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Quadruped Robot [QUAD V2]

- Started in February 2025 - ongoing
- Mechanical Lead
    - Coordinating the design of the robot and auxiliary systems
    - Hands-on designing of the robotic leg
        - Original designer of all non-red or COTS components

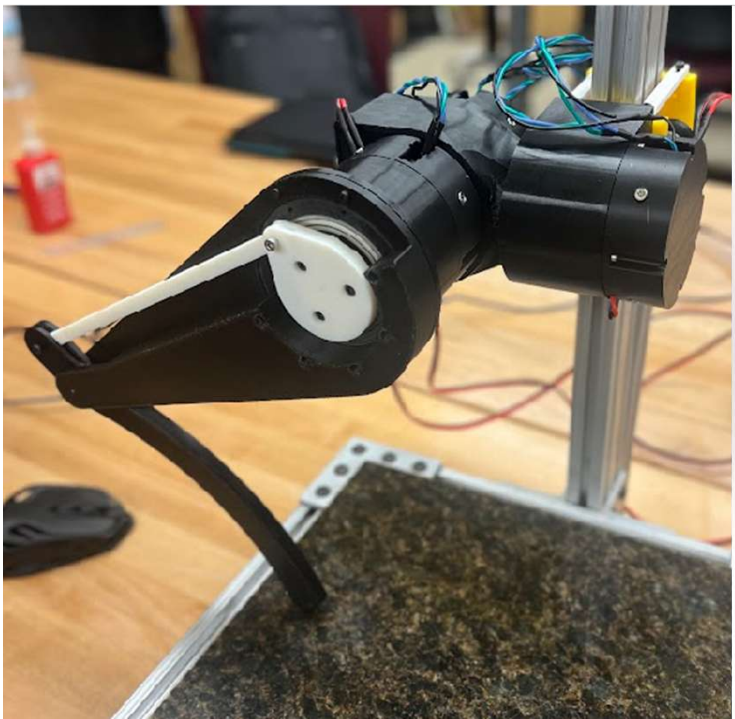
Current:

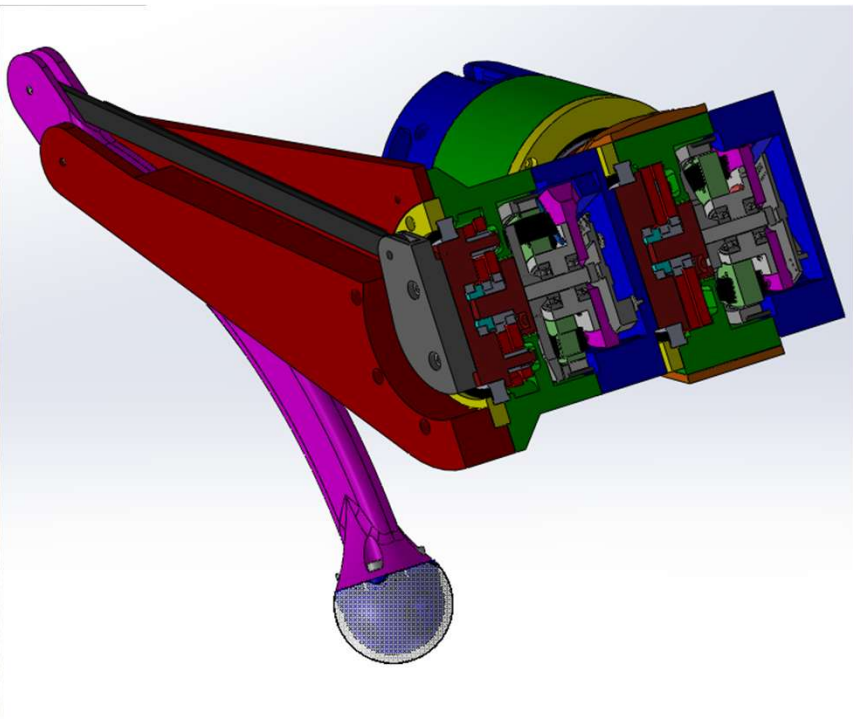
- All actuators can be swapped and replaced in under 8 screws
- Two gearbox configurations used for the three actuators
- Grease trap to allow gear lubrication without entering motor
- Knee ROM of 115.2° with bend of 35° and 150.2° extension
- Reusable foot mold allows quick replacement of high wear part
- All COTS components organized in folders within the CAD assembly
- Leg electronics: 3 moteus-c1, 3 mj5208 brushless motor

