

Tactile Auditory Sensory Substitution - Progress Report 8

3/17/07 – 3/23/07

Project Title: Sensory Substitution Device for Hearing Impairment

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Problem Statement:

The goal is to design and develop an auditory substitution device that through the use of vibro- or electro-tactile stimulation can substitute for regional frequency hearing loss. We will continue the work from last semester, mainly focusing on integrating vibro-transducers into the system in order to prepare the system for laboratory trials.

Statement of team goals:

1. Create problem statement
2. Create first draft of PDS
3. Begin to research and develop design ideas

4. Continue the design project
 - a) Research all possible background information.
 - b) Research existing and design alternatives
 - c) Brainstorm for all possible solutions
 - d) Meet with experts to gain ideas about possible solutions
 - e) Develop possible design solutions
5. Choose final three design solutions
6. Develop final three solutions
7. Create Power point presentation
8. Finish mid semester report, PDS
9. Discuss possible final design alternative
10. Finalize Design
11. Build and test prototype
12. Present final design & poster

Project Schedule

| | |
|-------------|---|
| 1/26 – 2/2 | Choose project, assign roles, meet with client |
| 2/3 – 2/9 | Draft first version of PDS, preliminary design ideas to improve prototype |
| 2/10 – 2/16 | Continue research and write PDS |
| 2/17 – 2/23 | Decide on design alternatives, brainstorm ideas |
| 3/23 – 3/2 | Work on design |
| 3/3 – 3/9 | Work on presentation and report, mid-semester oral presentations |
| 3/10 – 3/16 | Write and hand in written report, PDS, and notebooks |
| 3/17 – 3/31 | Work on design |
| 4/1 – 4/8 | Spring Break and continue to work on design |
| 4/9 – 4/25 | Work on Design, plan tests for the prototype |
| 4/26 – 5/4 | Work on final poster, presentation and report. Test the prototype and present to client. Give final poster presentation |

Last week's goals

1. Further test piezoelectric transducers with different voltage and frequency to try to make them vibrate
2. Look into possible outside help we might require with signal processing/ frequency analysis and electronics.
3. Research alternative vibrotactile stimulators

Summary of Team Accomplishments:

1. The piezoelectric transducers ordered from Digikey were further tested with many different frequencies and voltages but have yet to show signs of vibration.
2. A cell phone was torn apart in order to find the vibrator. The vibrator was then tested with different voltages.
3. Since those transducers could not be vibrated, 4 vibrating disc motors with diameters of 12 mm were ordered
4. Dr. Raymond Kent of the Communicative Disorders department at UW – Madison was contacted

5. Dr. Rick Jenison of the Psychology department at UW – Madison was also contacted to get further information
6. The team met with Dr. Raymond Kent of the Communicative Disorders department and discussed how best to filter human speech and transmit it back to the user.

Statement of Team Goals for Upcoming Week:

1. If the new vibrating motors are received in the mail, they will be tested with different frequencies and vibrations.
2. After testing, the vibrators will be tested with the circuit.
3. Put Dr. Raymond Kent's advice to work.
4. Possible meeting with Dr. Rick Jenison

Team Difficulties:

Stimulating the piezoelectric transducers from Digikey and getting them to vibrate. We ordered vibrating motors which are disc shaped and 12 mm in diameter to test instead.

Activities and Individual Accomplishments:

Team In-class/lab meeting (1 hour)

Monday night meeting – tested Digikey piezoelectric transducers, took apart a cell phone and tested the vibrator with voltage, ordered new vibrating motors – (2 hours)

Tuesday morning meeting with Dr. Kent – (1.5 hours)

Jimmy 1.5 hr Researched further specifications on the piezoelectric transducers

Matt 1.5 hr Donated a cell phone to the project, tore it apart to test the vibrator

Ryan 1.5 hr Contacted Dr. Kent and Dr. Jenison

Jack 1.5 hr Wrote progress report, researched alternative vibrotactile stimulators

