

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 use with standard walkers by clinicians and patients.

Brief status update:

As a team, we spent time researching code for the mmWave radar sensor and other possible distance/speed sensors. We also completed our first client meeting last week to realign our goals and scope for the semester. Our advisor gave us some great resources to reach out to for future patent-related pathways.

Difficulties/advice requests:

Nothing at the moment.

Major team goals for the next week

1. Pick material for electrical housing design
2. Start secondary testing for load cell calibration
3. Make program changes to mmWave radar

Next week's individual goals

Navya:

- Research how to improve distance measurement accuracy in mmWave radar
- Research non-linear distance measurement method
- Come up with new design for load cell housing that takes into account the angle at which load is applied

Shreya:

- Research mmWave radar configuration code
- Create procedure for load cell calibration
- Research replacement materials for electrical housing

Nicolas:

- Background research

Xicheng:

- Review all codes from last semester
- Research on possible non-linear distance measurement solutions

Timeline

Task	September			October					November				December	
	10	17	24	1	8	15	22	29	5	12	19	26	3	10
Project R&D														
Empathize														
Background...														
Prototyping														
Testings														
Deliverables														
Progress Reports														
Prelim presentation														
Final Poster														
Meetings														
Client														
Advisor														

Website														
Update														

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	11/09/26 17/09/26	Client meeting Research load cell housing structures	0.5 1	1.5	2.5
Shreya Venkatesh	11/09/26 15/09/26	Client meeting Write new load cell calibration procedure Research electrical housing 3d printing materials	0.5 0.5 1	2	3
Navya Jain	11/09/26 17/09/25	Client meeting Research on load cell housing angle issue and non-linear distance measurement	0.5 1	1.5	2.5
Xicheng Yang	11/09/25 11/09/25 17/09/25	BSAC meeting Client meeting Research on ios to android app porting	1 0.5 1	2.5	3.5

Current design

No current design to report.

Materials and expenses

No current design to report.

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

Documentation

[Product Design Specification](#)