

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
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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 have been testing out circuitry, soldering final connections, and beginning testing procedures with the plan of receiving data this weekend.

Difficulties/advice requests:

Nothing at the moment.

Major team goals for the next week

1. Soldering and final connections
2. Testing (Load cell, mmWave radar, overall system with app) and User feedback
3. Start poster

Next week's individual goals

Navya:

- Work on poster
- Testing
- Practice presentation

Shreya:

- Start poster
- Get materials for testing and data analysis completed

Nicolas:

- Work on poster
- Testing

Xicheng:

- Poster
- testing

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	X	X	X			
Testings															
Deliverables															
Progress Reports		X	X	X	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	X	X	X			

Website															
Update	X	X	X	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	14/04/26	Solder load cell components + test	1	6	25.5
	15/04/26	Fabrication + executive summary	2.5		
	16/04/26	Fabrication	2.5		
Shreya Venkatesh	14/04/26	Test the load cell and mmwave radar individually	2	4	23.5
	15/04/26	Test of tracker software and write mmwave radar procedure	1		
	16/04/26	Test mmwave radar system	1		
Navya Jain	13/04/26	Worked on soldering load cell and load cell amplifier	2	4	23.5
	15/04/26	Worked on poster and executive summary	0.5		
	16/04/26	Worked on executive summary	0.5		
	16/04/26	Researched more about the testing protocol	1		
Xicheng Yang	10/04/26	BSAC meeting	1	9	
	13/04/26	Fabrication meeting	2		
	13/04/26	Fabrication problem solving	2		
	15/04/26	Load cell assembly	2		
	16/04/26	Pi and radar software	2		

Current design

No current design to report.

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

[Materials and expenses](#)

Other files

[Product Design Specification](#)

[Design Matrix](#)

[Preliminary Presentation](#)

[Preliminary Report](#)

[Executive Summary](#)