UND College of Engineering & Mines
University of North Dakota

CEM Spring Design Exposition
Electrical Engineering – Underclass Project

EE480/481 - Augmented Robotic Manipulator (A.R.M)

Project Scope

Design and prototype a robotic arm to wirelessly mirror human controller inputs.

Main Goals:

- Build prototype robotic arm and Gauntlet controller
- Capture human inputs as usable data
- Wireless transmission of data
- Convert data to robotic movement
- Execute full data acquisition to robotic movement

Sub Goals:

- Perform basic dexterity tasks:
  - Pick up a ball
  - Pour coffee
  - Play chess
- Improve response time from controller inputs to robotic movement
- Full hand articulation

Project Results:

- Successful A.R.M and Gauntlet prototype models
- Successful Gauntlet data acquisition
- Successful Gauntlet data transmission
- Successful A.R.M data reception
- Successful A.R.M positional data acquisition
- Successful simulated movement
- Continual testing and refining in progress

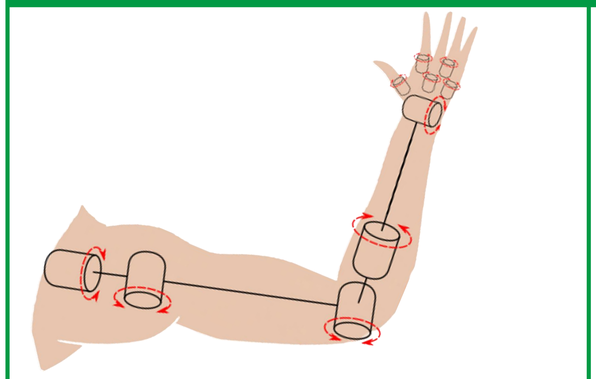
Future Work:

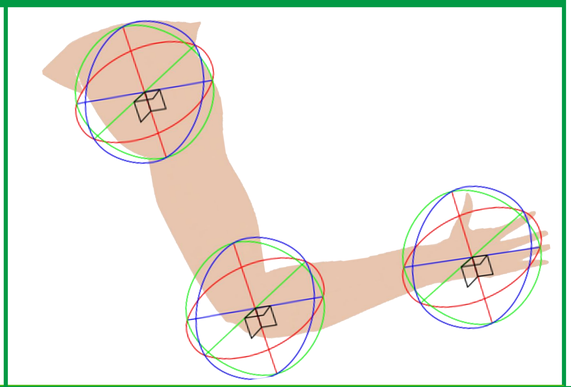
- Implement a stronger physical model
- Implement more powerful and precise motors
- Implement more hand articulation
- Implement higher-level motion capturing sensors
- Redesign Gauntlet model

Scan to Vote

Team: William Prody, Branson Elliott, and Garrett Tjernagel
Advisor: Tarek Elderini

Design

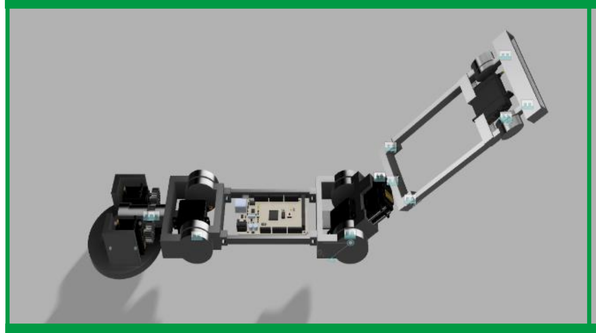


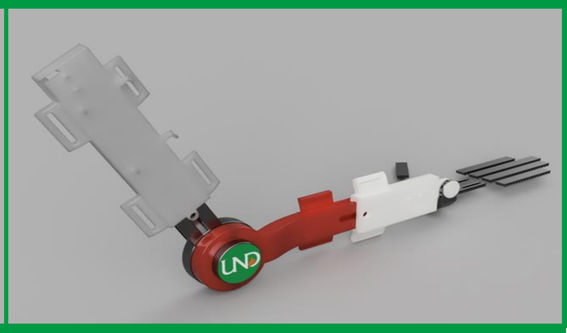


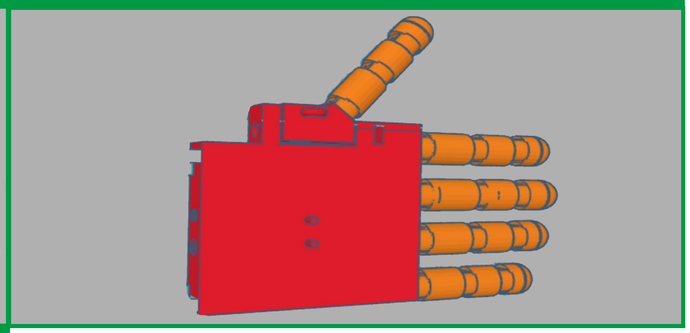
Project Features:

- Servo Motors
- Gyroscopes
- Flex Sensors
- Potentiometer
- Logic Controllers
- Radio Transceivers
- Custom 3D Printed Components
- Custom Wire Harnesses

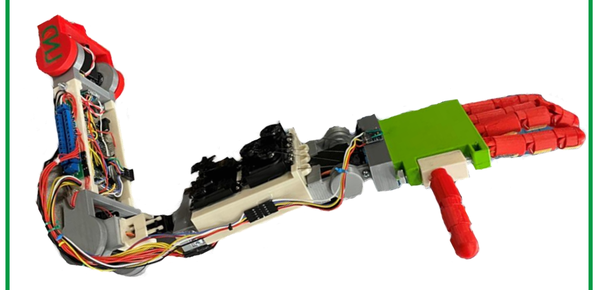
3D Models

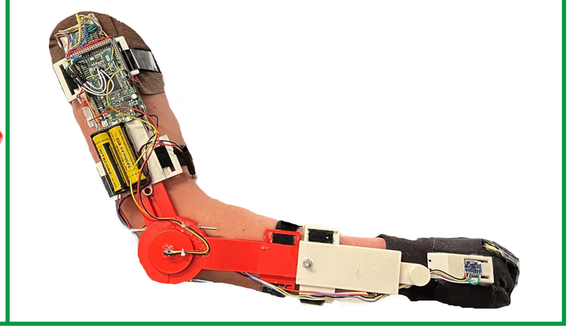






Prototype





Operation:

1. Capture Controller Position
2. Package data and send to A.R.M
3. Capture A.R.M Position
4. Calculate Positional Difference
5. Calculate Movement Distance
6. Repeat

Acknowledgements

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