

Background

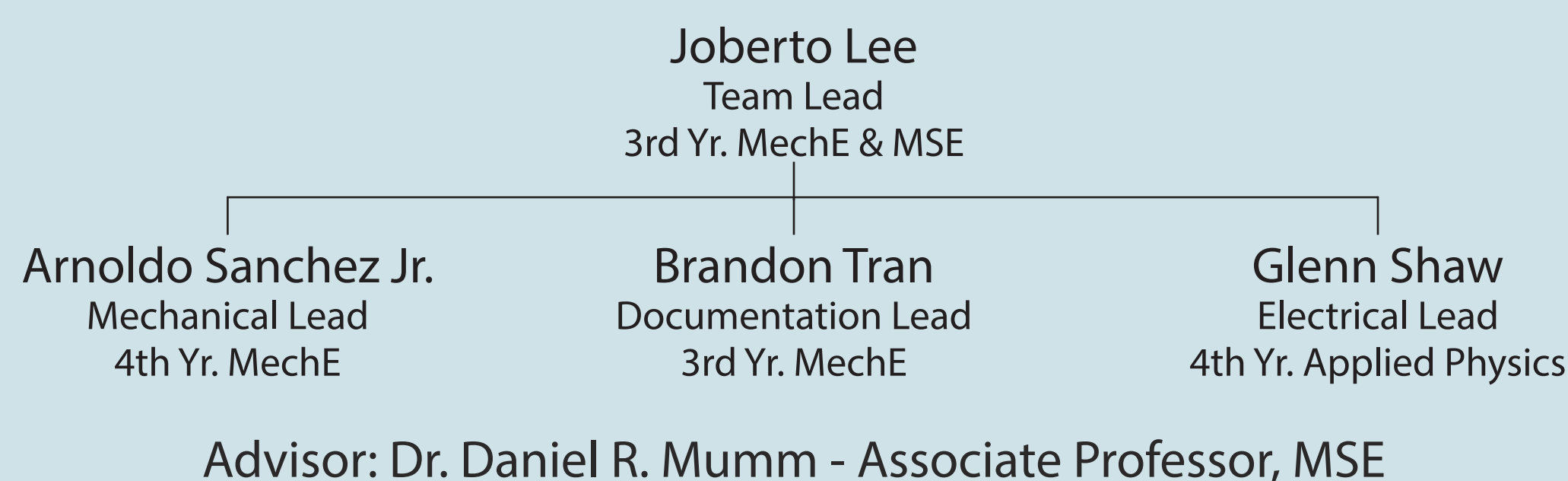
This project revolves around the design of a device which retrofits existing chain or cord driven shade systems to be automated and controlled via voice commands to the Google Assistant. With the design of this device, we will tackle three problems. Firstly, automating shades can reduce energy bills by regulating heat flow through windows on timed cycles. Secondly, it will solve problems with inconveniences associated with accessing shades on inconveniently placed windows - this is especially relevant for elderly persons. Lastly, we aim to design a system which is versatile, low cost, and reliable in order to fill a hole in the smart home device market.

Requirements

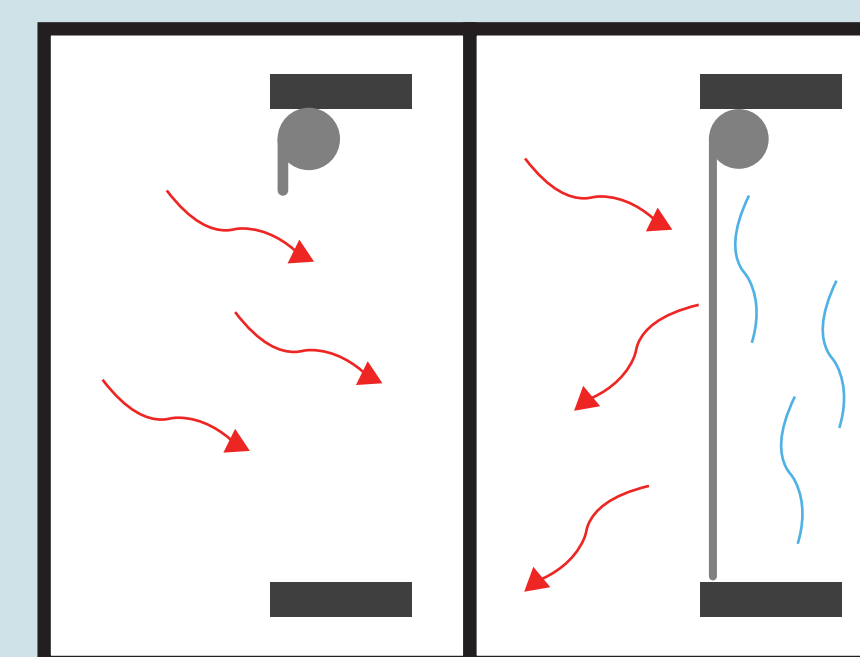
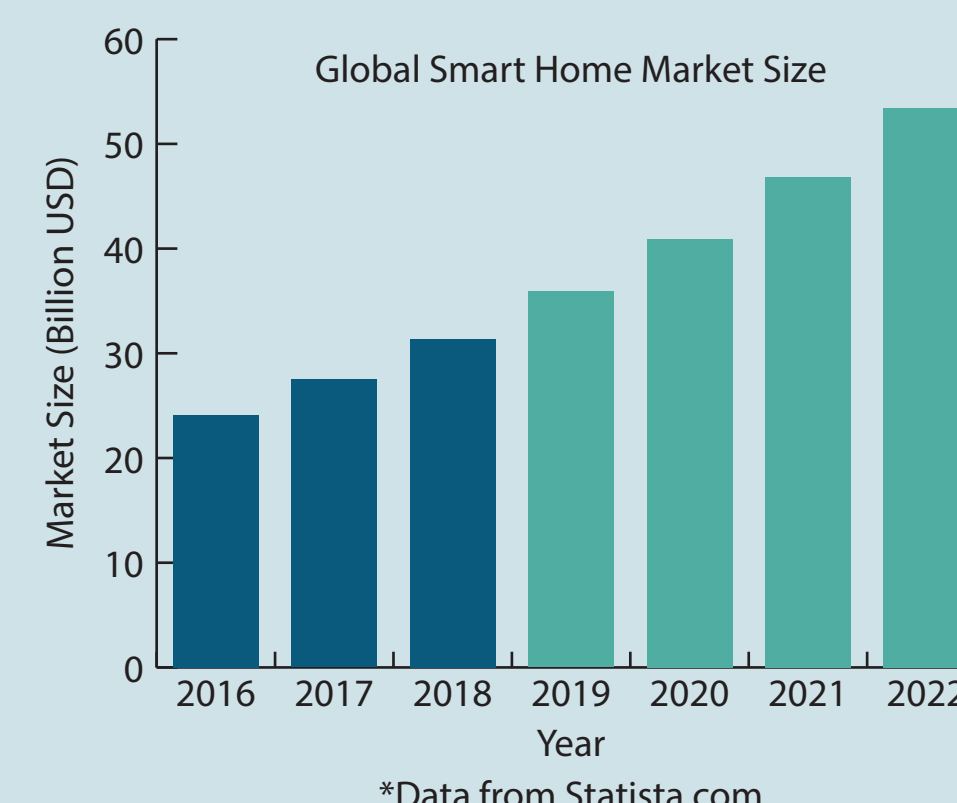
The product should be able to

