



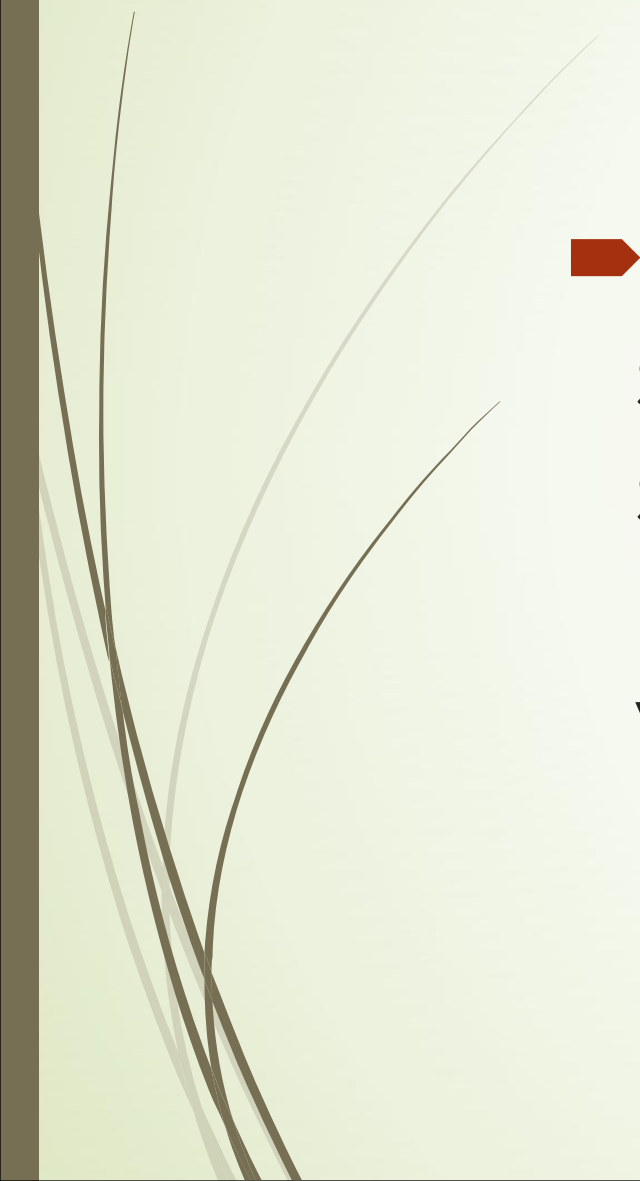
BedBuddy

Final Prototype Demo

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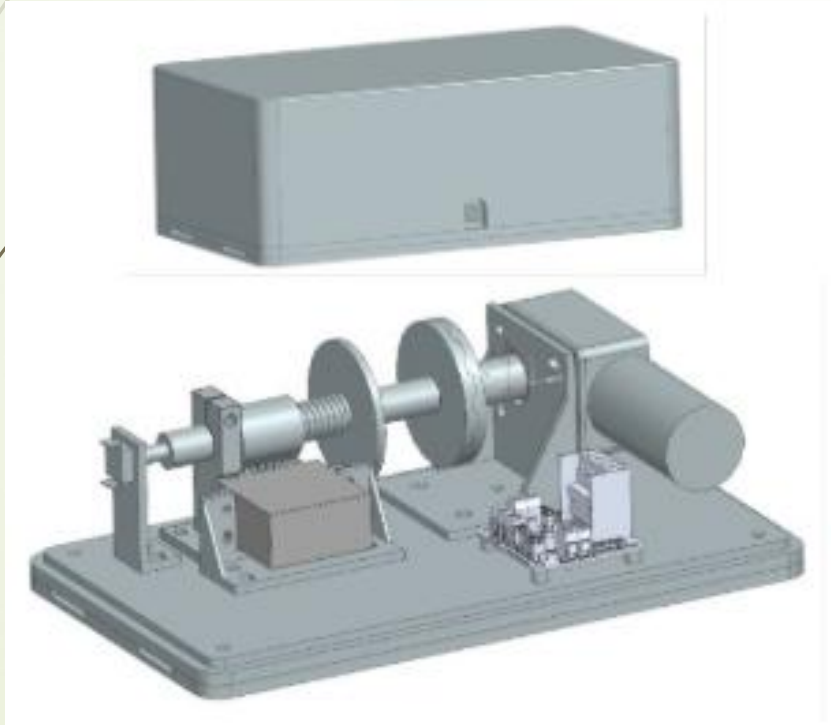


