

Open-source, low-cost, web-guided spirometer

Team: Jeremy Glynn – Team Leader
Jeremy Schaefer– Communications
Andrew Dias – BWIG
Andrew Bremer – BSAC

Week: January 13- February 20, 2009

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Problem Statement

Spirometers are used to diagnose many pulmonary diseases including chronic respiratory diseases that affect approximately 300 million people. Many of these people do not have access to a spirometer because current models are expensive and operation requires the presence of a trained technician. The purpose of this project is to develop a low-cost spirometer capable of measuring lung flows and volumes that can be used by patients without the aid of a trained technician. The project includes the physical design of the spirometer, software development, and designing a universal interface. We envision a first generation device that connects to a computer via a USB port and guides and coaches patients through the testing using digital audiovisual clips. As the procedures are performed, a combination of client and server software will graphically display flow and volume data, monitor and evaluate the quality of the maneuver, and instruct the subject when their performance needs to be corrected. The software should also carry out some rudimentary analysis and interpretation using algorithms that are freely available from the American Thoracic Society. Overall, we hope to develop a tool that would be widely affordable and would standardize pulmonary function measurements by delivering the same instruction and coaching across sites for the first time.

Last Week's Goals

- Create various designs and analyze them with a design matrix
- Begin SolidWorks modeling
- Write audio/visual training and coaching requirements, submit to David and media coordinator
- Experiment with incorporating the pressure sensor in basic circuits.

Accomplishments

- Met with David, Amit and Jon on 2/16 to discuss technical components of design.
- Received pressure sensor
- Received Arduino board and programming manual
- Updated PDS on openspirometry.org website

This Week's Goals

- Experiment with incorporating the pressure sensor in basic circuits.
- Develop and compare approximate costs for various construction options
- Continue SolidWorks modeling
- Investigate air-flow testing methods

Difficulties

- The target market for our product was not well agreed upon prior to Monday's meeting. The customer needs to be clearly defined in order to determine whether a computer or hub-like device will be doing the main signal processing.

Team Effort

Team Member	Accomplishments	Time (Hrs)	Running Total (Hrs)
Jeremy Glynn	Class time, client meeting, SolidWorks Modeling	4.0	15
Andrew Bremer	Class time,, BSAC, EWH meeting, A/V coaching design	4.0	15
Jeremy Schaefer	Class time, client meeting, mouthpiece research	4.0	15
Andrew Dias	Class time, website development, client meeting, PDS work, lab documentation	4.0	15

Project Schedule

PROJECT TASKS AND PROGRESS	Jan.	February				March				April					May	
	29	5	12	19	26	5	12	19	26	2	9	16	23	30	7	14
WORK																
Brainstorming																
Research																
Designing Prototype																
Selecting Prototype																
Obtaining Materials																
Building Prototype																
Testing Prototype																
Modifications																
DELIVERABLES																
PDS																
Mid-Sem. Report																
Mid-Sem. Presentation																
Final Report																
Final Presentation																
Weekly Reports																
Notebooks																
MEETINGS																
Team Meetings																
Client Meetings																
Advisor Meetings																
BSAC Meetings																
OTHER																
Web Page																
Special Lectures																

Expenses to Date:

- No expenses to report at this time.