

Sleep Lab Monitor - Progress Report 6

2/28/09-3/6/09

Project Title:

A combined Thermistor, Pressure, and CO₂ device for use in the Sleep Laboratory

Team Members:

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Problem Statement:

There are three measurements taken from each breath during polysomnography. The following devices are used: a thermistor to detect temperature difference between inhaled and exhaled air, pressure sensors that show a flattening pressure profile during upper airway narrowing, and CO₂ sampling tubes to sense End Tidal CO₂. These three measurements are taken from two different devices placed under the child's nose, with two prongs going into each nostril. This method can be inaccurate if a nostril was to become obstructed, and each device may not sample from both nostrils as well as the mouth. Moreover, the current apparatus may be uncomfortable for the child as well as insecure on the child's face. This could cause a disruption of sleep and a possibility of the devices becoming unfastened during the night. To solve these problems, the goal is to design and develop a prototype that combines these three measuring devices into one apparatus that samples from both of the nostrils as well as the mouth, and attaches to the child in both a durable and comfortable fashion.

Reinstatement of Team Goals from Last Week:

1. Perform the temperature test on Saturday, Feb. 28th
2. Try to obtain a EDF reader to look at actual numbers of data
3. Analyze our results from the sleep lab testing
4. Complete mid-semester presentation

Summary of Team Accomplishments:

1. Performed temperature test on Saturday, February 28th
 - a. Used a glass bottle with our device inside and thermometer and put the glass bottle inside a water bath
 - b. Derived an equation using the voltage divider we built to calculate thermistor resistance
 - c. Lindsey Modified the LabVIEW program to continuously calculate the thermistor resistance, temperature in degrees Celcius
 - d. Performed test by slowly heating up the water bath and recorded thermometer temp, thermistor resistance and temp for each degree change on the thermometer
2. Analyzed results from sleep lab testing and temperature testing
 - a. Nicole wrote up results for the thermistor comparison and distance tests
 - b. Lindsey wrote up results for the temperature test
3. Tried to obtain an EDF reader
 - a. Lindsey found a website that had free downloads of software to convert from EDF format to ASCII, will try it next week
5. Completed mid-semester presentations
6. Client Meeting 11:00a Thursday, March 5, 2009
 1. Concluded we will need a new thermistor that was more for medical applications
 2. Need to make sure it has a very low time constant
 3. He is going to send us a list of pediatric sleep labs to contact
 - i. We could possibly do a simple survey to assess the need for our product

Statement of Team Goals for Upcoming Week:

1. Each member will search and contact a company that sells thermistors for medical applications
2. Complete notebooks
3. Try out the free EDF-to-ASCII converter software

Project Schedule

1/23/09-1/30/09: First client meeting, background research for modifying current prototype

1/31/09 – 2/6/09: Perform background research

2/7/09 – 2/13/09: Background research, modification alternatives
2/14/09 – 2/20/09: Continue to brainstorm for modification ideas, test current prototype
2/21/09 – 2/27/09: Work on design and choose design modification alternatives
2/28/09 – 3/6/09: Complete Mid Semester Presentations
3/7/09 – 3/27/09: Develop modifications and build new prototype
3/28/09 – 4/24/09: Test modified prototype
4/25/09 – 5/1/09: Complete and give Final Presentation, submit notebooks and paper

Team Difficulties:

Contacted Respironics and they are very protective of the specification details they will give us on their thermistors and thermistor channel.

Expenses:

None

Activities and Individual Accomplishments:

Temperature Testing-4: Ran thermistor comparison and distance tests

Client Meeting-1: Discussed results of testing

Nicole – 8: Wrote thermistor comparison and distance test results, contacted respironics about thermistor specs, notebooks/midsemester report

Jason – 5: Developed algorithm to calculate thermistor resistance, midsemester presentation/notebook

Lindsey – 7 hours: Worked on labVIEW program to add features to collect data into an excel file and added algorithms to calculate thermistor resistance and temperature, did individual calculations for thermistor temperature calculations, wrote up temperature test results, notes/midsemester

Robyn – 5 hours: Received samples from Plastics1, updated website, midsemester presentation/notebook

Total hours for this week: 30

Cumulative hours to date: 103.5

Sleep Lab Monitor Gantt Chart Spring 2009												Completed:			
												In Progress/Planned:			
	1/23	1/30	2/6	2/13	2/20	2/27	3/6	3/13	3/20	3/27	4/3	4/10	4/17	4/24	5/1
Background research	Completed	Completed	Completed	Completed											
Test Current Prototype					Completed										
Client Meetings	Completed		Completed		Completed	Completed				In Progress			In Progress		
Meetings with Professors/Tech															
Brainstorm design		Completed	Completed	Completed											
Design Modification alternatives/mat				Completed	Completed										
Midsemester presentation					Completed	Completed	In Progress								
Finalize design ideas							In Progress								
Ordering materials							In Progress	In Progress	In Progress						
Construct modified prototype								In Progress	In Progress	In Progress					
Test modified prototype & Materials								In Progress	In Progress	In Progress	In Progress				
Plan final poster presentation													In Progress	In Progress	
Write final paper												In Progress	In Progress	In Progress	
Final advisor meeting															In Progress