Product Objective

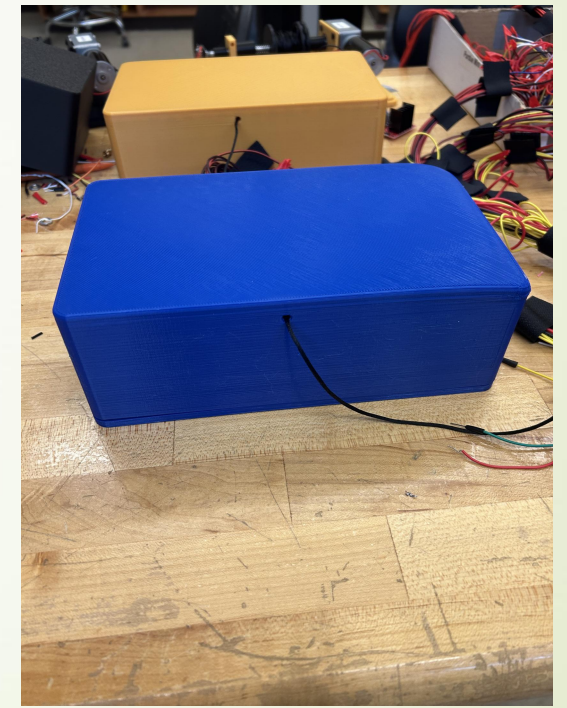
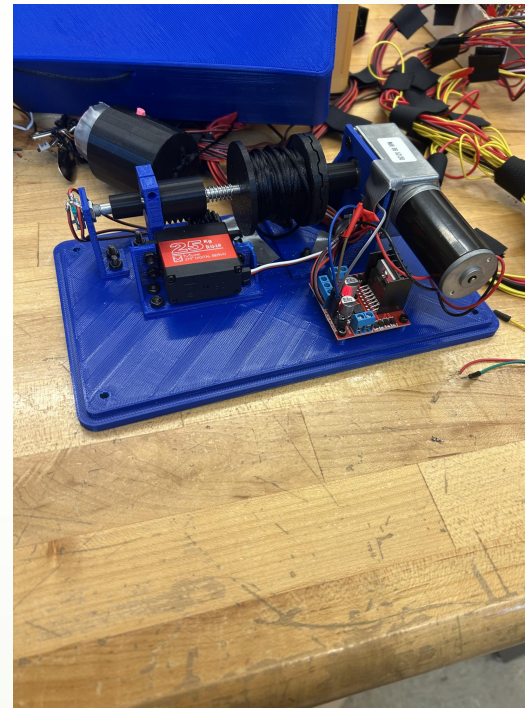
- To ease the process of changing bed sheets and making beds simple and stress-free for everyone, helping people enjoy a fresh, cozy bed without hassle.
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Module Design