- Articulate movement of a shade system for a window (Up to 16 ft²)
- Fully extend/contract within 15 seconds
- Interface with beaded chains (3-6 mm) or cords (2-6mm)
- Mount to a wall or ledge via screws or adhesive strips
- Be compact and only occupy one power outlet
- Be added to a user's Google home ecosystem within 5-10 minutes

Team Members



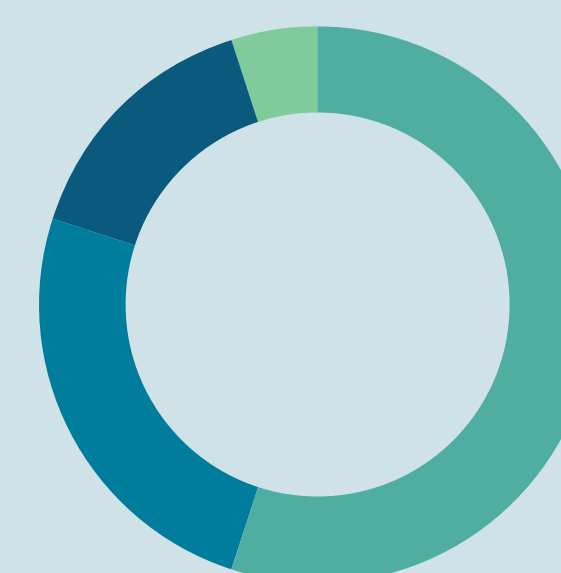
Graphics



Budget

Major Costs

- Parts Fabrication
- Materials
- Electrical Components



- Electrical: \$150
- Safety Net: \$250
- Computer Science: \$50
- Mechanical: \$550

Innovation & Big Picture

There are a few other similar devices on the market, but each has its own flaws. We are innovating in this market by designing a device to retrofit existing shade systems. The only other device like ours requires an additional hub, which ours will not. In terms of the big picture, we've noted the steadily increasing size of the smart home device market and have intentions of bringing this device to market.

Goals & Objectives

The goal for the Smart Home Device 2018-2019 team is to create a working prototype for a chain-driven shade add-on which raises and lowers the shade via voice commands to the Google Home Assistant.

Mechanical Objectives

- Construct a model window frame
- Design and fabricate a versatile motor-chain interface
- Design and fabricate housings for the motor and electronics

Electrical Objectives

- Design and implement a power delivery system for our device
- Design a custom printed circuit board for our device

Computer Science Objectives

- Learn relevant coding languages (Python, HTML, JavaScript, etc)
- Program Raspberry Pi using Python to read/write to our database
- Reprogram the RPi OS to run the Python script on startup
- Utilize device state information from the database to alter device state
- Implement voice control via the Google Home Assistant

Current Status & Future Plans

Where we're at

- The mechanical parts have been designed and fabricated
- All electronics are integrated and working as designed
- Commands can be understood by the Google Assistant
- Shades can be driven up or down via voice commands
- We have a fully working mock shade system to show off our prototype

Coming Soon

- Documentation is almost finished
- We will be discussing the future of this project as a team
- A custom printed circuit board design is in the works
- Filming a project video is set to begin after finals
- Team members are researching production feasibility and business model logistics

Timeline

