Weight Bearing Sensor

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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

- Circuit prototype and calibration code completed
- Continued designing work for the remaining piece of the load cell assembly
- Began work on the code for the sensor
- Continued looking at the

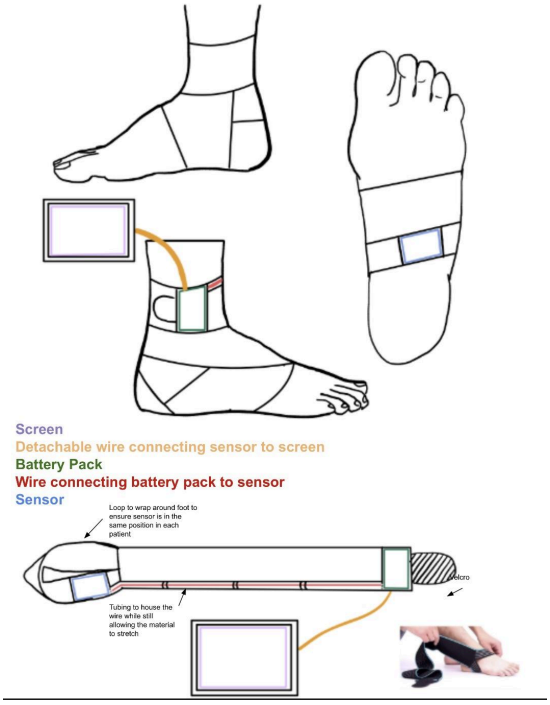
Difficulties/advice requests

- Debugging the circuit and code
- Lining up schedules for testing

Current design

Designs:

