Quad Rat Vitals Monitor

Week 11 – November 20 to December 3

Team Members: Rob Bjerregaard – Team Leader

Derek Klavas – Communicator

Caitlyn Collins – BSAC

Matthew Bollom– BWIG

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Problem Statement:

The aim of this project is to continue designing and constructing a quad rat vitals monitor to be used during PET imaging experiments in order to maintain appropriate anesthesia dosages on each of the four rats independently. The device will monitor heart rates, SpO_2 levels, respiratory rates, and rectal temperatures. Two main goals for this semester are to design a pulse oximeter probe and show that it can detect the pulse of a rat, while improving the existing prototype by expanding the graphical user interface to incorporate displays of all four vital signals for each of the four rats.

Restatement of Last Week's Goals:

- Check thermistor calibration – recalibrate
- Finalize breathing rate monitor
- Finalize LabVIEW GUI
- Finish construction of pulse oximeter probe prototype

Summary of Accomplishments:

- Recalibrated thermistors
- Incorporated new power source – safer and much less cumbersome
- Finished construction of pulse oximeter probe
- Finished LabVIEW Graphical User Interface, including user adjustable history graphs, chart mark, and everything else the client currently desires
- Constructed a circuit to test detection of pulse (human and rat) using our pulse oximeter probe

- Tested breathing rate detection (great), temperature detection (needed recalibration for new power source), history graph implementation (great), and pulse detection on an anesthetized rat (good)
- Filtered test data, constructed graphs for poster, made poster.
- Tweaked pulse oximeter probe with an extra capacitor, a sort of Faraday cage ground to reduce noise, and a non-inverting amplifier

Team Goals:

Next semester (if we continue with this project):

- Incorporate new pulse oximeter circuit, improve ambient light isolation
- Fabricate three more pulse oximeters
- Print circuit boards and build housing for finished product
- Transfer LabVIEW onto new, faster laptop. Possibly tweak program
- Run test on four rats simultaneously during a PET scan

Activities:

Rob	Rob and Matt: thermistor recalibration / new power supply	11/20/09	3.5 hrs
	Team meeting – pick out new laptop	11/23/09	1 hr
	Finish GUI and pulse ox probe	11/23/09	2.5 hrs
	Construct pulse ox test circuit	11/29/09	3 hrs
	Team meeting – prepare for rat testing	11/30/09	1 hr
	Testing pulse ox, FSR, thermistors, history graphs	11/30/09	1.5 hrs
	Tweak pulse ox circuit – capacitor, non-inverting amplifier, and transfer to breadboard	11/30/09	2 hrs
	Data analysis / Work on poster	11/30/09	3.5 hrs
	Finish poster and pulse oximeter circuit	12/1/09	3 hrs
	Thermistor recalibration (new power supply)	12/2/09	2 hrs
	Prepare for poster presentation	12/3/09	1.5 hrs
Derek	Derek and Caitlyn: pulse ox probe construction	11/20/09	3.5 hrs
	Team meeting – pick out new laptop	11/23/09	1 hr
	Finish GUI and pulse ox probe	11/23/09	2.5 hrs
	Construct pulse ox test circuit	11/29/09	3 hrs
	Team meeting – prepare for rat testing	11/30/09	1 hr
	Testing pulse ox, FSR, thermistors, history graphs	11/30/09	1.5 hrs
	Data analysis / Work on poster	11/30/09	3.5 hrs
	Finish poster and pulse oximeter circuit	12/1/09	3 hrs
	Prepare for poster presentation	12/3/09	1.5 hrs
Caitlyn	Derek and Caitlyn: pulse ox probe construction	11/20/09	3.5 hrs
	Team meeting – pick out new laptop	11/23/09	1 hr
	Finish GUI and pulse ox probe	11/23/09	2.5 hrs
	Obtained components for pulse ox circuit	Thanks-giving	? ?
	Construct pulse ox test circuit	11/29/09	3 hrs
	Team meeting – prepare for rat testing	11/30/09	1 hr

	Testing pulse ox, FSR, thermistors, history graphs	11/30/09	1.5 hrs
	Data analysis / Work on poster	11/30/09	3.5 hrs
	Thermistor recalibration (new power supply)	12/2/09	2 hrs
	Prepare for poster presentation	12/3/09	1. hrs
Matt	Rob and Matt: thermistor recalibration / new power supply	11/20/09	3.5 hrs
	Team meeting – pick out new laptop	11/23/09	1 hr
	Finish GUI and pulse ox probe	11/23/09	2.5 hrs
	Final touches – LabVIEW GUI	?	?
	Construct pulse ox test circuit	11/29/09	3 hrs
	Team meeting – prepare for rat testing	11/30/09	1 hr
	Testing pulse ox, FSR, thermistors, history graphs	11/30/09	1.5 hrs
	Data analysis / Work on poster	11/30/09	3.5 hrs
	Finish poster and pulse oximeter circuit	12/1/09	3 hrs
	Thermistor recalibration (new power supply)	12/2/09	2 hrs
	Prepare for poster presentation	12/3/09	1.5 hrs

Difficulties:

No major difficulties

Project Timeline:

	September			October					November				December
Tasks	11	18	25	2	9	16	23	30	6	13	20	27	4
Project research													
Brainstorming													
PDS													
Design													
Ordering													
Expected shipping													
Device manufacturing													
Testing													
Re-designing													
Re-testing													
Presentation													
Progress report													
Website													