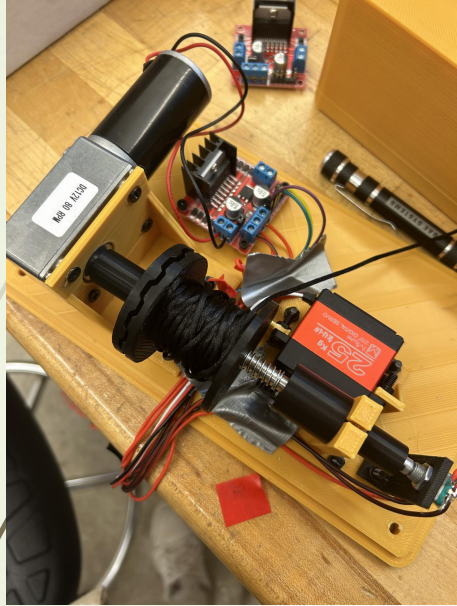
CAD Model



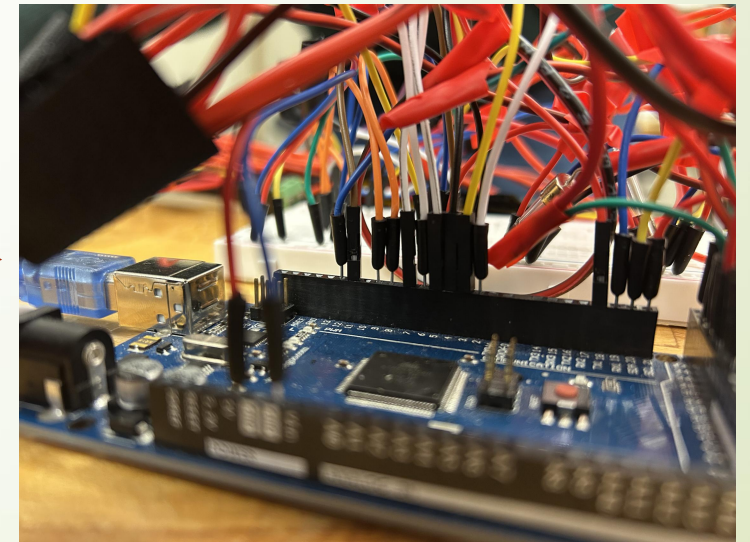
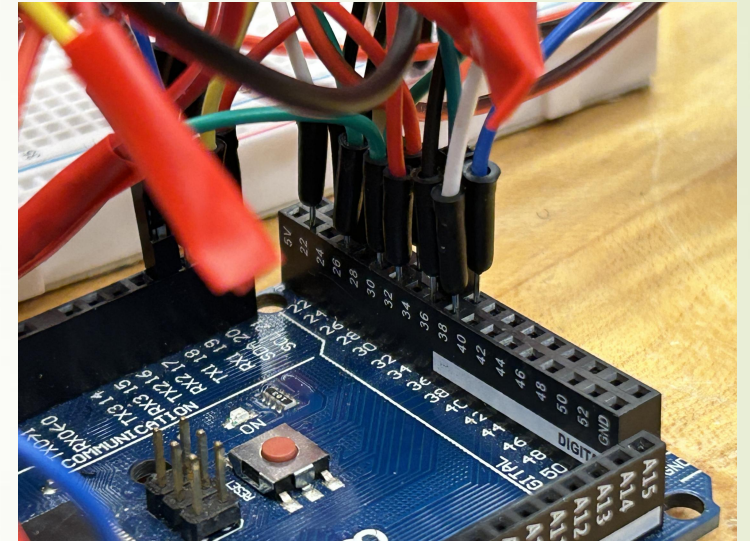
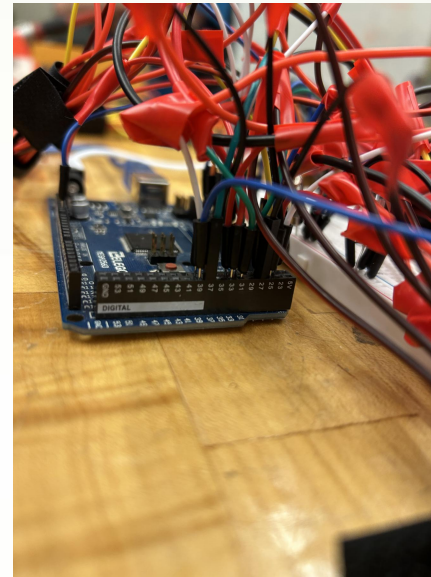
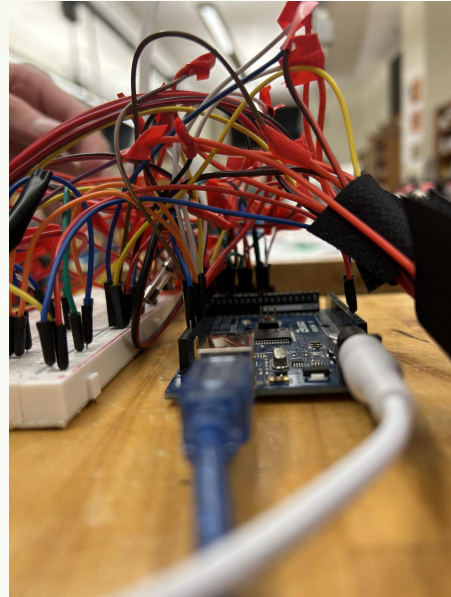
Final Prototype



