- Conclusively save a time and increase the possibility of saving lives

# System Overview









# etter Life System Specification

#### Hardware

- Hardware specification
  - I. Pre-amplifier (TL072)
  - 2. Butterworth low-pass filter (TL072)
  - 3. Power amplifier (LM386)
  - 4. Voltage regulator (MAXIM680)
  - 5. Electret-Microphone
  - 6. Zener-diode
  - 7. Resistors and Capacitors

# Better Life System Specifications

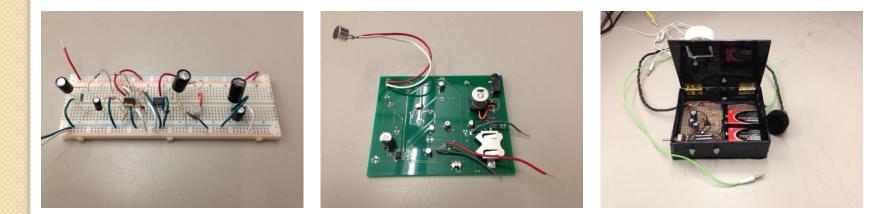
#### Hardware modification

- Supposed to use Bluetooth
- Actually used 4-pin audio cable
- Supposed to use OrCAD
- Actually used Eagle
- Supposed to use PCB with SMD components
- Actually used prototype board with through-hole components
- Supposed to use case designed by AutoCAD
- Actually used manual-cut plastic case

# Better Life System Specifications

#### Circuit

- Electronic Stethoscope Circuit Design
  - I. Prototype using Bread Board
  - 2. PCB
  - 3. Complete Circuit using prototype board with case





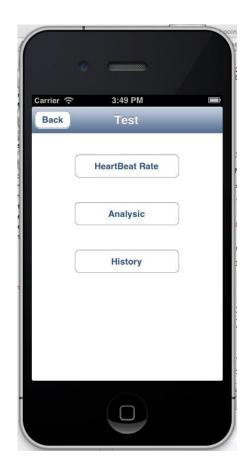
#### **Software**

- -User Interface
- -Sounds Strength
- -AurioTouch



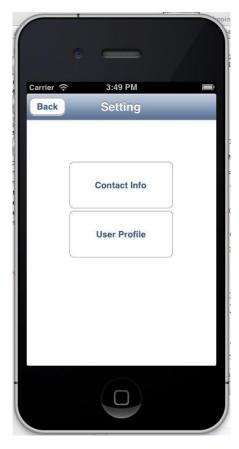
#### **User Interface**







#### **User Interface**



Carrier 중 Back U	3:50 PM Iser Profile	19
Age		
Gender		
Name		

	<sup>49 PM</sup> ■ act Info
Contact 1	
Number	
Contact 2	
Number	
Contact 3	
Number	



#### **User Interface**



Heart sounds are the noises generated by the beating heart and the resultant flow of blood through it (specifically, the turbulence created when the heart valves snap shut). In cardiac auscultation, an examiner may use a stethoscope to listen for these unique and distinct sounds that provide important auditory data regarding the condition of the heart to a trained observer.

In healthy adults, there are two normal heart sounds often described as a lub and a dub (or dup), that occur in sequence with each heartbeat. These are the first heart sound (S1) and second heart sound (S2), produced by the closing of the AV valves and semilunar valves respectively. In addition to these normal sounds, a variety of other sounds may be present including heart murmurs, adventitious sounds, and gallop rhythms S3 and S4.



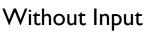
Better Life Technology is consisted of fivemember team, all of whom are confident. skilled, and motivated. Real Yuen, Guntae Park, Jungioo Lee, Seven Yao, and Jesse Yang are all fourth-year engineering students majoring in electronics or systems engineering. All of the members from Better Life Technologies are concern about the heart disease. Therefore they have invented the device - Personal electronics stethoscope.

