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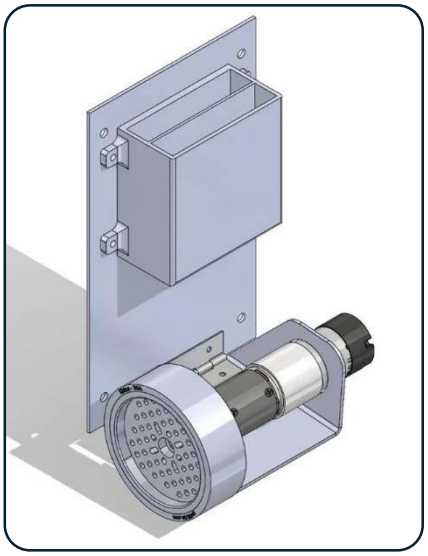
ADA Automated Door Opener

What?

- Our ADA door opener is an automated, cost-effective door opener designed to improve accessibility for individuals with disabilities
- Powered by a 20V planetary gear motor that drives high-traction wheels mounted on a door
- Controlled by an Arduino microcontroller, which receives input from an IR remote



Challenge

- Design a product that benefits a marginalized population
- Existing automated door openers are expensive, unsuitable for residential use, or not user-friendly for DIY installations

Results

- Capable of delivering 18.9 lb-in (2.14 Nm) of torque to wheel
- Spring-loaded hinge applies >50 N of downforce
- Runs on 24V DC power adapter
- Bolted onto door for easy installation (~15 minutes)
- ~$270 cost of manufacture (retail pricing)
- Mass-manufacturable via injection molding and stamping

DESIGN / FEA

- Designed in SolidWorks
- Low-fidelity drawings used to explore early design concepts
- Conducted hand calculations to confirm design validity and establish minimum forces required for reliable door operation
- Ran FEA simulations on bracket to determine minimum thickness of sheet metal while sustaining a 5 FoS (for shock loads) with fixed supports for worst case scenario