College of Engineering
LAMAR UNIVERSITY

Biomedical Cardineers

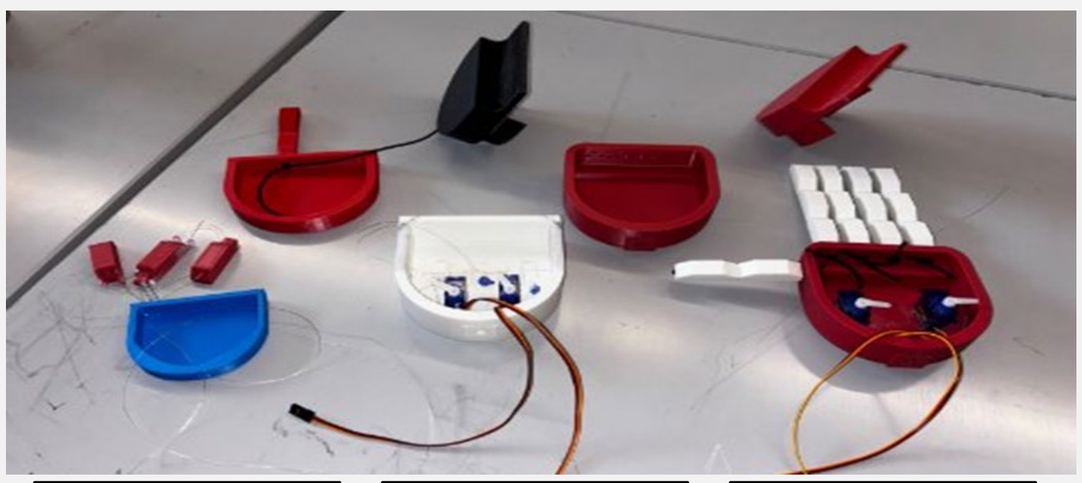
Introduction

- **Problem Statement**

Design a durable prosthetic/robotic hand capable of completing minor physical activities.

- **Project Objectives**
  - Minimal weight
  - Low maintenance
  - Dexterity

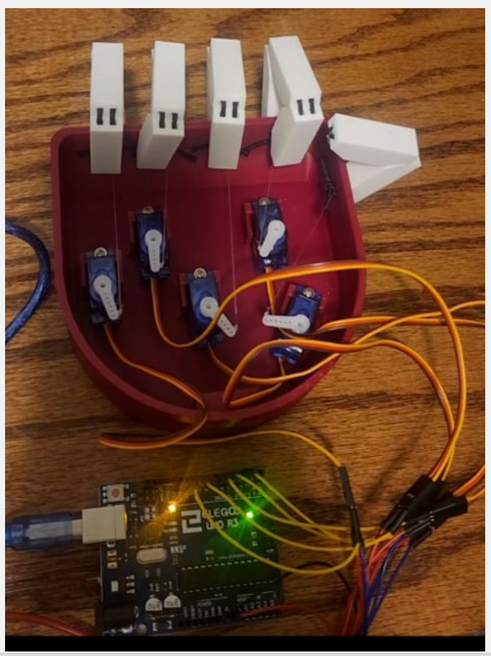
Concept Generation and Concept Evaluation

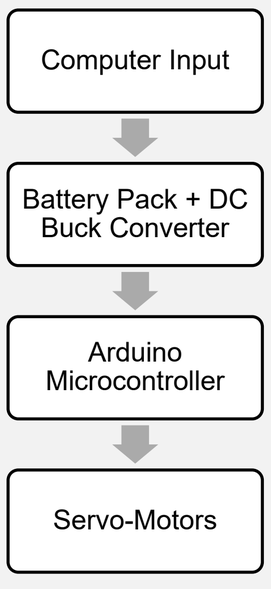


Finger	Palm	Forearm
• 14 joints • Retracted by string • Extended by elastic	• Space and mounting ports for motors • Rounded for cosmetics • Attachment port for fingers and forearm	• Base for palm attachment • Space for attaching electrical components • Space for amputee fitting

Controls: Electrical Components

The system incorporated five SG90 servo motors to actuate the fingers, which were controlled using an Arduino Uno microcontroller. To ensure proper power regulation, a 12V 8A power supply was used in combination with a DC buck converter to step down voltage to levels safe for the servos and microcontroller.

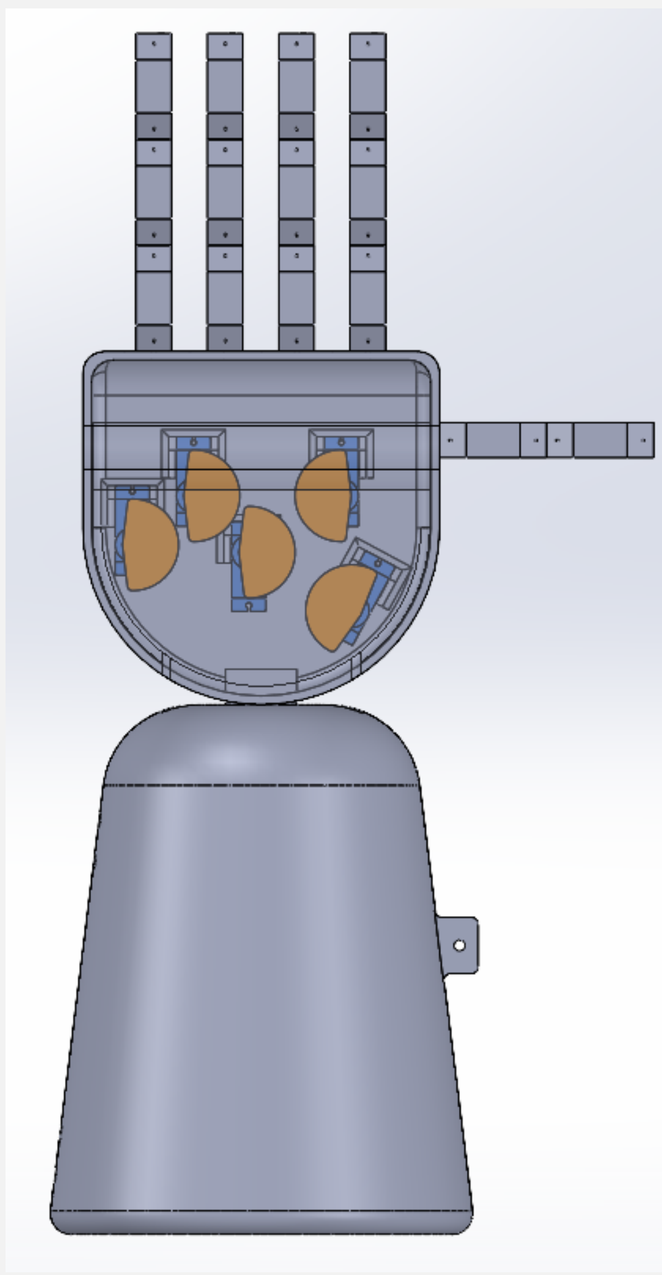




Project Challenges and Setbacks

- Finger design selection : interlocking mechanisms
- Sizing and dimensions
- Motor selection
- Printing errors

Final Design: Completed End Model



- 3D printed prosthetic hand designed for affordability and accessibility.
- Enables precise and natural hand motions for the user.
- Powered by lithium-ion battery.
- Built with modular components for easy maintenance and customization.
- Features lightweight structure for user comfort and extended wear.

Conclusion

We successfully designed and constructed a 3D printed prosthetic hand. Our design is capable of individual finger articulation and minor physical activities.

Students & Faculty Advisors

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