Weight Bearing Sensor

Client: Daniel Kutschera
Advisor: Prof. David Dean
Team Members:
Nikolai Hess (nphess@wisc.edu) - Leader
Jetzu Thao (jthao27@wisc.edu) - BSAC
Norah Greer (njgreer2@wisc.edu) - BWIG
Keira Ferrigan (kferrigan@wisc.edu) - BPAG
Cassity DeChenne (dechenne@wisc.edu) - Communicator
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Problem statement

Patients with, or in recovery from, many conditions have restrictions on how much weight they can safely put onto their legs without causing themselves further injury. While there are some ways to attempt to ensure this requirement is met, they are difficult to implement, do not work as well, or provide as much feedback as would be helpful to patients and those assisting them. The goal of this project is to design a low-profile, easy-to-use device to measure and record the amount of weight put onto the legs of a patient, and give feedback to the patient and care providers to ensure their safety precautions are being met.

Brief status update

- Selected designs
- Preliminary presentation preparation
- Upcoming client meetings
- Ordering materials

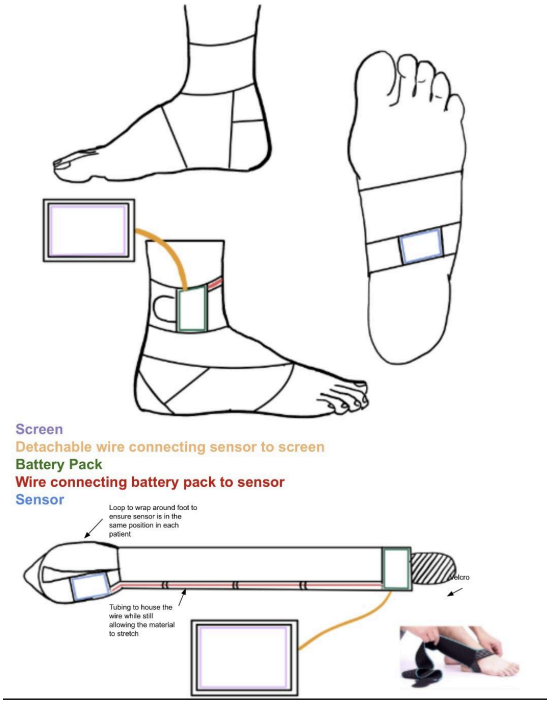
Difficulties/advice requests

Some clarification on the exact design desired by client, looking at an insole like design or a strap that could wrap around a patient's foot, looking for clarification from client to decide what would be more advantageous for them.

Current design

Designs:

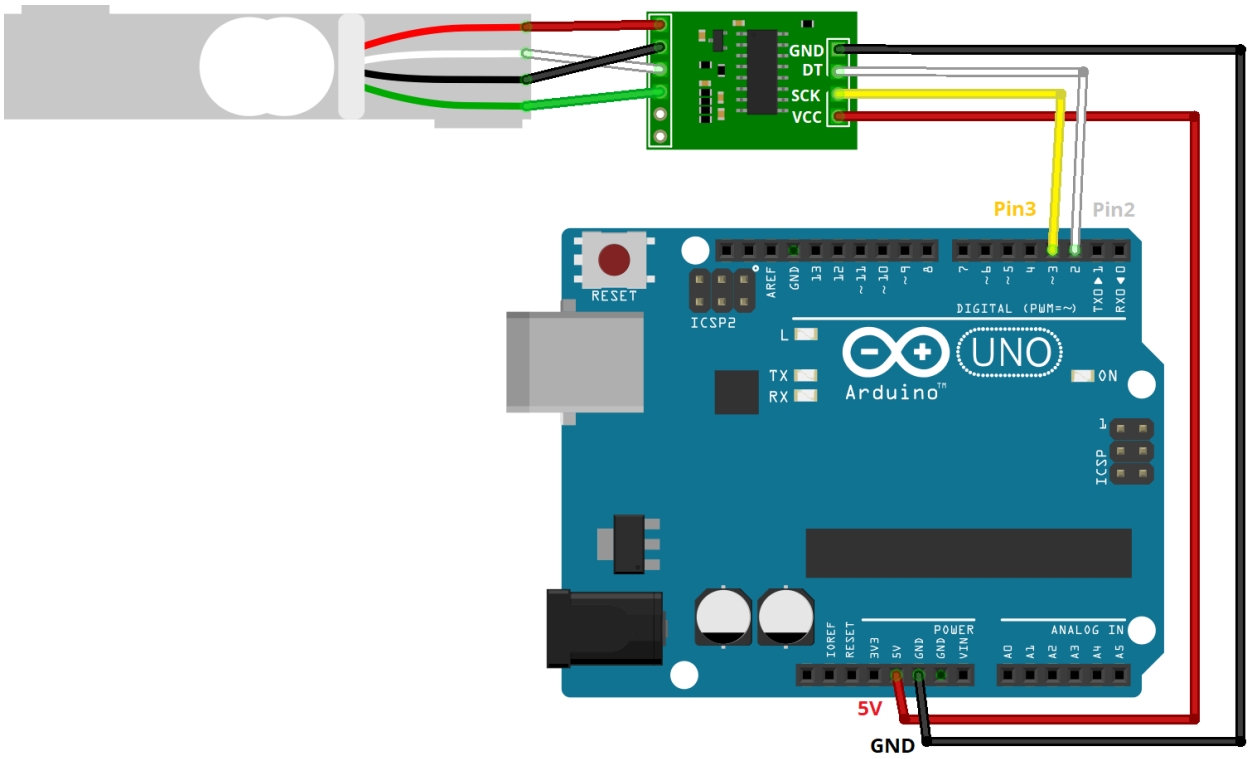
Design 1: Built in Strap



This device uses an ankle-brace like strip of elastic that can be adjusted to fit any patient. The loop at the end ensures that the sensor will sit in the same spot on each person's foot. The wiring will be fed through a tube of fabric to allow it to stay contained while the strap stretches. The battery pack will be fixed to the end of the strap, near the velcro strip. The wire connecting the battery pack/sensor to the readout will be detachable to prevent tangling when putting the device on.

Circuits:

Design 3: Circuit with Amplifier



This circuit is the basic design for a load cell using an Arduino. The Arduino microcontroller is powered by a battery and is connected to a HX711 amplifier, which is a breakout board that allows you to easily read load cells to measure weight. This amplifier would be connected to a load cell, which measures the weight, and the measured weight would then be sent to the display.

Materials and expenses

No materials or expenses at this time

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Category 1										
									$0.00	
									$0.00	
Category 2										
									$0.00	
									$0.00	
								TOTAL:	**$0.00**	

Major team goals from last week

1. Refine chosen design
2. Begin work on solidworks models of device, and initial stress and strain testing
3. Look into materials for the device, based on stress requirements and safety factors

Major team goals for the next week

1. Meet with client to discuss final design and future work
2. Give our preliminary presentation and get answers to any questions we have
3. Continue research on device and competition
4. Begin solidworks designs and modeling of the device

Last week's individual goals

- Nikolai Hess: Look into more standards and codes related to materials. Brainstorm materials and look into what is used by insoles and similar products to come up with some ideas for material design.
- Jetzu Thao: Do more research into arduino circuit design and load cells, brainstorm designs for integration of circuits.
- Norah Greer: Look at all designs using the design matrix and decide on one we want to focus on. Move forward in researching how we can achieve that n.
- Keira Ferrigan: Refine my drawings of the design, continue research on the sensor and screen.
- Cassity Dechenne: Continue communicating with client and advisor, improve and finalize design ideas

Next week's individual goals

- Nikolai Hess: Begin solidworks designs, look into the potential load cells for the different requirements set out by the client, begin work on the circuit, continue research
- Jetzu Thao: Start ordering parts, start building basic circuits, fine tune designs.
- Norah Greer: Discuss final design with client and figure out logistics of building it, order parts
- Keira Ferrigan: Look into potential materials, continue brainstorming, meet with client.
- Cassity Dechenne: Continue communicating with client and advisor, meet with client, meet with advisor, continue researching improvements

Timeline

https://docs.google.com/spreadsheets/d/1GoAuANy3F-ltP7vhI7g-B9dxuefjj8c50qzYs246SlE/edit?usp=sharing

Activities

Name	Date	Activity/Previous Week's Accomplishments	Time (h)	Week Total (h)	Sem. Total (h)

Nikolai Hess	10/1 10/2	Preliminary presentation work Practiced preliminary presentation	1 1	2	10
Jetzu Thao	10/2	Work on presentation Research load cell	3	3	8
Norah Greer	10/1 10/2	Added to and practiced assigned presentation slides Worked on presentation as a group	2.5	2.5	7.5
Keira Ferrigan	10/2	Worked on presentation Fixed up my brainstorm designs Practiced our presentation as group	2 1	3	8
Cassity Dechenne	10/2	Formulated presentation slides, practiced presentation Communicated with client Met with team, met with advisor	3	3	9