In-Progress:

- Assembly and testing of V2 leg, focused on heat buildup
- Initial chassis design review

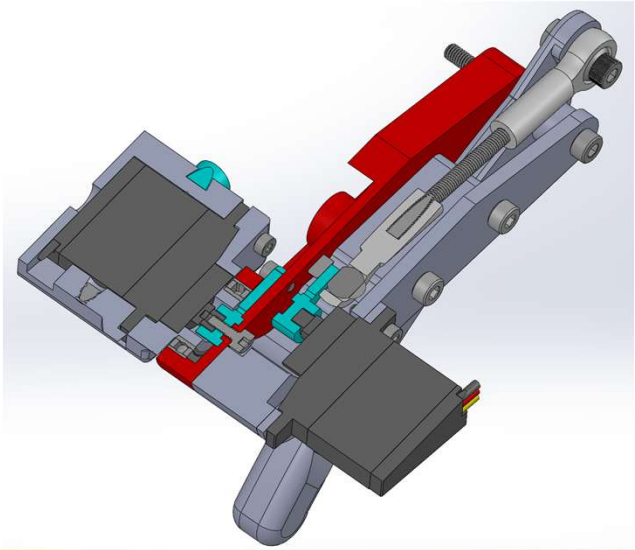
V1 Picture / V2 CAD





Mini-Quadruped Robot

- Allocated component goals, bounding boxes and mounting geometry
- Designed all upper leg components

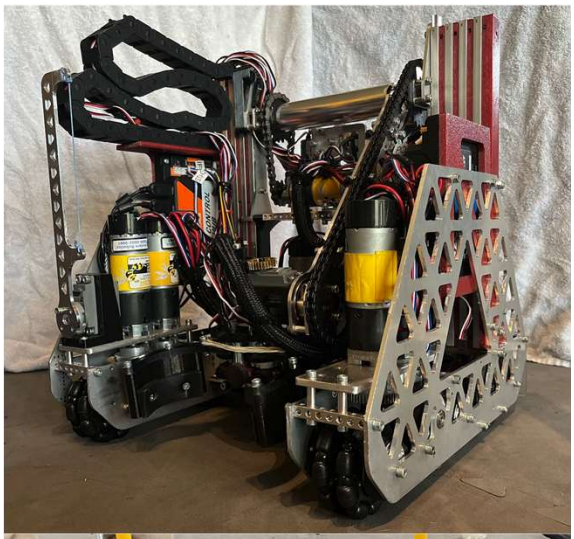


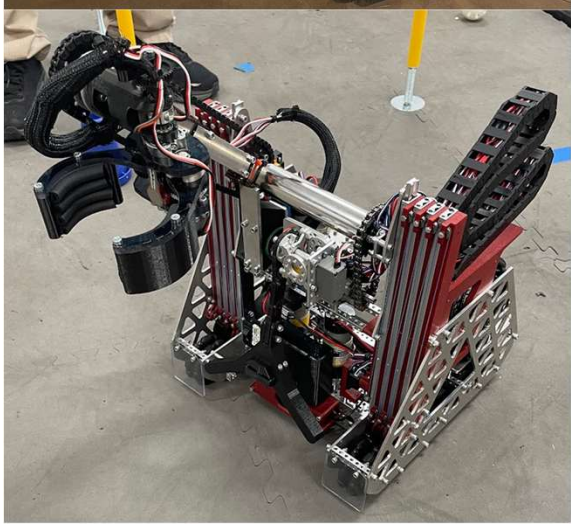
Specs:

