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Robot Simulation Analysis

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Robot Simulation Analysis



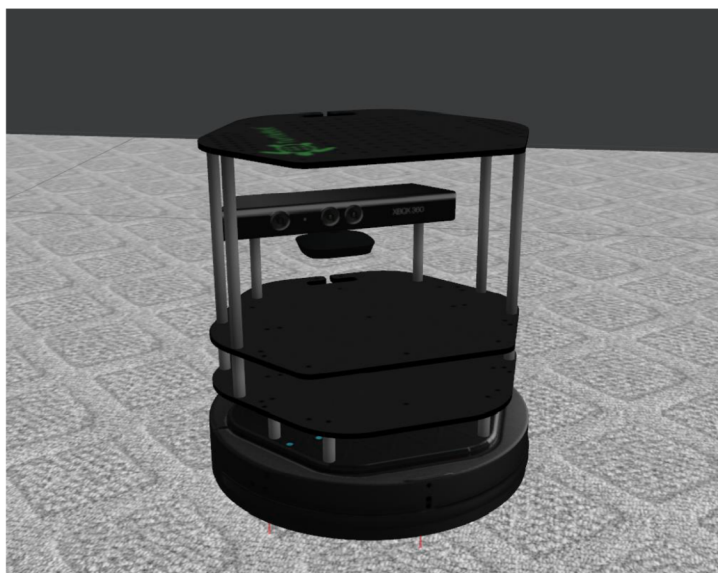
Southwestern Oklahoma State University

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Definitions

- ROS – Robot Operating System. An open source suite of programs designed to be implemented in various robot platforms
- SLAM – Simultaneous Localization and Mapping. The estimation of an unknown map and an agent's location inside it
- Turtlebot – Entry level robotics platform, utilizing open source software

Turtlebot Example



Objectives

- Simulate virtual robot for test and analysis
- Analyze SLAM solutions using ROS
- Assemble a functional Turtlebot
- Emphasize projects related to current research trajectories for NASA, and general robotics applications

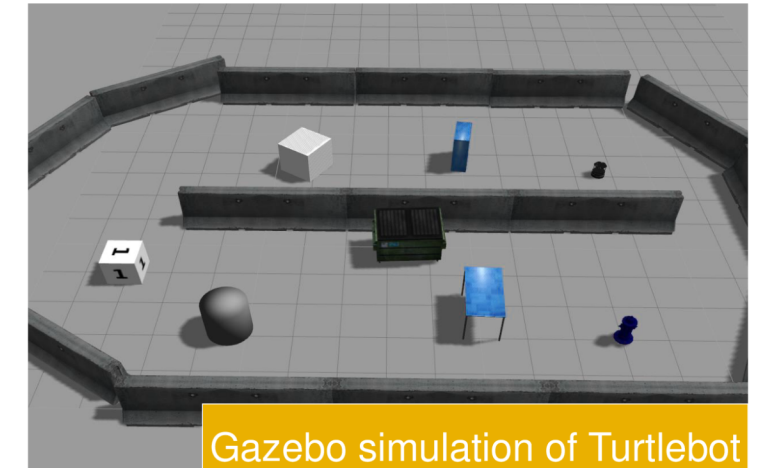
Project Future

- Use already completed work to create a functional, physical robot
- Utilize Researchers previous experience in image segmentation to accomplish:
- Have robot SLAM autonomously
- Analyze and compare SLAM approaches
- Have robot seek out a particular object in volume

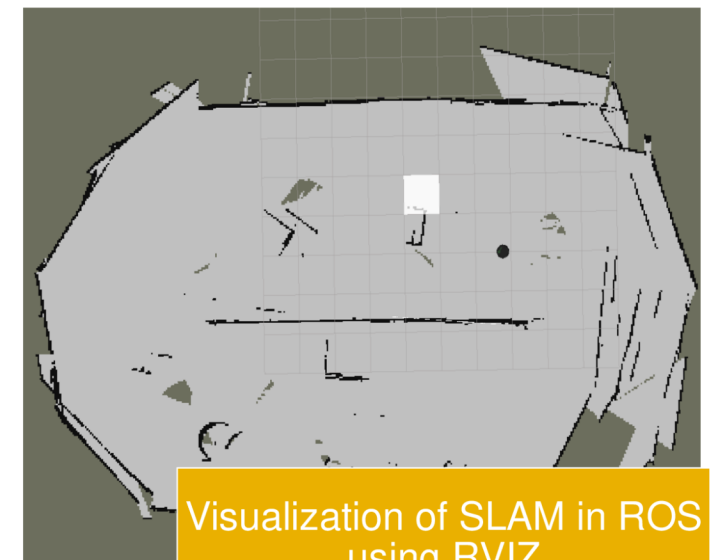
Methods

- Created robot simulation: Gazebo
- Implemented SLAM
- Capable of autonomous navigation and simple objectives

Visualization



Gazebo simulation of Turtlebot in crafted environment



Visualization of SLAM in ROS using RVIZ

References

- Quigley, M., Conley, K., Gerkey, B., Faust, J., Foote, T., Leibs, J., ... & Ng, A. Y. (2009, May). ROS: an open-source Robot Operating System. In *ICRA workshop on open source software* (Vol. 3, No. 3.2, p. 5).
- Durrant-Whyte, H., & Bailey, T. (2006). Simultaneous localization and mapping: part I. *IEEE robotics & automation magazine*, 13(2), 99-110.
- ROS Documentation. (n.d.). Retrieved from ROS Wiki: wiki.ros.org