

Smart Walker

Client: Mr. Daniel Kutschera

Advisor: Prof. Darilis Suarez

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 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 it 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 clinicians and patients to use with standard walkers.

Brief status update:

As a team, we ordered all required materials, reprinted the load cell housing, and also worked on improving our software. We started the IRB forms and held a client meeting to update them on the IRB process. We will continue assembling the ordered items with the new 3D-printed parts tomorrow.

Difficulties/advice requests:

Nothing at the moment.

Major team goals for the next week

1. Incorporating all ordered components into the system
2. Load cell recalibration
3. mmWave radar program research and software changes.

Next week's individual goals

Navya:

- Work more on the code, specifically improving distance values
- Work on IRB application and set up meeting with Reliance

Shreya:

- Put together load cell system with new board
- Complete load cell testing and recalibration

Nicolas:

- Assembly load cell housing
- Calibrate/test load cells

Xicheng:

- Radar code reconstruction
- Work with team load cell testing, prepare for possible app improvements

Timeline

Task	September			October					November				December	
	10	17	24	1	8	15	22	29	5	12	19	26	3	10
Project R&D														
Empathize	X	X	X	X	X	X	X							
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							
--------	---	---	---	---	---	---	---	--	--	--	--	--	--	--

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

Get to know teammates, outline roles and responsibilities, create a communication plan.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Nicolas Maldonado	17/10/26 19/10/26 20/10/26 20/10/26	CAD polishing Team meeting Client meeting Printed new load cell housing	0.5 1 0.5 0.5	2.5	17
Shreya Venkatesh	17/10/26 19/10/26 20/10/26 21/10/26	Researched possible materials to order Team meeting #2 client meeting Researched procedures for human testing	1 1 0.5 1	3.5	12.5
Navya Jain	18/10/26 19/10/26 20/10/26	Ordered materials and worked on IRB application Team meeting Client Meeting	1 1 0.5	2.5	17.75
Xicheng Yang	17/10/26 19/10/26 20/10/26 22/10/26	Material ordering team meeting Merge navya's sensor code update Client meeting Research on campus android dev support	1 .5 1 1	3.5	21

Current design

No current design to report.

Materials and expenses

[Material Expense Sheet](#)

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

Documentation

[Product Design Specification](#)

[Design Matrix](#)

[Preliminary Presentation](#)

[Preliminary Report](#)