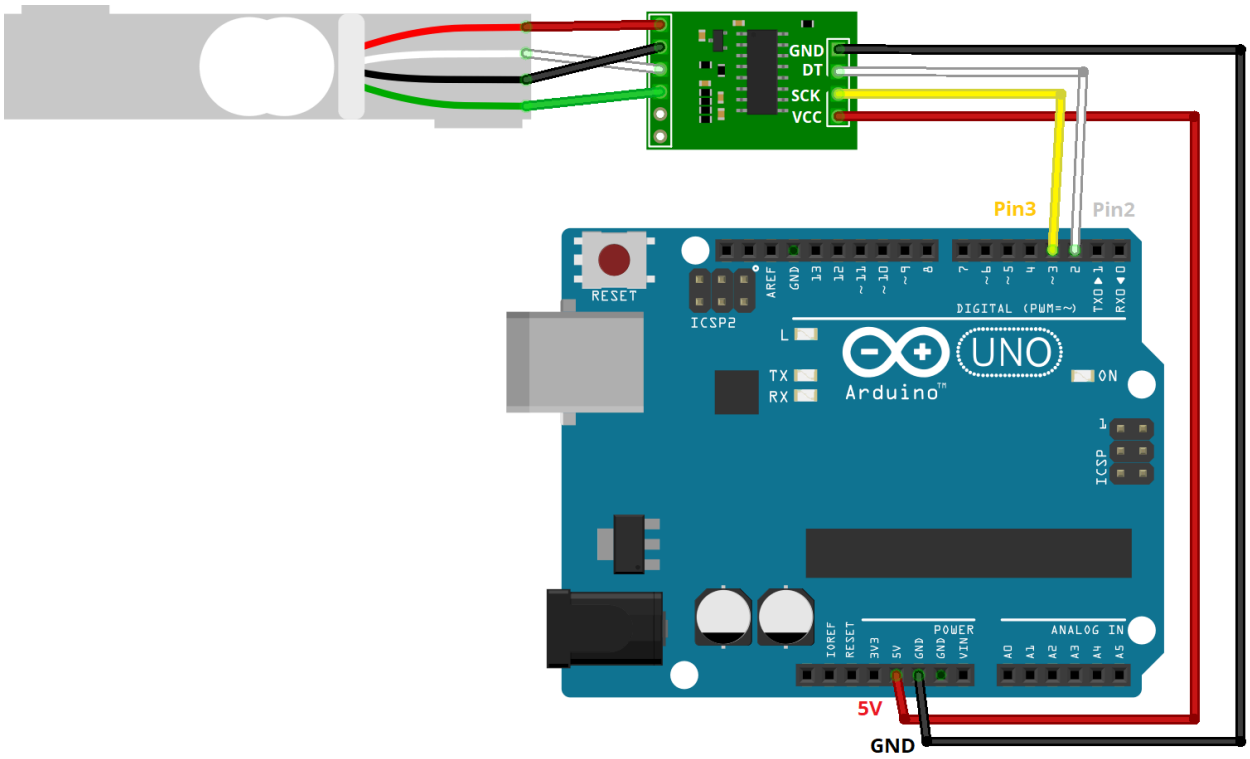
Design 1: Built in Strap



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

Item	Description	Number (amnt)	Cost per unit	Total Cost	Link
Category 1					
	Velcro strap for arduino	1 (2" x 16')	10.99	10.99	Amazon
	Ankle strap	1	7.59	7.59	Amazon
Category 2					
	Uxcell HX711 Module Weighing Sensor Pressure Sensor AD Module	1 (34 x 21 x 3mm)	6.39	$11.38	Harfington
	Uxcell 100kg 42mm x 38mm x 3mm Electronic Scale Body Load Cell Weighing Sensor	1 (42mm x 38mm x 3mm/1.7" x 1.5" x 0.12)	8.12	13.11	Harfingon

	LCD display	1	6	6	Makerspace
	pin headers (for amplifier and display)	6	$0.02	0.12	Makerspace

Major team goals from last week

1. Finalize testing plan and testing data analysis document
2. Begin testing prototypes
3. Finish debugging circuit
4. Present at Show and Tell

Major team goals for the next week

1. Begin testing and calibration of sensor
2. Start testing code
3. Order parts for final circuit
4. Begin production of circuit boxes and sensor platform

Last week's individual goals

- Nikolai Hess: Finish debugging circuit and code, begin testing and calibration of sensor, begin work on final version of code and circuit.
- Jetzu Thao: Debug code, help with testing, troubleshoot issues, being working on integrating circuit and strap designs.
- Norah Greer: Finish CAD model for load cell, help with testing
- Keira Ferrigan: Finish 3D modeling the boxes, getting the boxes printed, assisting in the debugging process for the arduino
- Cassity Dechenne: Finalize work on a document for testing data analysis, help to formulate elevator pitch, present at show and tell, communicate with client/advisor

Next week's individual goals

- Nikolai Hess: Finish debugging circuit and code, begin testing and calibration of sensor, begin work on final version of code and circuit.
- Jetzu Thao: Start testing sensor, fabrication of sensor casing, and beginning implementation of sensor into strap once sensor testing is complete.
- Norah Greer: Continue researching how to connect the sensor platform to the sensor, and the sensor to the strap.
- Keira Ferrigan: Research the cheap yellow display, get parts approved, get parts ordered, start testing sensor
- Cassity Dechenne: Start helping with CAD designs, set up meeting with client and request more materials for our final product

Timeline

https://docs.google.com/spreadsheets/d/16zWtF1-gL17xbjSfm-4aDRiTb-1oFXjDqdXYRBUVdkQ/edit?usp=sharing

Activities

Name	Date	Activity/Previous Week's Accomplishments	Time (h)	Week Total (h)	Sem. Total (h)
Nikolai Hess	11/4/25 11/6/25	Circuit and code work and testing Final circuit parts research	1.5 0.5	2	20.5
Jetzu Thao	11/6/25	Circuit testing / hardware research	1	1	17
Norah Greer	11/6/25	Researched padding for sensor	1	1	17.5
Keira Ferrigan	11/6/25	Researched the output screen, 3D modeled the boxes	1	1	15
Cassity Dechenne	11/6/25	LCD code debugging research, communication, research	1	1	18