Becky 1.5 hr Researched vibrotactile stimulators and piezoelectric transducers

Total hours for this week: 12.5 hrs

Cumulative hours to date: 117.5 hrs

| ID | Task Name | Start | Finish | Duration | Gantt Chart | | | | | | | | | | | | | | | | | | |
|----|---|-----------|-----------|----------|-------------------------|----------|-----|------|----------|------|-----|----------|------|------|------|-----|------|------|--|--|--|--|--|
| | | | | | Feb 2007 | Mar 2007 | | | Apr 2007 | | | May 2007 | | | | | | | | | | | |
| | | | | | 2/18 | 2/25 | 3/4 | 3/11 | 3/18 | 3/25 | 4/1 | 4/8 | 4/15 | 4/22 | 4/29 | 5/6 | 5/13 | 5/20 | | | | | |
| 1 | Research alternative Transducers | 2/16/2007 | 2/23/2007 | 1.2w | [Bar from 2/16 to 2/23] | | | | | | | | | | | | | | | | | | |
| 2 | Research correlation between frequency and phonemes | 2/16/2007 | 3/2/2007 | 2.2w | [Bar from 2/16 to 3/2] | | | | | | | | | | | | | | | | | | |
| 3 | Research technical implementation of transducers | 3/16/2007 | 3/30/2007 | 2.2w | [Bar from 3/16 to 3/30] | | | | | | | | | | | | | | | | | | |
| 4 | Research input and output of audio waveform | 3/2/2007 | 3/9/2007 | 1.2w | [Bar from 3/2 to 3/9] | | | | | | | | | | | | | | | | | | |
| 5 | Brainstorm configurations for system | 2/16/2007 | 3/16/2007 | 4.2w | [Bar from 2/16 to 3/16] | | | | | | | | | | | | | | | | | | |
| 6 | Prepare mid semester presentation | 3/2/2007 | 3/9/2007 | 1.2w | [Bar from 3/2 to 3/9] | | | | | | | | | | | | | | | | | | |
| 7 | Compile mid-semester report | 3/2/2007 | 3/16/2007 | 2.2w | [Bar from 3/2 to 3/16] | | | | | | | | | | | | | | | | | | |
| 8 | Spring Break | 3/30/2007 | 4/6/2007 | 1.2w | [Bar from 3/30 to 4/6] | | | | | | | | | | | | | | | | | | |
| 9 | Obtain transducers | 3/16/2007 | 3/23/2007 | 1.2w | [Bar from 3/16 to 3/23] | | | | | | | | | | | | | | | | | | |
| 10 | Implement transducers | 3/23/2007 | 3/30/2007 | 1.2w | [Bar from 3/23 to 3/30] | | | | | | | | | | | | | | | | | | |
| 11 | Implement transducers (cont'd) | 4/6/2007 | 4/13/2007 | 1.2w | [Bar from 4/6 to 4/13] | | | | | | | | | | | | | | | | | | |
| 12 | Filter signal for frequencies of interest | 4/6/2007 | 4/20/2007 | 2.2w | [Bar from 4/6 to 4/20] | | | | | | | | | | | | | | | | | | |
| 13 | Test and perfect frequency to vibration correlation | 4/20/2007 | 5/9/2007 | 2.8w | [Bar from 4/20 to 5/9] | | | | | | | | | | | | | | | | | | |
| 14 | Prepare for final presentation | 4/27/2007 | 5/9/2007 | 1.8w | [Bar from 4/27 to 5/9] | | | | | | | | | | | | | | | | | | |
| 15 | Compile final report | 4/27/2007 | 5/11/2007 | 2.2w | [Bar from 4/27 to 5/11] | | | | | | | | | | | | | | | | | | |
| 16 | Progress Reports | 2/16/2007 | 5/11/2007 | 12.2w | [Bar from 2/16 to 5/11] | | | | | | | | | | | | | | | | | | |
| 17 | Update Website | 2/16/2007 | 5/11/2007 | 12.2w | [Bar from 2/16 to 5/11] | | | | | | | | | | | | | | | | | | |

***Gantt chart for semester*