Dynamic Balance Device, BME 200/300

Client: Mr. Daniel Kutschera

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Problem Statement

Many elderly people–especially those who have suffered from strokes–sustain lasting mobility problems as they attempt to recover and return to "everyday" life. Currently, the solutions for physicians to use in addressing this issue are either too expensive to easily acquire, or are inadequate and are too hard to use while giving sufficient attention and support to the patient. The goal of this project is to provide a solution that remedies the issues with current designs at an affordable cost.

Brief Status Update

This week, the team shared our design with our peers during show and tell. We got feedback on various aspects of the design. We also met with our client to discuss our design and the progress we have made so far. We also clarified some design requirements and expectations with our client. Moving forward, the team will discuss the feedback received from our peers during show and tell and edit our designs if necessary.

Summary of Weekly Team Member Design Accomplishments

- Team:
    - Met with our client to discuss our design progress and next steps.
    - Shared our design with our classmates and got feedback during show and tell.
- Gabriela:
    - Gathered feedback on different parts of the design at the show at tell
    - Did research on suggestions given by people at the show and tell

- Gracie:
    - Met with our client to discuss our design and clarify some design specifications.
    - Continued to research pressure sensors and speakers for our circuit design.
- Jack:
    - Improved handle designs on Onshape
    - Designed a box for the display unit on Onshape
    - Researched for different display box and handle design improvements
- Kyle:
    - Researched capacitive and pressure sensors for a feedback loop from the screen
    - Received grove buzzer
    - Looked into code for the grove buzzer

Weekly/Ongoing Difficulties

An ongoing difficulty is finding time for our group to meet. We all have very busy schedules and we are entering midterms this and next week. Many aspects of our design require hands-on work, so it is difficult for the team to make a lot of progress on the design when we have trouble finding times to meet.

Upcoming Team and Individual Goals

- Team:
    - Finalize circuit materials and order them.
    - Continue to create models of the display screen box.
- Gabriela:
    - Make changes to the handles and 3D print the new ones
    - Finalize all necessary parts of the design on Onshape
    - Finish research on pressure sensors
- Gracie:
    - Finalize circuit design and order necessary materials.
    - Continue to research microcontrollers that are smaller than the arduino.
- Jack:
    - 3D print new handles and potentially the display box
    - Research screens and pressure sensors
    - Order pressure sensors and screen
- Kyle:
    - Make code for the buzzer that will be compatible with the Arduino

- ○ Order pressure sensor and acrylic material
- ○ Begin looking into number lamination on the carbon fiber

Project Timeline

Project Goal	Deadline	Team Assigned	Progress	Completed
Preliminary Presentations	Oct 4	All	Completed	Yes
Preliminary Deliverables	Oct 9	All	Completed	Yes
Show and Tell	Nov 1	All	–	Yes
Poster Presentations	Dec 6	All	–	No
Final Deliverables	Dec 11	All	–	No

Expenses

Item	Description	Manufacturer	Part Number	Date	QTY	Cost Each	Total	Link

Component 1								
LED Matrix	An LED matrix that should be easy to wire and Arduino, the main component of display panel.	Loamlin	WS2812B	10/17/2024	1	$12.51	$12.51	link
Component 2								
Carbon Fiber Shaft	Piping that we're using for the length of the rod itself, carbon fiber casing, should be lightweight yet very durable	Carbon Kevlar Supply	843728109361	10/17/2024	1	$47.46	1	link
Component 3								
Arduino Buzzer	Buzzer that we should be able to hook up to a capacitive sensor to create an audible feedback for the patient	Arduino Store	C000143 107020000	10/31/2024	1	4.14$	$4.14	link
TOTAL:								**$59.97**