Electronics



Module
Wiring



Arduino and
Breadboard Wiring



Functional Requirements

Requirement	Testing Method
Compatible with Twin to King Size Beds; 6" to 16" thick mattresses	Set up modules under an actual bed
Compatible with power input of 120 Volts	Power using Wall Outlet and see if Prototype Functions
Does not damage or leave imprints on bedsheet	After testing, check where bedsheet was clipped
Each module must support 225 pounds in static condition	Apply weight on top of module
Weight under 10 pounds	Weigh each module
Noise level under 70 dB while operating	Use decibel meter to measure noise level while operating
Time to remove and replace bedsheet of less than 2 minutes	Time while testing
Accuracy of Bed Sheet Placement within 3 inches	Measure corner placements after testing



Validation

- When testing the prototype, it was clear that it did work. When the cables stopped early that just means we had to adjust the servo values so that the force necessary to stop would be much larger.
- Unfortunately for an unknown reason the modules stopped functioning once new values were used
- Wiring was checked but there seemed to be nothing wrong with it
- This prototype works as a proof of concept; realistically if it did work this would be a fully functioning project

Validation (cont'd)

- We placed the modules in their intended positions and discovered that there was more than enough space to accommodate larger beds



- We checked the corners of the bedsheet for any damage that might've been caused from the clips, finding none

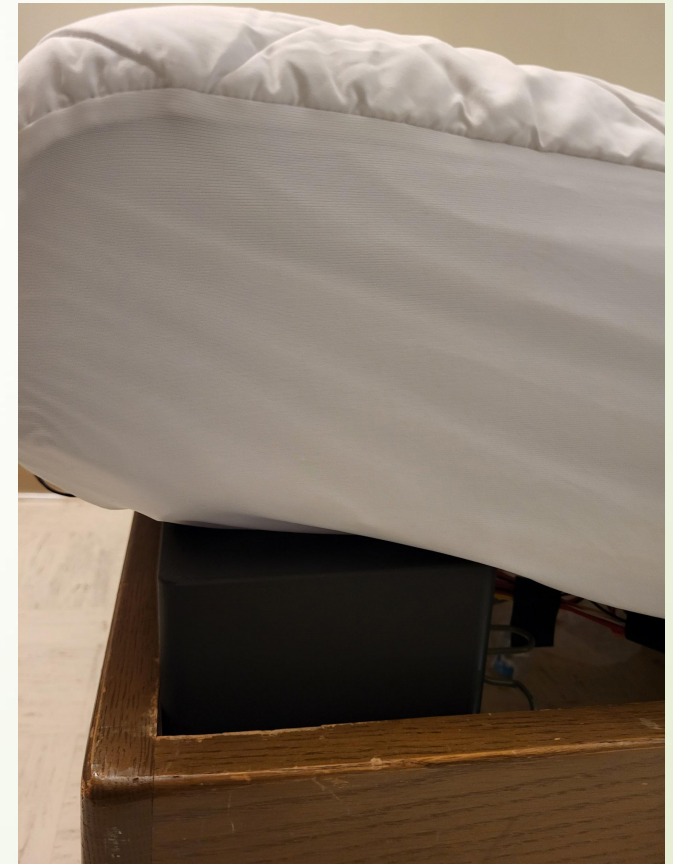


Validation (cont'd)

