LSU | College of Engineering Department of Mechanical & Industrial Engineering | College of Engineering School of Electrical Engineering & Computer Science

To Predict ▶ To Design ▶ To Perform

ME, ECE Capstone Design Programs

Team #7: Julian Wants to Play Basketball II
Taylor Cates, Wenxiu Hu, Raigyne Moncrief, David Munoz, Alexander Watson

Background Information
- Julian has quadriplegia cerebral palsy
- Julian communicates using eye gaze computer, Accent 1400

Objective Statement
Modify first iteration's design to move along the 3-point line with the addition of motors and a control system.

Safety Considerations

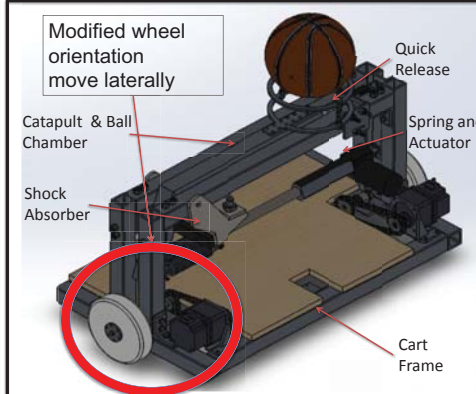| Nearby objects detection	Release subsystem will disable when sensors sense nearby object
Reset button	On/Off switch that cuts power to motors

Engineering Specifications

Quantitative Specifications	Target Values		Results	
Velocity: Set Speed	4 ft/s±10%		3.5ft/s	
Acceleration	3 ft/s^2±10%		3ft/s^2	
Weight	≤150lbs		150lbs	
Ultrasonic Safety Range(Front/Sides& Back)	6 ft/s± 10%	3 ft/s± 10%	6 ft/s± 10%	3 ft/s± 10%
Shot Accuracy	40%		40%	

Qualitative Specifications	Target
GUI	User-friendly
Safety	easily accessible power switch

New Drive-Train Assembly

Brushless DC Motor, Wheel, Wheel Chain, Sprocket, Wheel Shaft
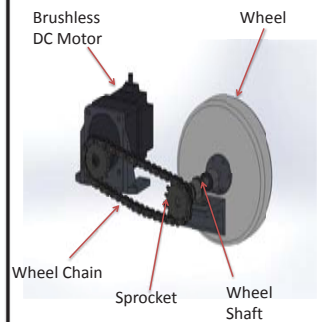
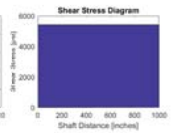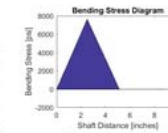Modified wheel orientation move laterally, Quick Release, Catapult & Ball Chamber, Spring and Actuator, Shock Absorber, Cart Frame
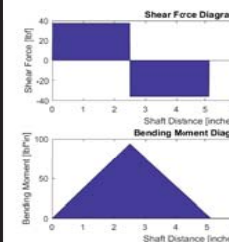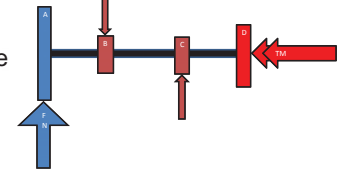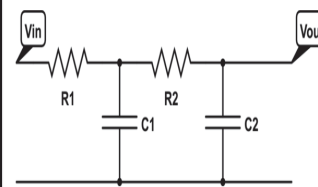
Graphic User Interface

Engineering Analysis

Shaft Analysis
The wheel shaft is supported by two bearings. Below are the calculated forces, moments, and stresses along the shaft and the input and max output values.
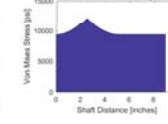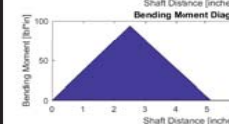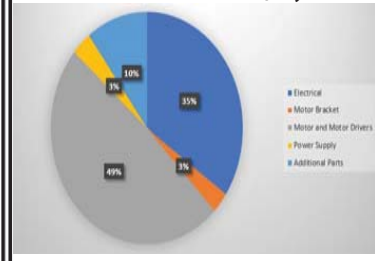

Control System
Cascaded RC filter that converts pulse width module to analog

Budget Management
Total Amount: $2,300

September	October	November	December	January	February	March	April	May
Engineering Specification	Concept evaluation and research	Technical Sketches and analysis	Concept Re-evaluation	Concept Finalization and Parts Ordering	Machine Construction	Sponsor review, Feedback, and Troubleshooting	Final Deliverables	Final Feedback and takeaways

Sponsor: Elissa McKenzie   **Advisers: Gabriel De Souza, David Giurintano, Warren R. Hull, Tyler Parker**