ChargeForge: gang charging system for newly developed physiological monitoring device

Client: Ms. Isabel Erickson
Aptima Inc.

Alternate Contact: Mr. Kevin Durkee

Advisor: Prof. Chris Brace

Team: Allison Rausch (Team Leader)
Jake Maisel (Communicator)
Yeanne Hwang (BSAC)
Kenan Sirlioglu (BWIG)
Luke Blaska (BPAG)

Date: September 9, 2024 - September 13, 2024

Problem Statement

A new wearable device for physiological monitoring, specifically designed for occupational safety in environments like heat stress and confined spaces, is currently being developed. The design contains a hard-shelled carrying case which provides protection but lacks trays that can connect physiological sensing devices with charging cables. Thus, the team is tasked to design and fabricate a gang-charging system to help solve this problem effectively and efficiently. Overall, the design should be able to transport, charge, and recuperate 40-50 sensors. The charging system ideally should indicate charge and UV levels. The final design should balance cost, durability, and manufacturability.

Brief Status Update

The team is currently working on understanding the goal of the project and has begun researching background information on the properties and dimensions of Pelican Cases, cost-effective and durable materials for trays, and the mechanisms behind UV detection and display. Currently, the team has set up its first in-person meeting with the client and with the advisor on the project. The team is working diligently to create a list of questions to ask during both meetings to gain a better understanding of the expectations for the project by the end of the semester and a better understanding of the task.

Summary of Weekly Team Member Design Accomplishments

- Team:
    - Assigned new team members to the project

    - Assigned team roles
    - Completed first team meeting to complete the first-day checklist
- Allison Rausch
    - Researched the pelican case
    - Started researching the mechanisms of the sensors
    - Created and shared the LabArchive notebook to begin documenting the design journey
    - Started Progress Report 1
- Jake Maisel
    - Reached out to the client to set up a meeting to ask questions about the project.
    - Started my research into materials for the charging system
- Yeanne Hwang
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- Kenan Sirlioglu
    - Updated our team's website with the first progress report and team photo
- Luke Blaska
    - Began research and became familiar with the devices that we will be charging
    - Came up with questions for the client

Weekly/Ongoing Difficulties

The team is excited to meet with the advisor and client for more information and for a better understanding of the expectations for the semester. There have not been any obstacles to overcome this week as the team settles in.

Upcoming Team and Individual Goals

- Team:
    - Meet with the advisor to set semester project and communication expectations
    - Meet with the client and ask questions to begin drafting the Product Design Specification document
    - Continue researching and updating the LabArchives team notebook
- Allison Rausch
    - Create a list of questions based off the PDS to ask the client
    - Update the project information section of the team notebook and add the problem statement
    - Continue researching the mechanisms for UV and charge detection and display
- Jake Maisel
    - Add questions to our client meeting list
    - Research more about charging systems and physiological devices
    - Research codes and standards for the PDS
- Yeanna Hwang
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- Kenan Sirlioglu
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- Luke Blaska
    - Complete advisor and client meetings and gain more clarity about the project
    - Do more specific research once we receive more details like possible materials and what electronics we would need for displaying charges

Project Timeline

Project Goal	**Deadline**	**Team Assigned**	**Progress**	**Completed**
Product Design Specification (PDS)	September 19, 2024	All	25%	
Design Matrix	September 20, 2023	All	0%	
Preliminary Presentations	October 4, 2024	All	0%	
Preliminary Deliverables	October 9, 2024	All	0%	
Show and Tell	November 1, 2024	All	0%	
Poster Presentations	December 6, 2024	All	0%	
Final Deliverables	December 11, 2024	All	0%	

→ Arrows indicated dependencies