Autonomous robot navigation in mixed environment

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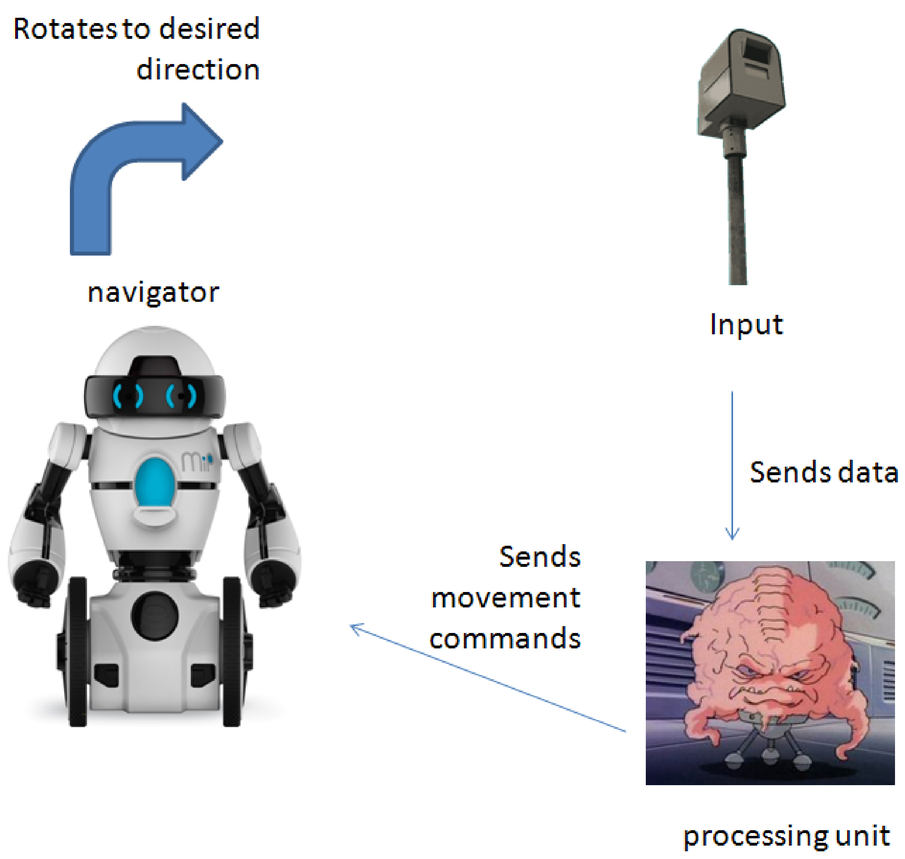
Introduction

- Models of crowd behavior predict human group behavior
- Implementing such model (SCT- Social comparison Theory) using ROS

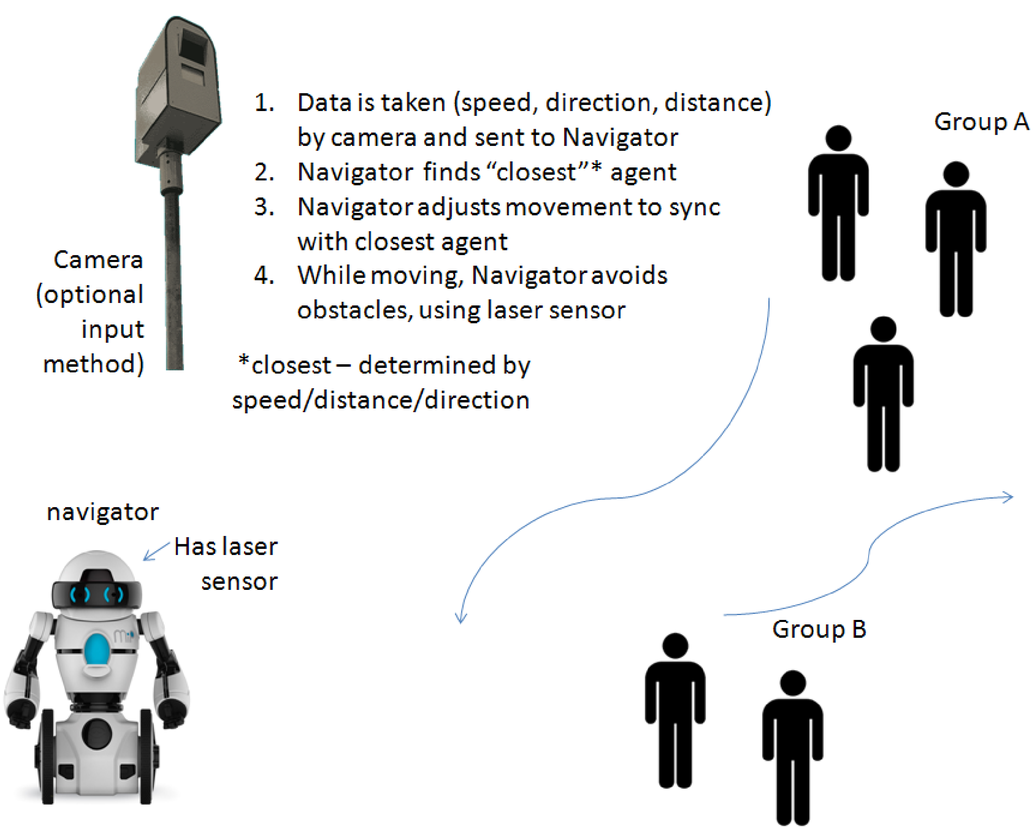
Project's Objectives

- Gather information on other agents in environment based on
  - speed
  - direction
  - distance
- Synchronize movement with similar agents
- Move while avoiding obstacles (e.g. walls, other robots)

