Team 19
NASA Lunabotics Competition

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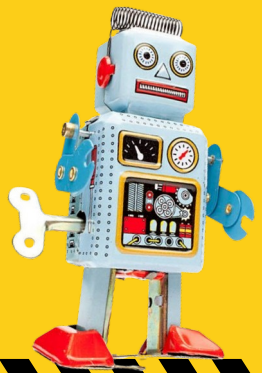
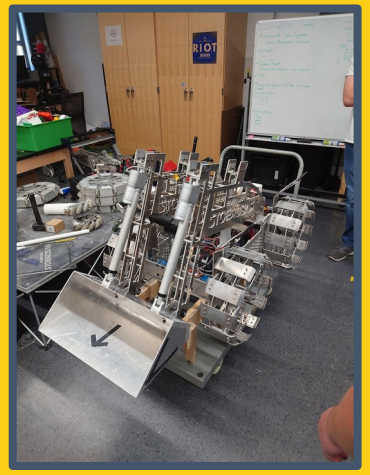


Abstract

- NASA holds an annual lunabotics competition, where schools nationwide compete to build the best lunar robotics system
- Previous years’ robots have faced significant challenges
- Our goal for this year is to fix as many of the past mistakes as possible

Problem

- ❑Unreliable communication system
- ❑Electromagnetic interference
- ❑Cumbersome robot testing
- ❑Unsatisfactory GUI
- ❑No additional cameras for arena awareness



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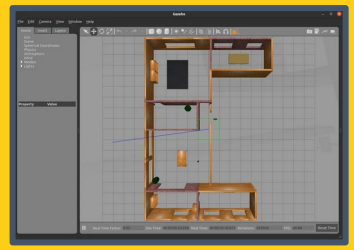
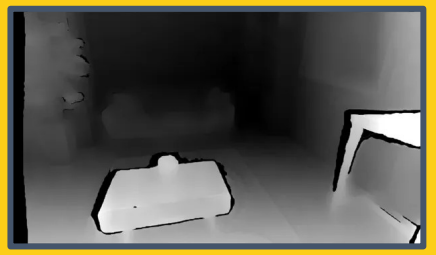
Objective



- ❑Update communications systems
- ❑Build a comprehensive simulation
- ❑Implement full autonomy using stereo camera system
- ❑Adjust the GUI to make information easier to read
- ❑Implement deployable awareness camera

Background



Key Concepts

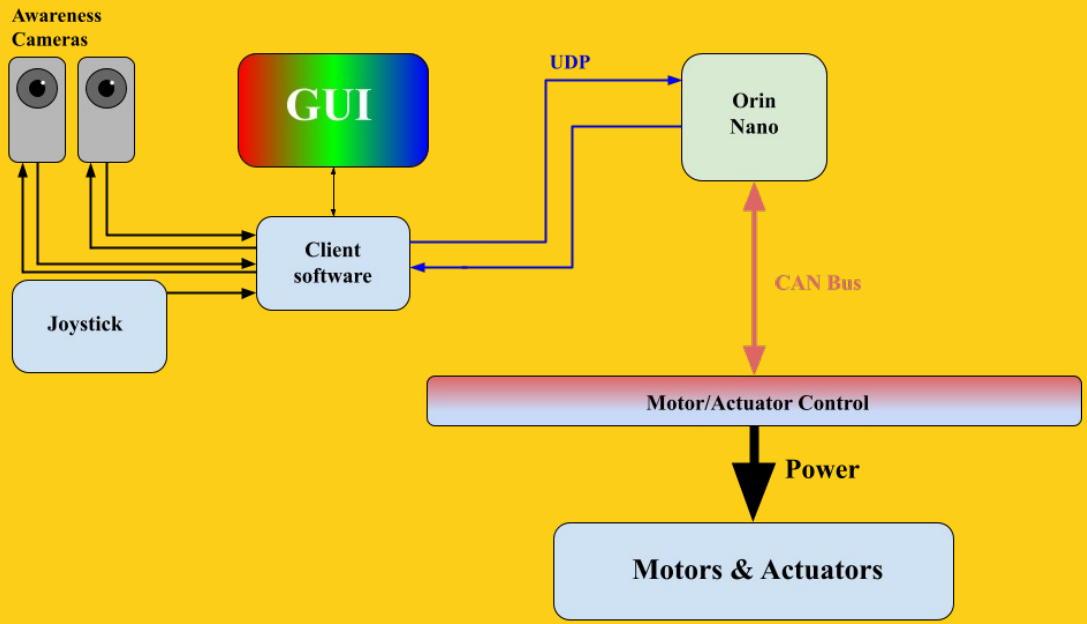
- ❑BP-1, ROS2, Jetson Orin Nano, CAN Bus, ROS Gazebo, GTKMM, ZED API, UDP

Related Work

- ❑Previous years' robots
  - ❑ Skinny
  - ❑ Spinner
  - ❑ Scoop
  - ❑ Shovel

Use Cases

- ❑Fully autonomous but can be controlled (WiFi)
- ❑Camera feed for navigation
- ❑Driver can take control using the joystick.



Requirements

- ❑Robot dimensions, maximum mass, and navigation
- ❑The robot should be autonomous to help gain extra points
- ❑The robot needs to have a bucket to pick up piles of dirt
- ❑The robot must avoid any obstacles during testing and the competition
- ❑Joystick that allows basic driving controls and bucket movement
- ❑Runtime requirement that the robot must achieve during the competition and testing

Key Personnel

Ryan Cheng – responsible for refinement of the GUI

Joseph Folen – responsible for revising the communication system and protocols for improved reliability

Landon Reynolds – responsible for refinement of the GUI

Maxwell Thursby – responsible for the implementation of the simulation software and optimization of the electrical components of the robot

Blake Williams – responsible for revising the communication system and protocols for improved reliability

Kevin Zheng – responsible for the implementation of the simulation software and optimization of the electrical components of the robot

Questions?