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Team Name: RACE (for now)
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PG1

Wearable Medical Glasses

Design Intent

With technological advancements in small, low-power computing, wearable medical devices are a hot research field, growing in popularity. In addition, we have seen wearable, wireless camera technology in the form of "glasses" ala projects such as Google Glass. Taking this trend, a multi-disciplinary research group comprised of professors and students from The University of Massachusetts, The University of Michigan and Yale University seek to build a research platform to investigate medical uses for such a wearable sensor device. The hypothesis is that by combining the camera sensing from the wearable glasses with other sensors, thereby creating a larger picture of the environment, non-invasive and non-medication interventions to mental illness will be possible.

Taking the hardware (and system) capabilities one step further from current systems, we'd like to build a very low power, light set of wireless glasses with an eye-facing camera to track eye movements. Our proposed platform represents a starting point for this multi-disciplinary research team.

Design Requirements

Customer Requirement # (Crxxx)	**Description**
CR001	The device shall be light enough to be worm comfortably for some time.
CR002	The device shall have, at minimum, one camera facing the user's eye, and shall be able to track these movements (off device processing is acceptable).
CR003	The device shall have a method for acquiring data. Wireless would be ideal, but if time constraints dictate, we will have a backup solution prepared (e.g. ethernet).
CR004	The designed device shall operate with very low power consumption, such that it will be suitable to run on a reasonable battery in a later iteration of the project.

Group Agreement

- Hours per week per person:
  - Joe / Akshay: 15-20 hours per week
  - Russ: 30-40 hours per week
- When during the week is each person free:
  - **Joe:** Free all of Friday-Sunday. Free most Wednesday and Thursday nights. Unavailable on Mondays and Tuesdays.

    - **Akshay:** Free Thursday, Friday and Sunday. Free most of Monday, Wednesday and Thursday nights.
    - **Russ:** Free all week outside of class and other project meetings. EECS498 class is MW 3:00-4:30; EECS550 is TTh 12:30-2:00. Meetings are Tuesday 12:00-12:30 and Wednesday 1:00-200. Would like to keep Saturday evening-Sunday afternoon as my "day off", but, of course, will be willing to work if need be.
- Work shall be spread evenly throughout the week.
    - Individual work is ongoing, concentrating primarily M-W. We will work together during weekends, starting Thursday evenings..
    - When we work as individuals we will work on PCB layout and software. The schematic will be worked on in pairs, and the PCB/schematic will be verified by the entire group in one of the weekly meetings.
    - When we meet, we will assign tasks for the coming week to be done individually. Success of the project relies on individuals making progress between group work and meetings.
- General Work Breakdown
    - Initially, we must work in parallel on software and hardware. Initial efforts will involve prototyping camera devices, and investigating the viability of incorporating a wireless radio into the glasses. Hardware design needs to start rather soon, so prototyping must ramp up quickly.
    - **Joe:** In charge of taking notes at meetings, PCB design, general hardware issues (supplying power, noise reduction in circuits, etc.). During research phase, Joe will work on interfacing with different cameras we are trying. We would like to prototype on Arduino (or launchpad if necessary/desirable).
    - **Akshay:** In charge of software and scheduling meetings. During research phase, working on prototyping the hardware (cameras, network interface, battery). Also, requirements gathering, and doing power budget for all of our parts.
    - **Russ:** Initially tasked with gather requirements for the cameras and getting parts rounded up for prototyping. Getting familiar with OpenCV, and developing simple algorithms for eye tracking and perhaps more advanced processing.
- Known Conflicts
    - **Joe:** Out of town for fall break (Thursday-Sunday).
- Thursday night around 6 will be meeting time for a general non-technical meeting. We will discuss work we've done as individuals on Monday, Tuesday and Wednesday and talk about how we will split up work as a group throughout the weekend.