- Linear leg control mechanism
- 180° Hip range of motion
- Knee bend of 37.46° with 130.72° extension
- 6701-2RS 12x18x4mm ball bearing for reduced servo load
- Femur width of 22.85mm
- Electronics: 12 MG92B micro servos, RPi Zero 2W, RPI camera module 3, RPi Servo Bonnet, and 9-DOF IMU

FTC Robotics 12th grade

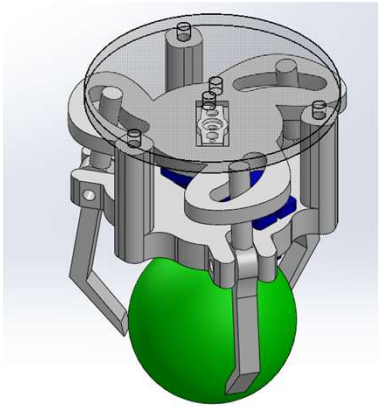
- Co-Mechanical Design Lead
  - Used trade studies and experience to determine overall design approach
  - Responsible for completion of drivetrain, telescopic slides, and cone righting mechanism
- Lead Technician
  - Assembly and maintenance
  - Post-processing on in-house CNC parts





Specs:

- Virtual four-bar mechanism
- Automated claw via force sensor integration
- Sensor embedded wishbone for pole detection
- Belt and gear drivetrain with four powered wheels
- Custom floss pick to upright mini-cones in under a second.



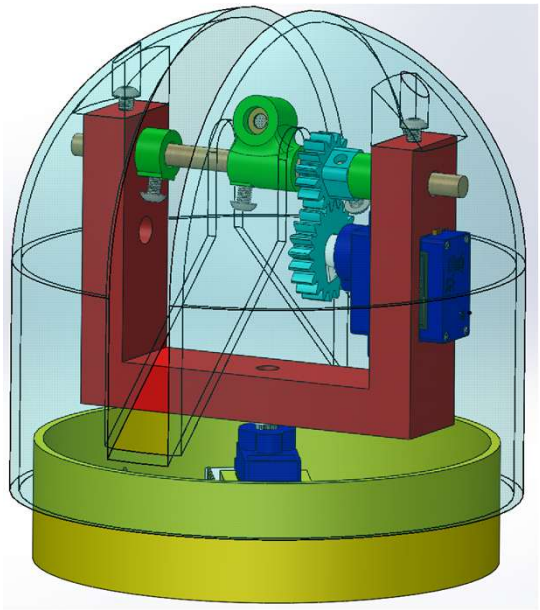
Hatchling Robot

Goal:

- Pick up 1.5in diameter foam balls

Specs:

- Three finger claw end-effector controlled by the rotation of a micro servo
- Custom lazy Susan bearing allows servo rotation of crane system
- Hoist transmission has unused clutch mechanism for future additions
- Crankshaft mechanism used to raise and lower catcher
- Electronics: 2 SG90 micro servos, Arduino Uno R3, 3 DC motors, 2 L298n motor drivers, HC-05 Bluetooth module

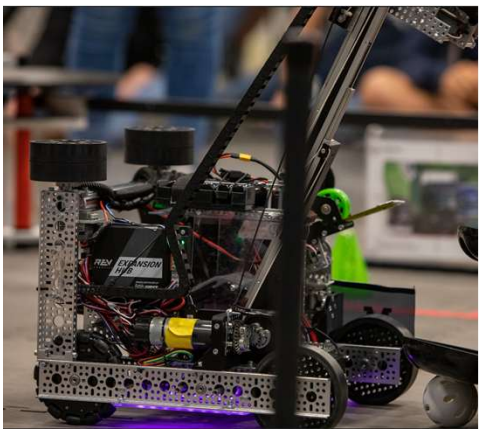


Bluetooth Laser Turret

- Responsible for elevation axle components, shell, and programming electronics.

Specs:

- 240° Elevation range of motion
- 180° Azimuth range of motion
- All parts have a corresponding drawing with ISO tolerancing
- Electronics: 2 SG90 servos, ESP32 Pico



FTC Robotics 11th/8th grade

- Competed at World's (Best international 180 teams)
- Co-Mechanical Design Lead
- Responsible for robot assembly and maintenance