Dynamic Balance Device

Date: 03/15/2026 - 03/21/2026

Client: Mr. Daniel Kutschera
Advisor: Professor Monica Ohnsorg

Team:

Kat Sattel - Team Leader (sattel@wisc.edu)

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Problem statement: Patients that have suffered strokes have a 25-30% rate of developing spatial neglect syndrome. Symptoms of spatial neglect syndrome include loss of awareness of the body in space. Our client, Dr. Kutschera, a physical therapist, helps patients to regain strength and balance following a stroke. The client seeks to develop a device that can be used to improve visual scanning and balance training that is an update from the previous yard-stick design. The device should be mutli-functional so as to help patients with varying degrees of need and be effective in the rehabilitation treatment.

Brief status update: This week, the team started making the circuitry, updated and printed a preliminary CAD model, and prepped for show and tell.

Difficulties / advice requests: None to report

Current design:

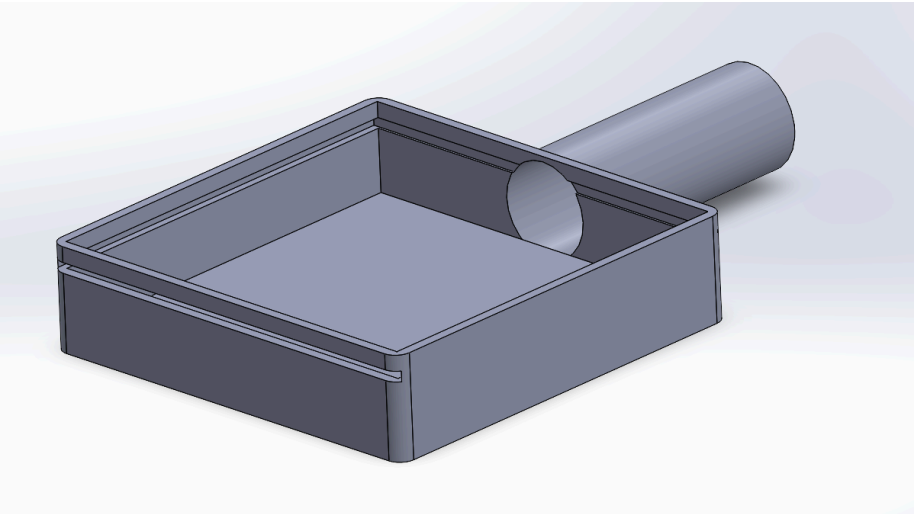

Figure 1: CAD Model of the Display Portion of the Design

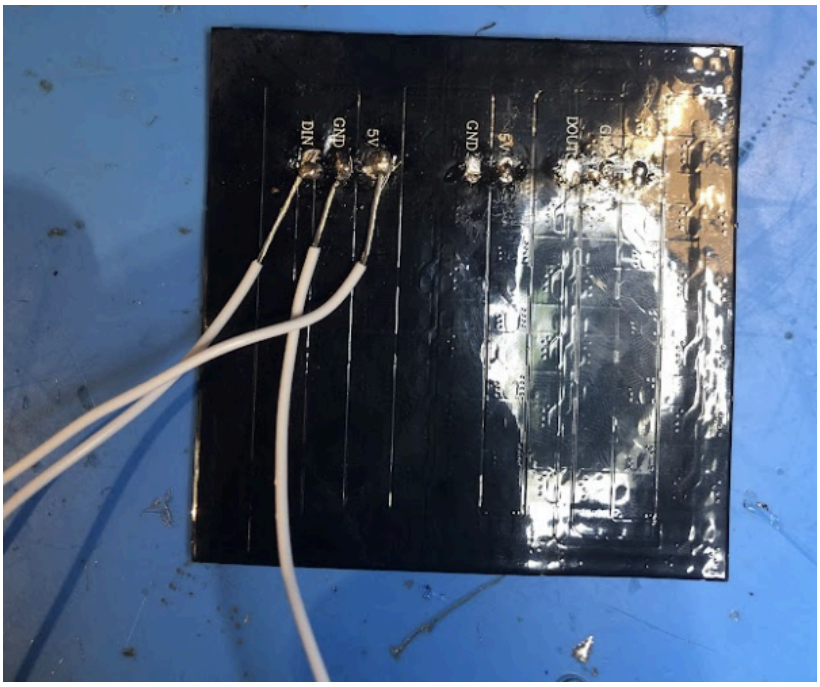

Figure 2: Backside of the LED Display with Soldered Wires.

