Variable Arm Reach Extender (VARE)

ME Capstone Project 2025-26

James Moore (moore2022@my.fit.edu)

Leira Maynard (lmaynard2024@my.fit.edu)

Kaleem Bocus (kbocus2023@my.fit.edu)

James Koethe (jkoethe2021@my.fit.edu)

Quin Fredrickson (qfredrickson2020@my.fit.edu)

Vaughn Havins (vhavins2021@my.fit.edu)

David Mierzejewski (dmierzejewski2023@my.fit.edu)

Joonhyung Si (jsi2020@my.fit.edu)

Project Manager: Matthew Gorton (mgorton2022@my.fit.edu)

Systems Engineer: Adam Johnson (adam2022@my.fit.edu)

Instructor: Dr. Anand Nellippallil (anellippallil@fit.edu)

Advisor: Dr. Seong Hyeon Hong (shhong@fit.edu)

GSA: Junot Damen (jdamen2020@my.fit.edu)

Agenda

- Project goals and problem
- Project approach
- Desirable skills and knowledge

Project Problem

- Roughly 20% of all disabilities in the United States are physical disabilities. With 90% of chronic disabilities relying on an assistive device for daily use.
- Within this market, a large gap has opened in assistive devices for physical disabilities.
- A significant number of assistive device users state having unmet needs ranging from 24-52% depending on the severity of their disability.

Project Goals

- Design and produce a fully functional reach extender.
- Incorporate a universal end effector (grasping head) to lift a wide variety of objects.
- Restore a significant amount of physical independence to the user.
- Safely disperse the load of the object to reduce strain on the user.
- Incorporate stability controls with a strong focus on comfort and ease of use.
- Provide sensory information/ feedback to the user through various sensors and systems.

Project Approach

- The intended approach is to first conduct primary research and gather information from patients and doctors on what improvements would be most beneficial.
- Use this primary research to come up with a design of both the physical structure and control systems.
- Properly code/integrate multiple different sensors and systems together into one cohesive machine.
- Conduct final testing and ensure proper functionality.

What We Need From You

Electrical Systems

- Grasping controls
- Motion controls
- Motion Tracking/ Stabilization
- External power Integration
- Human-Machine interfacing

Sensors

- Haptic sensors
- Voltage
- Current sensor
- EM Interfacing/ sensors
- Motors
- Pressure sensors
- Location Sensors

What We Need From You

Communication

- Clear and concise communication that will demonstrate your understanding of the project
- The ability to give us a comprehensible overview of the projects script

Interested in learning more?

If you are interested in learning more about this project, or would like to join the team, please refer to the contacts slide shown above!