Progress Report 10
11/10/06 – 11/16/06

Project Title: 43. Chewing Sounds

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**Problem Statement:**
Obesity is beginning to be recognized as a chronic disease in the United States. Our goal is to design a system to record and display audio data from a person chewing food in order to analyze caloric input. Recent research has suggested that the amplitude and pitch of the audio signal are related to the identity of the food.

**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

**Last week’s goal**
1. Incorporate new microphones into built circuit
2. Finalize and verify the accuracy of our method of obtaining the fourier transform
3. Begin categorizing chewing sounds from available data
4. Develop method to safely attach the microphone to the subject

**Summary of Team Accomplishments:**
1. IRB research consent forms were signed and turned in
2. A design was proposed to embed one of the small microphones in an ear plug
3. Began construction of prototype
4. Materials for constructing a prototype were acquired
5. Successfully visualized sounds using new microphones

**Summary of Individual Accomplishment:**
1. Jimmy- Prototype design and construction
2. Matt- Prototype design and construction
3. Bryan- Continued work with MatLab for signal processing and analysis
4. Aditi- Prototype design, experimented further with recording with cheaper mics
5. Vidhya- Prototype design, recording with cheaper mics, purchased ear plugs

**Statement of Team Goals for Upcoming Week:**
1. Continue work on prototype
2. Finalize our methods for performing the Fourier transform and other signal analysis
3. Record chewing sounds of various foods
4. Devise a system to sort and categorize data based on chewing sound characteristics

**Project Schedule:**
9/8: Choose projects and form group roles. Contact client about meeting.

9/8-9/15: Formulate questions for the client. Read background literature about project.

9/15-9/21: Find more research papers on chewing sounds, Write preliminary PDS, Research microphones

9/22- 9/28: Finalized PDS, Finished background research, Preliminary tinkering with electronics in lab

9/29- 10/5: Build a circuit to display microphone output on oscilloscope, eliminate noise, experiment with new probe microphones, continue Powerpoint

10/6 – 10/12: Determined that the new probe microphones need a different interface to oscilloscope, Attempted to determine frequency response of microphones, continue Powerpoint, started midsemester paper.

10/13 – 10/19: Further work was done to investigate the lower limit of frequency response of the probe. Successfully captured sounds in computer through the oscilloscope. Some pretzel chewing sounds as well as normal speech were recorded. Completed Powerpoint and prepared for presentation, continued work on midsemester paper.

10/20 – 10/26: Delivered presentation, compiled, edited, printed midsemester paper. Explored possibility of using the mastoid process as a location.

10/27-11/2: Successfully combined different microphones and amplifiers. Several miniature microphones were purchased, all are under $6 and have a frequency response down to 20 Hz. Alternative methods of applying the Fourier Transform to recorded data were researched.
**11/3-11/9:** Received microphones from digikey and found the specifications of microphones. Built circuit that powers the microphone and amplifies it if necessary. Bryan continued frequency analysis in MATLAB.

**11/10 – 11/16:** IRB consent forms where signed and turned in. A design was proposed to embed one of the small microphones into an ear plug for a cost-effective prototype. Ear plugs and other necessary supplies were obtained.

### Difficulties:

### Activities:

Team In-class/lab meeting (2 hours)

Jimmy- 2 hr – Prototype construction, part shopping
Matt- 2 hr – Prototype construction
Bryan- 2.5 hr – MATLAB work and research
Aditi- 2 hr– Experimenting and recording with new microphones
Vidhya- 2 hr – Experimenting and recording with new microphones, part shopping

**Team total hours for this week: 10.5 hrs**

**Cumulative team hours to date: 99.5 hrs**

### Design Schedule:
- Semester Wrap Up