Smart Walker

Client: Mr. Daniel Kutschera

Advisor: Prof. Justin Williams

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

Name	Email	Role
Nicolas Maldonado	namaldonado@wisc.edu	Leader
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:

- Research and write testing procedures
- Begin fabrication
- Begin writing fabrication protocls

Shreya:

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

Nicolas:

- Begin fabrication
- Continue rapid prototyping design

Xicheng:

- App improvement
- Add Arduino & sensor app support

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	X						
Prototyping							X	X	X						
Testings															
Deliverables															
Progress Reports		X	X	X	X	X	X	X	X						
Prelim presentation						X									
Final Poster															
Meetings															
Client			X				X								
Advisor		X	X	X	X	X	X	X	X						

Website															
Update	X	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	17/03/26 19/03/26 20/03/26	Worked on changes to CAD design Worked on changes to CAD design Team Fabrication	1 0.5 2	3.5	16
Shreya Venkatesh	18/03/26	Create basic testing protocol	1	1	17.25
Navya Jain	17/03/26	Researched more on testing protocols	0.5	0.5	17
Xicheng Yang	13/03/26 15/03/26 17/03/26	BSAC meeting App update Research on the TI mmWave sensor pins	1 3 .5	4.5	22.5

Current design

No current design to report.

Materials and expenses

Other files

Product Design Specification

Design Matrix

Preliminary Presentation

BME Design: 200, 300, 301, 400 and 402

Preliminary Report