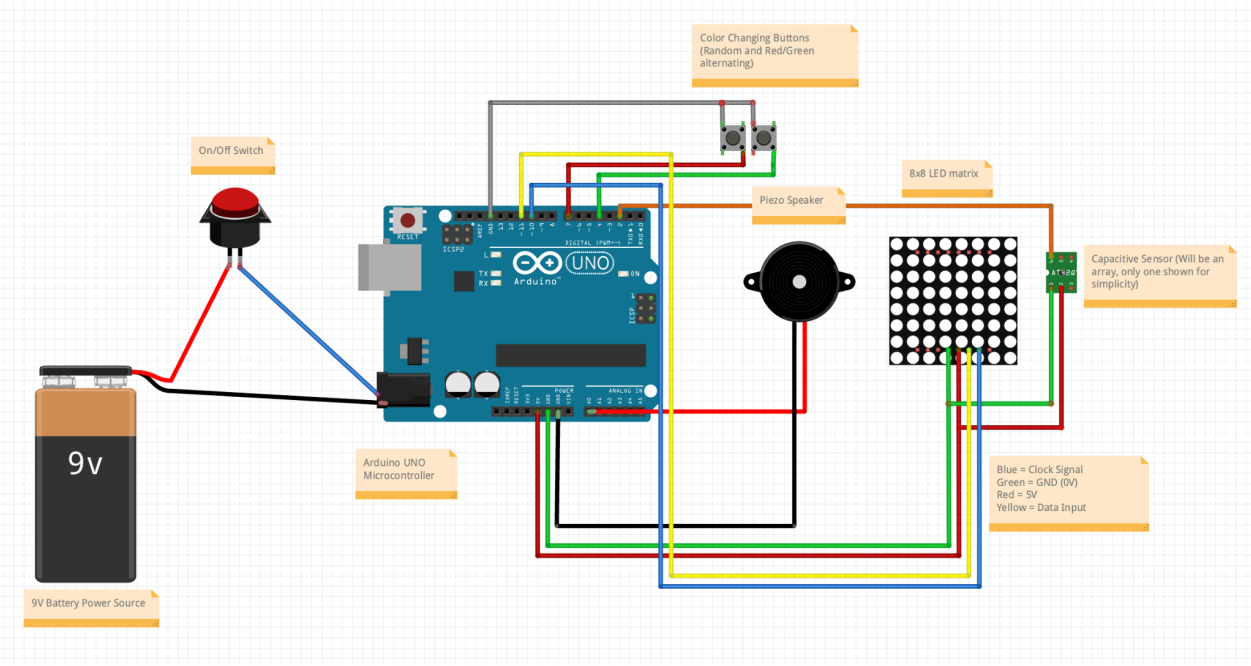

Figure 3: Fritzing Diagram of Circuitry for the Entire Device

Materials and expenses

See table below:

Item	Description	Manufac-turer	Mft Pt#	Vendo r	Vendo r Cat#	Date	#	Cost Each	Total	Link
Materials										

Carbon Fiber Tube	1m long, 20mm outer diameter, 18mm inner diameter	CHZDPP	B0DJJTX3SQ	Amazon	B0DJJTX3SQ	3/9/2026	1	$48.49	$48.49	Amazon.com
3D Filament	3D Printed portion	Makerspace	n/a	Makerspace	n/a	3/18/2026	1	$1.89	$1.89	https://making.engr.wisc.edu/
Electronics										
Capacitive Touch Sensor Switch	Sensor	Arduino	TTP223B	Ebay	TTP223B	3/9/2026	1	$8.32	$8.32	Ebay.com
9v battery	Battery	Vetco Electronics	VUPN8981	Shopify	VUPN8981	3/9/2026	1	$0.75	$0.75	Vetco Electronics
Tactile switch	Button	Vetco Electronics	TEA-5144	Shopify	TEA-5144	3/9/2026	2	$0.89	$1.78	Vetco Electronics
Waterproof Switch	On/Off switch	Vetco Electronics	NTE-54-250W	Shopify	NTE-54-250W	3/9/2026	1	$9.99	$9.99	Vetco Electronics
Speaker Module	Speaker	Vetco Electronics	VUPN6344	Shopify	VUPN6344	3/9/2026	2	$4.21	$16.21	Vetco Electronics
								TOTAL:	**$87.43**	

Major team goals for the next week

1. Finish circuitry
2. Design and print handle
3. Begin manufacturing with carbon fiber rod

Next week's individual goals

- Kat Sattel
  - Finish circuitry
  - Finish writing testing protocols
- Therese Kalt
  - Finish the handle portion of the design in CAD
  - Finish writing testing protocols
- Noor Awad
  - Finish circuitry
  - help finalize CAD design and print
- Freyja Heggeland

- Finish circuitry and testing protocols
- Begin constructing physical design with cheaper materials and discuss with team

Timeline

Task	Week				Week					Week				Week	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Project R&D															
Empathize	X														
Background…	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		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

- Kat Sattel
  - Started writing fatigue testing protocol
  - Worked on circuitry
  - Helped print initial CAD model
- Therese Kalt
  - Created initial and updated CAD model for display portion of the design
  - Printed both the initial and updated CAD model for Show and Tell
- Noor Awad
  - Wrote the circuitry protocol
  - Tested all components of the circuit
- Freyja Heggeland
  - Assisted with assembling circuitry and soldering
  - Wrote complete tentative Arduino Code
  - Collected new materials for future fabrication

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Kat Sattel	3/13/2026 3/18/2026	- Began writing fatigue testing protocol - Circuitry	1 2	2	30.5
Therese Kalt	3/15/2026 3/18/2026 3/19/2026 3/19/2026	- Created initial CAD model of display - Printed initial CAD model of display - Updated CAD model of display - Printed updated CAD model of display for Show and Tell	2 1 1 1	5	28
Noor Awad	3/18/26	- Tested circuitry components and edited protocol	3		23
Freyja Heggeland	3/16/26 3/18/26	- Reviewed Arduino code - Worked with soldering and circuitry components, sourcing new materials	1 2	3	31.5