Smart Walker

Client: Mr. Daniel Kutschera

Advisor: Prof. Justin Williams

Team Members: Nicolas Maldonado, Shreya Venkatesh, Navya Jain, Xicheng Yang

Name	Email	Role
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Shreya Venkatesh	svenkatesh9@wisc.edu	Communicator
Navya Jain	njain52@wisc.edu	BPAG & BWIG
Xicheng Yang	xyang622@wisc.edu	BSAC

Problem statement:

The client, a physical therapist working in neuro-rehabilitation, has several patients with traumatic brain injury who use walkers as transition devices. He needs a smart walker for his patients that can objectively measure gait speed, distance walked, and the weight/force applied through the walker. Data is required by Medicare to demonstrate progress and efficacy, but can also help improve clinical assessment and motivate patients as they work to reduce device dependence. Currently, quantitative measurements are taken manually, which is time-consuming and incomplete, as there is no way to measure weight-bearing. Two prototypes have been made by modifying an existing walker, but this compromises structural integrity and is not viable for patient testing. The main goal is to develop a safe, attachable assessment device that provides real-time, clinically relevant gait and weight-bearing data for use with standard walkers by clinicians and patients.

Brief status update:

As a team, we purchased materials and discussed designs for hardware circuitry. We have also printed all the required parts for the end cap. We are fabricating a housing for the mmwave radar and planning out more detailed circuitry and soldering options.

Difficulties/advice requests:

Nothing at the moment.

Major team goals for the next week

1. Outline testing methods
2. Soldering
3. Begin market research and get feedback

Next week's individual goals

Navya:

- Finalise all material purchases
- Edit the protocol document
- Write fabrication and testing protocols

Shreya:

- Research and write up testing procedures
- Begin writing fabrication plans

Nicolas:

- Continue prototyping housing for mmWave radar and load cells
- Begin planning the circuit configuration

Xicheng:

- Build a working app sample

Timeline

Task	January		February				March				April				
	23	29	5	12	19	26	5	12	19	26	2	9	16	23	29
Project R&D	/	/	/	/	/	/	/	/							
Empathize															
Background…		X	X	X	X	X	X	X							
Prototyping							X	X							
Testings															
Deliverables															
Progress Reports		X	X	X	X	X	X	X							
Prelim presentation						X									
Final Poster															
Meetings															
Client			X				X								
Advisor		X	X	X	X	X	X	X							
Website															

Update	X	X	X	X	X	X	X	X							

Filled boxes = projected timeline
X = task was worked on or completed

Previous week's goals and accomplishments

Complete 3D printing, outline hardware fabrication, order materials.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Nicolas Maldonado	11/03/26	CAD design of the mmWave radar + load cell housing	1.5		16
Shreya Venkatesh	06/03/26	Research, testing, and fabrication methods	1	1	16.25
Navya Jain	06/03/26 11/03/26	Researched and ordered materials Research for testing protocols	0.5 1	1.5	16.5
Xicheng Yang	07/03/26 12/03/26	Learn how to use swift Initialize a swift app project	1 1	2	18.5

Current design

No current design to report.

Materials and expenses

Other files

Product Design Specification

Design Matrix

Preliminary Presentation

Preliminary Report