Modelling the Environments and the Robots

Midterm Presentation

Elif Erbil, Eesha Kumar

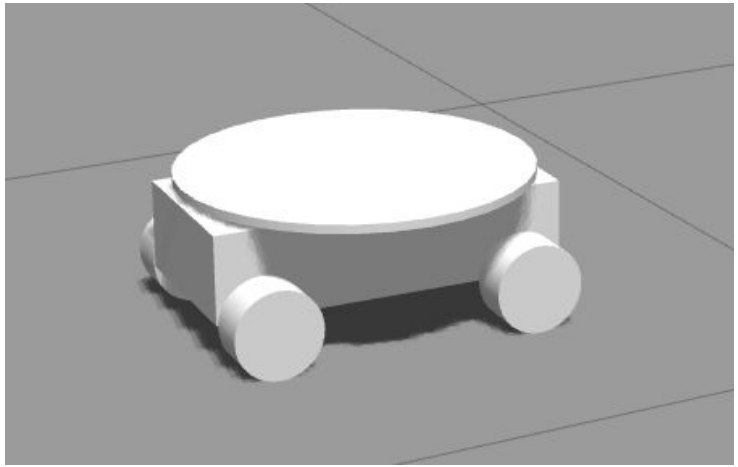
Software Engineering in Robotics
Summer Semester 2019

Milestones

- Modelling the Kiva robots with sensor, actuator and transmitter functions
- Modelling a simple warehouse
- Controlling the robots for some basic tasks in a static warehouse model
- Adding ids to items in the storage units to control which items are being carried
- Parametrization of warehouse attributes (size of the warehouse, number of kiva robots and conveyor belts)

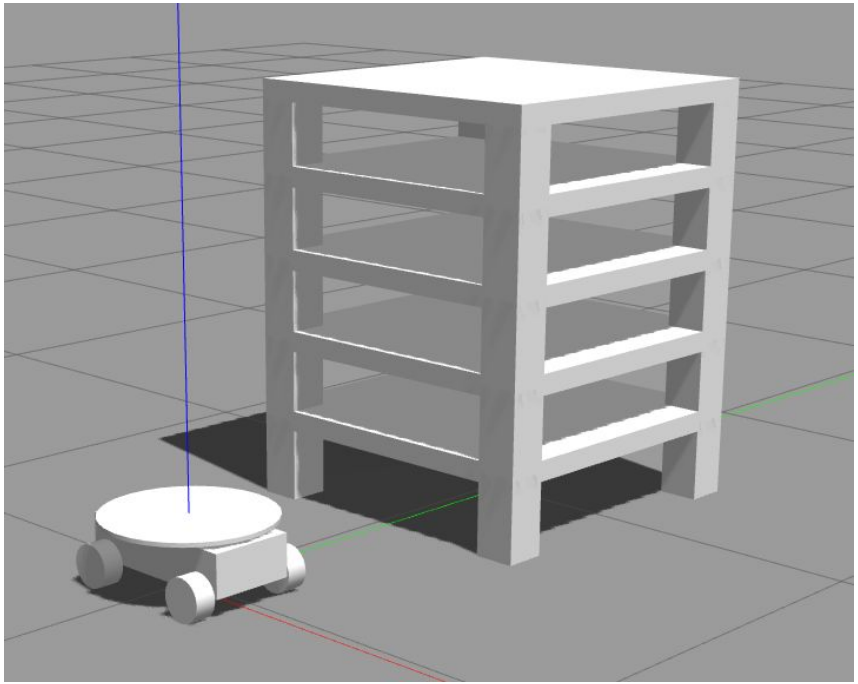
Robot Component

- Robot
  - Body
    - Chassis
    - Wheels
  - Tower
    - Tower plate
    - Tower body
  - Joints
    - Revolute joints
    - Fixed joints



Warehouse Component

- Floor
- Light Source
- Ground Plane
- Storage Unit
  - Shelf
    - Body
    - Legs
- Conveyor Belt



Functionality

- Kiva Robot
  - Move
  - Lift
  - Rotate
- Warehouse
  - Spawn Shelves
  - Spawn Robots

Demo

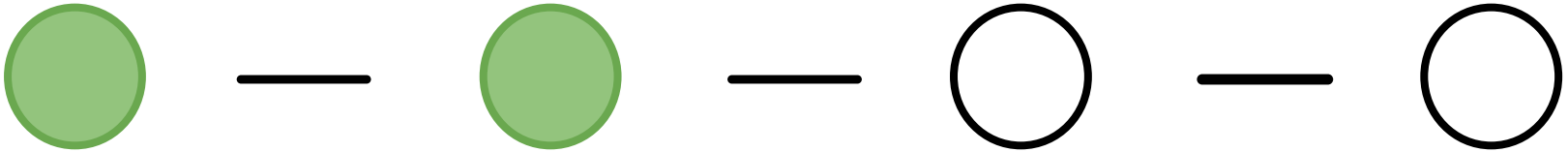
Open Issues

- Oscillation during rotation
- Publishing/subscribing is dependent on Gazebo
  - We need to look for a way to communicate information for ROS consumption
- Unable to load multiple model plugins
- Changing the orientation of the robot according to its destination

Next Steps

- ROS Communication
  - Control the movement of robots
  - Getting ids of the storage units
  - Publishing robot information to the API
- Adding meshes to robots and warehouse objects
- Cleaning and refactoring our code
- Creating multiple warehouses with different sizes
- Testing (if time permits)

Timeline



First Status Update

Basic models for the warehouse and its components

Basic models for the Kiva robots

Midterm Presentation

Core functionality of Kiva robots

A fixed warehouse model to test the functionality of Kiva robots

Second Status Update

Setup ROS to control the movement of the robot

Adding ids to items on the shelves to create realistic simulations

Final Presentation

Parametrization of the properties of the warehouse and creating a warehouse according to these parameters

Adding meshes to the robot and warehouse objects

Questions