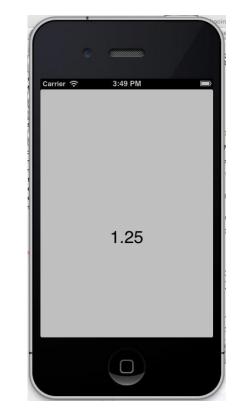
Personal Electronic Stethoscope (PES) is the product that would be utilized to detect and diagnose heart beat rate, and if abnormal heart beat or arrhythmic heart beat is detected, then the abnormal condition message or warning will be shown. This function will help people to preserve themselves, and there will be economic positive effects in medical industries and aovernment.



#### **Sounds Strehgth**







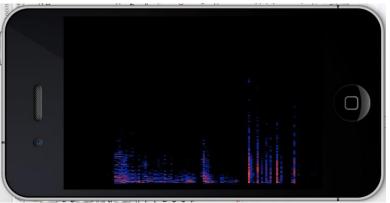
Apply Input



# **AurioTouch**



#### Sonogram Mode



# Better Life System Specifications

### **Challenge for Software**

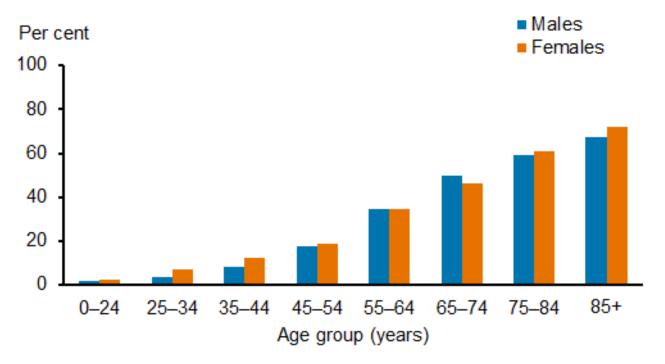
- New Language/Environment
- Real Time Data Analyze



#### People who need our product

-Age above 22

Figure: Proportion of people with coronary heart disease by age and sex in 2007-08





#### **Price for our product**

Categories	Competitor in Market	1 unit of PES	1000 units of PES
Components	N/A	\$49.61	~\$33.95
РСВ	N/A	\$73.92	~\$25
Goal	For doctor	For patient	For patient
Total	\$199~\$399	\$123.53	~\$58.95



# Setter Life Business & Marketing

Comparator

- Public Hospital (Takes Time)
- Private Doctor
  - Normal Body Check
  - ECG test



## Time & Budget

# Time table

Spring 2013			
January	February	March	April
	January January January January		



## Time & Budget

## Budget

Equipments List	Estimated Unit Cost (CAD)	Actual Cost (CAD)
Hardware		
Stethoscope	\$120	N/A
Sound Amplifier	\$35	N/A
PCB Layout Cost	\$100	\$147.84
SMD components (Capacitors, Resistors, Op-amps, voltage regulator etc.)	\$25	\$103.62
Through Hole Components (Capacitors, Resistors, Op-amps etc.)	\$25	\$80.70
Hardware Packaging	N/A	\$30.82
Software		
iOS App development Fee	\$100	N/A
Network Cost	\$100	N/A
Unexpected Cost		
Earphones	N/A	\$13.61
Totals	455	\$376.59



## **Future Work**

#### Hardware

- Need a right voltage regulator application
- Need to find low tolerance SMD components
- Need a new PCB with modified design
- Need to design hardware case using AutoCAD
- Goal to make it lighter and smaller



#### **Future Work**

#### Software

- Combine the existing code
- Sound analyze algorithm
- Filter input signal



# Conclusion

- Accomplish the most we can
- We have learnt a lot
- Future work needed







# Acknowledgement

- Dr. Andrew Rawicz
- Dr. Ash M. Parameswaran
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- Mr. Steve Whitmore
- Mr. Lukas-Karim Merhi
- Mr. Ali Ostadfar
- Mr. Hsiu-Yang Tseng









# Thank You