Dynamic Balance Device, BME 200/300

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Date: October 18 to October 24, 2024

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

Our team received the materials for our prototype and are going to start experimenting with the LED screen and various handle designs. We have developed the framework for multiple handles in SolidWorks and Onshape and are going to begin 3D printing them. We also drafted a testing and prototyping plan that will optimize feedback at the show and tell.

Summary of Weekly Team Member Design Accomplishments

- Team:
    - Got the materials for the shaft and the LED display
    - Made progress on OnShape and SolidWorks modeling of the device
    - Drafted a testing and prototyping plan for the following week aiming for getting feedback at the show and tell
- Gabriela:
    - Started modeling the device on SolidWorks to perform mechanical testing

    - Went to the MakerSpace and got information on the most appropriate material to use to 3D print the handle.
- Gracie:
    - Researched how to supply power to an arduino as well as materials to connect a battery to an arduino.
    - Began prototyping the electronics portion of the design.
- Jack:
    - Continued prototyping different handles on Onshape
    - Researched different 3D printer filaments that would be best suited for the handle and if we can mix different filaments
- Kyle:
    - Received materials, cataloged purchases in accounting spreadsheet.
    - Researched Arduino capabilities and how the LED's work
    - Experimented with the LED panel and looked at the wiring

Weekly/Ongoing Difficulties

The biggest challenge we encountered this week was trying to decide how we were going to produce a handle for this device. While we looked online for some simple ones, we decided that with the battery pack and wiring that we'll need, it may be easier to fabricate one ourselves, and we have started looking into prototyping that, along with the electronics.

Upcoming Team and Individual Goals

- Team:
    - 3D print different handle designs for the show and tell
    - Perform testing on the different parts of the device
- Gabriela:
    - Finish the mechanical testing simulation of the device on SolidWorks
    - Do research on ways to code the LED display
    - 3D print a rough prototype of the handle for the show-and-tell
- Gracie:
    - Continue to develop the electronics portion of the device.
    - Begin determining the materials required for the circuit design.
    - Begin designing a box for the display screen.
- Jack:
    - Go to the makerspace and print out one to two handles for show and tell
    - Finish Onshape designs
- Kyle:

- Look at company instructions for how to wire the LED Panel
- Begin developing testing plans and weight structures for the device

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	–	No
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	1	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								

TOTAL:								**$59.97**