Design



How It should Work



ROS

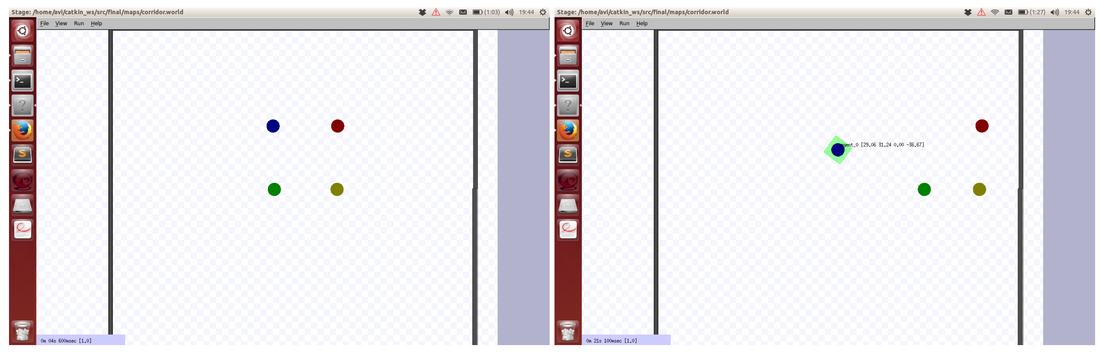
What is ROS?

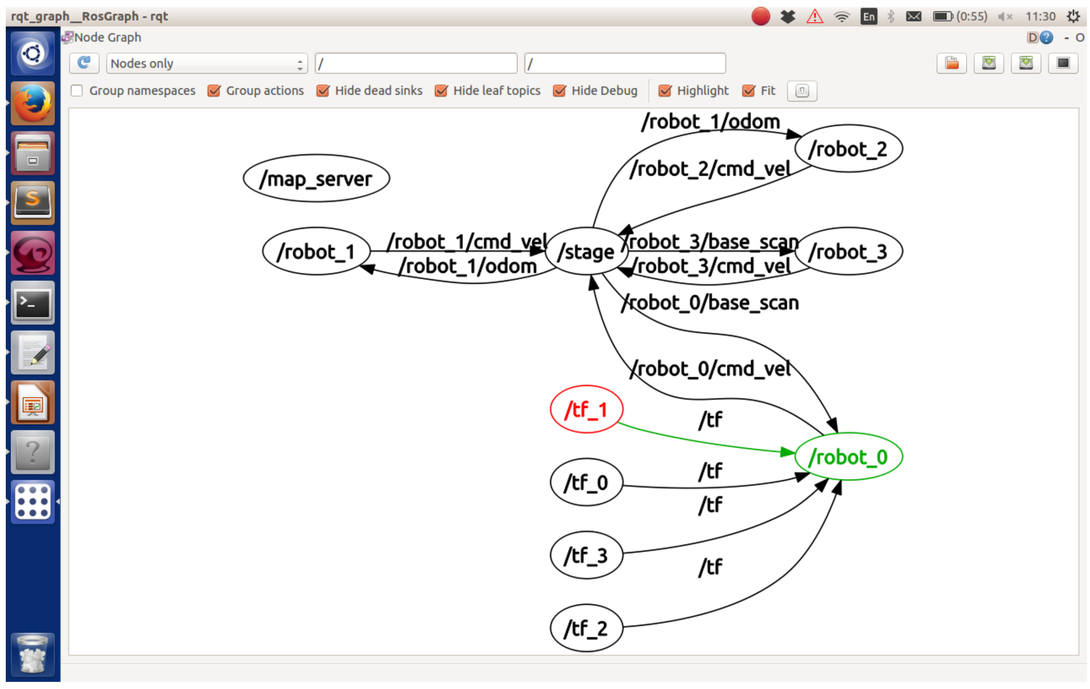
- Set of software libraries and tools to help build robot applications
- Provides drivers, algorithms and useful tools for robotics project
- The whole simulation is done using the ROS framework

Simulation on ROS framework

Tools provided by ROS

- laser sensor: added as part of robot's definition - replaces actual laser sensor
- topics: kind of a message board for sharing data (speed, distance and direction of each agent in the environment) - replaces camera
- world files: allows to create a costume environment
- stage: simulator





- Left: Starting position of a stage simulation with an empty square world file
- Right: Same simulation, showing stats (name, location and direction) of agent 0
- Bottom: RQT-Graph - another tool of ROS, showing the frames in the simulation and the connections between them