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Robot Simulation Analysis

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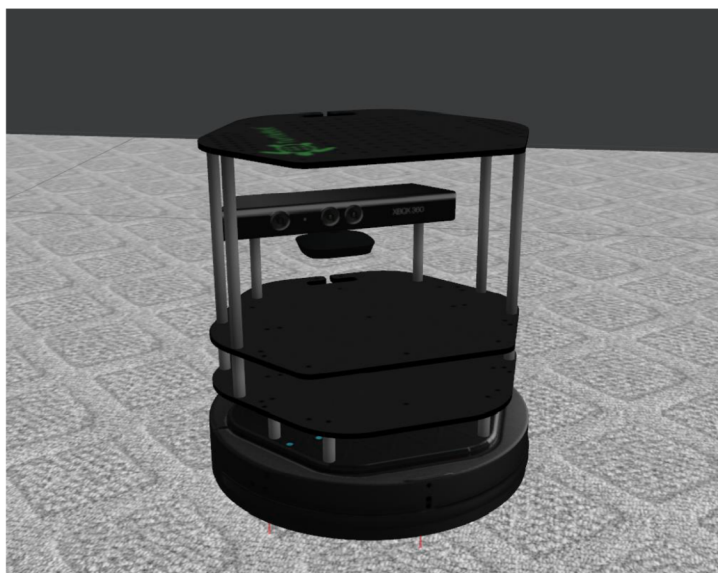
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Southwestern Oklahoma State University

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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
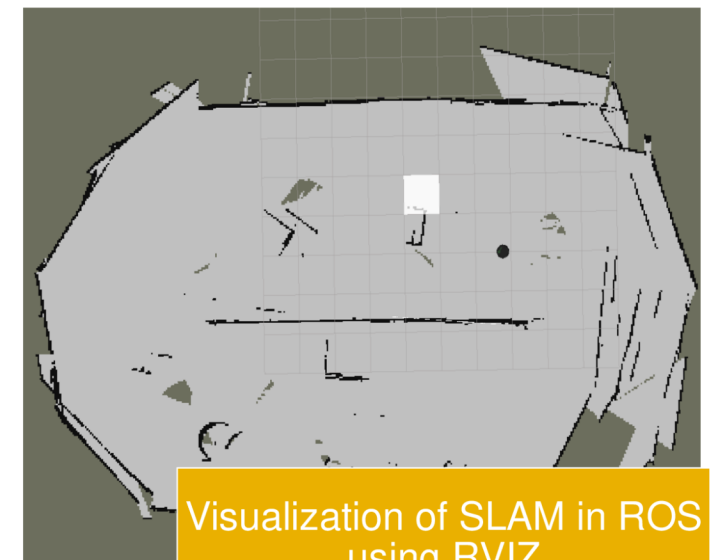- Have robot seek out a particular object in volume

Methods

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

Visualization
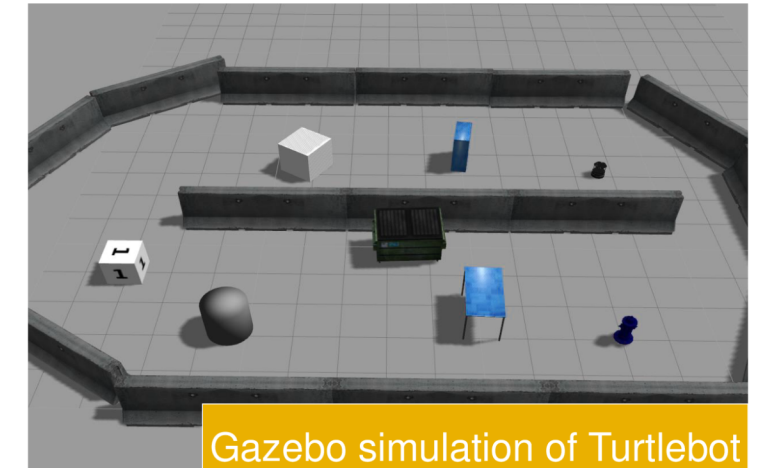
Gazebo simulation of Turtlebot in crafted environment

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.

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