

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 spent time researching code for the mmWave radar sensor. We also worked on our design matrix for substitute materials for the electrical housing and also designs for the end cap. Additionally, we started planning secondary load cell testing with a new print of the end caps.

Difficulties/advice requests:

Nothing at the moment.

Major team goals for the next week

1. Make program changes to mmWave radar
2. 3D print the endcaps
3. Look at human testing requirements and training

Next week's individual goals

Navya:

- Update load cell calibration protocol
- Research non-linear movement detection with radar

Shreya:

- Research replacement materials for electrical housing
- Worked on design matrix
- Create procedure for load cell calibration

Nicolas:

- Reprint all housing components with changes made

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															
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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	09/20/26 09/24/26	Redesign research Redesign work	0.5 1.5	2	4.5
Shreya Venkatesh	23/09/26	Electrical Housing Materials Research Team meeting Design Matrix	1 1 0.5	2.5	5.5
Navya Jain	20/09/26 23/09/26 23/09/26 24/09/26	mmWave Radar distance measuring research Team meeting Design matrix Housing unit material research	0.5 1 1 0.5	3	5.5
Xicheng Yang	23/09/26 24/09/26 24/09/26	Design matrix team meeting Software design matrix Research on flutter sdk	1 1 .5	3	6

Current design

No current design to report.

Materials and expenses

No current design to report.

Documentation

[Product Design Specification](#)

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

[Design Matrix](#)