

Smart Walker

Progress Report 8: 11/06/2025

Client: Mr. Daniel Kutschera

Advisor: Duc-Huy Nyugen

Team:

- Leader: Nicolas Maldonado
- BSAC: Carolyn Randolph
- Communicator: Aidan Burich
- BWIG: Nial Donohoo
- BPAG: Henry Salita

Problem Statement: Mr. Daniel Kutschera a physical therapist working in neuro-rehabilitation needs objective, real-time data from walker use to guide therapy and meet documentation needs required by medicare. Today these metrics are gathered manually (wheel + stopwatch) and do not quantify load, making measurements inconsistent and hard to track. Earlier attempts to add sensors by modifying frames have compromised walker safety and usability. We need a small, lightweight, clip-on module for common walkers that shows speed, distance, and how much weight the user puts through the walker in real time, saves a short session summary after each use, and doesn't change how the walker is used or folded. Our budget to complete this is \$500.

Brief Team Status Update: The team has made significant progress in terms of circuitry. We have the LiDAR sensor in mostly working order and are approaching the testing phase. We have created custom molds for the load sensors and will continue to develop them.

Summary of Weekly Individual Design Accomplishments:

- Nicolas Maldonado: Worked on the load sensor calibration and general research on arduino
- Carolyn Randolph: Soldered the load cell wires for better connectivity, built a platform for load cell calibration and continued to work on finding calibration value.
- Aidan Burich:
- Nial Donohoo: Did additional research on load sensor calibration. Looked into laser pointer devices to put on top of lidar sensor to make sure its pointed in the correct direction.
- Henry Salita: Worked on designing clamps or pressure holders for walker leg, as well as other 3D design modifications.

Weekly/Ongoing Difficulties: We are currently troubleshooting the load sensors in order to get them calibrated correctly

Upcoming Team Goals: Finish all circuits and begin testing and housing development

Upcoming Individual Goals:

- Nicolas Maldonado: Have working electronics to continue to housing development and testing
- Carolyn Randolph: Finish calibration and start integrating different components into combined system.
- Aidan Burich: Continue to work on bugs in load cell code. Obtain batteries for Arduino.

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- Nial Donohoo: Purchase the rest of necessary parts, get sensors to work to continue to work on the housing component.
- Henry Salita: Print functional pressure clams for walker legs, and do research to understand how our load cells function.

Project Timeline

Project Goal	Deadline	Team Assigned	State of Completion
Initial Research	9/12	All	The team will continuously research throughout the semester.
Product Design Specifications	9/18	All	The PDS has been completed
Design Matrix	10/3	All	Complete
Preliminary Presentation	10/3	All	Complete
Preliminary Report	10/8	All	Complete
Customize Load Cell sensor holder	10/24	Henry Salita	First iteration is done
Initial Fabrication - Circuitry and Coding	11/7	All	In progress

Expenses

Item	Description	Manufacturer	Part Number	QTY	Cost Each	Total	Link
Walker	2-wheel walker, gifted by client	Performance Health Supply, Inc.	081561703	1	\$136.73	\$0	Performance Health
Load Cell initial 3D print	3D print of End-Cap 2.0 design gifted by friend with printer.	bambu lab a1 mini	N/A	1	\$1.60	\$0	N/A

