

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 spent time understanding the problem statement, purpose, and topic. We each did background research, had a client meeting on February 2, and completed the first draft of the Product Design Specification.

Difficulties/advice requests:

Nothing at the moment.

Major team goals for the next week

1. Finish ordering of materials
2. Start discussing new design ideas
3. Begin on the design matrix

Next week's individual goals

Navya:

- Brainstorm design ideas
- Work on the design matrix
- Finalise materials that need to be ordered

Shreya:

- Do research on sensors in the market to order
- Brainstorm design ideas for attachments

Nicolas:

- Design possible designs in CAD to get a rough idea of possible directions
- Model all existing components, including end caps, walker, etc.

Xicheng:

- Design matrix
- Finalize items needing upgrade (UWB, bluetooth, pressure sensor)

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

| | | | | | | | | | | | | | | | |
|----------------|---|---|---|--|--|--|--|--|--|--|--|--|--|--|--|
| Website | | | | | | | | | | | | | | | |
| Update | 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) |
|-------------------|--|--|--------------------------|----------------|----------------|
| Nicolar Maldonado | 02/02/26 03/02/26 02/02/26 04/02/26 | Client meeting PDS work Did research on possible load sensors at different price points Explored the possibility of integrating a load sensor into the existing end cap | 0.5 1 0.75 0.75 | 3 | 4.5 |
| Shreya Venkatesh | 02/02/26 02/02/26 05/02/26 05/02/26 | Client Meeting Completion of PDS sections PDS review Research on real-time monitoring attachments | 0.5 1 0.5 1 | 3 | 5.5 |
| Navya Jain | 02/02/26 03/02/26 04/02/26 | Client Meeting Worked on PDS More research on UWB sensors | 0.5 1 0.5 | 2 | 2 |
| Xicheng Yang | 01/30/26 02/04/26 02/05/26 | BSAC meeting PDS part 3 miscellaneous Competitive design research | 1 1.5 1 | 3.5 | 6 |

Current design

No current design to report.

Materials and expenses

No current design to report.

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

Other files

[Product Design Specification](#)