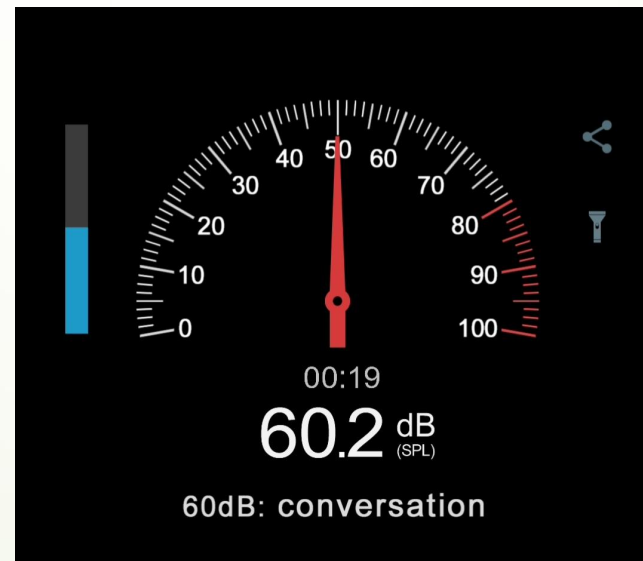
- ▶ We weighed one of the modules on a scale; each module was less than 10 pounds



- ▶ We tested the weight the modules could hold; they can withstand someone directly on top of them as well as someone in the center of the bed.



- ▶ We measured the noise level of the module while operating using a decibel meter; the maximum noise level to be 60.2 dB



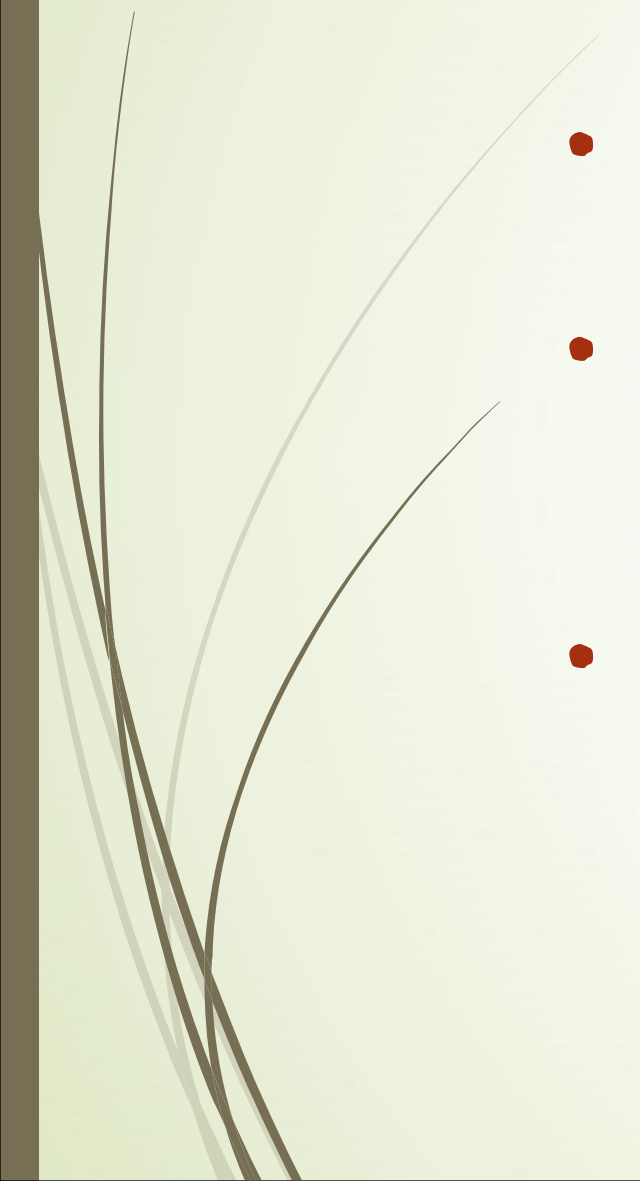
Validation (cont'd)

- ▶ We tested the functionality of the entire prototype on a real bed. Unfortunately, the prototype did not work entirely as intended





General Future Considerations

- Figure out a way to make each module more compact
 - Design a fixture to make the module more embedded into the bed frame
 - Make the entire system controllable from a mobile device
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What can be Improved on After Testing

- Having each module be circular and have 2 spools would have been better
- Simple plug ins for each module so that wiring isn't an issue
- Housing for the wiring hub to go underneath the center of the bed for greater range
- More time for testing to determine why it stops working



Any Questions?