Wearable Light Logger to Facilitate Full Spectrum Light Dosing for Mood Disorders

Date: September 20 to September 26, 2024

Client: Dr. Jean Riquelme
Advisor: Dr. Brandon Coventry
Team:

    Molly Wilhlemson mwilhelmson@wisc.edu (Team Leader, BSAC)
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Problem Statement

Currently, there are no affordable wearable light-logging devices on the market. Full-spectrum light therapy has been proven to be successful in treating mood disorders, especially seasonal affective disorder, but patient response studies are lacking. A wearable allows for accurate representation of light intensities that reach the retina, the presumed site of action. A wearable light logger would provide convenient research into what correct dosages for optimal patient response look like for patients suffering from mood disorders.

Brief Status Update

Last week we met again with our client and advisor. We shared our potential design ideas with the client and got insight into which design the client prefers. With our advisor, we began to investigate the circuitry design and began thinking about what parts we need to purchase. This week we are working on the preliminary presentation and continuing to make progress with the circuitry of our product.

Summary of Weekly Team Member Design Accomplishments

- Team:
  - The team received the light therapy light we ordered and met with our client and advisor again. The team has begun to purchase relevant items for our project regarding the circuitry. We have also created our design matrix ranking possible design options.

- Molly Wilhelmson:

- Researched possible circuit designs and components (2 hrs)
- Worked on our design matrix for the wearable components of the project (1 hr)

- Ella Eklund:
  - Planned out the three wearable aspects of our design for a potential design matrix (1hr)
  - Researched options for light sensors and headlamp options for our project (1hr)

- Neel Srinivasan:
  - Researched code requirements for sensor setup and possibilities of bluetooth connection
  - Researched options for light sensors and their compatibility with Raspberry Pi Pico chips

- Kate Briesemeister:
  - Sketched our 3 potential designs to include in the design matrix document (45min)
  - Researched different light sensors to figure out which will be most compatible with the kind of light and wavelength we are trying to measure (1hr)

Weekly/Ongoing Difficulties

We are still determining what wavelengths our light sensor should respond to.

Upcoming Team and Individual Goals
- Team:
  - Present our design ideas and research at the preliminary presentations
- Molly Wilhelmson:
  - Complete section of the presentation
  - Continue researching components to use in our circuit design
- Ella Eklund:
  - Work on the assigned section of the preliminary presentation
  - Continue researching material options for the circuitry

- Neel Srinivasan:
    - Continue researching coding methods and light sensors
    - Work on preliminary presentation and start coding
- Kate Briesemeister:
    - Work on assigned section of the preliminary presentation
    - Continue to investigate basic circuitry design and assist group members in making a preliminary circuit

Project Timeline

Project Goal	Deadline	Team Assigned	Progress	Completed
Meet with client	09/13	All	100%	Yes
→ Product Design Specification	09/20	All	100%	Yes
Preliminary Presentations	10/4	All	10%	No
Preliminary Deliverables	10/9	All		
Show and Tell	11/01	All		
Poster Presentations	12/06	All		
Final Deliverables	12/11	All		

Expenses

Item	Description	Manufacturer	Part Number	Date	QTY	Cost Each	Total	Link
Component 1								
Happy Light	Light for testing sensor	Verilux	N/A	9/13/24	2	$49.99	$99.98	Link
Component 2								
Battery	Battery for chip	PGSONIC	CR2045	9/19/24	1	$1.15	$1.15	
Component 3								
Head Lamp	Light that attaches to head	Fire Supply Depot	FL8210-6SMD	9/26/24	1	$11.92	$11.92	Link
TOTAL:								**$113.05**