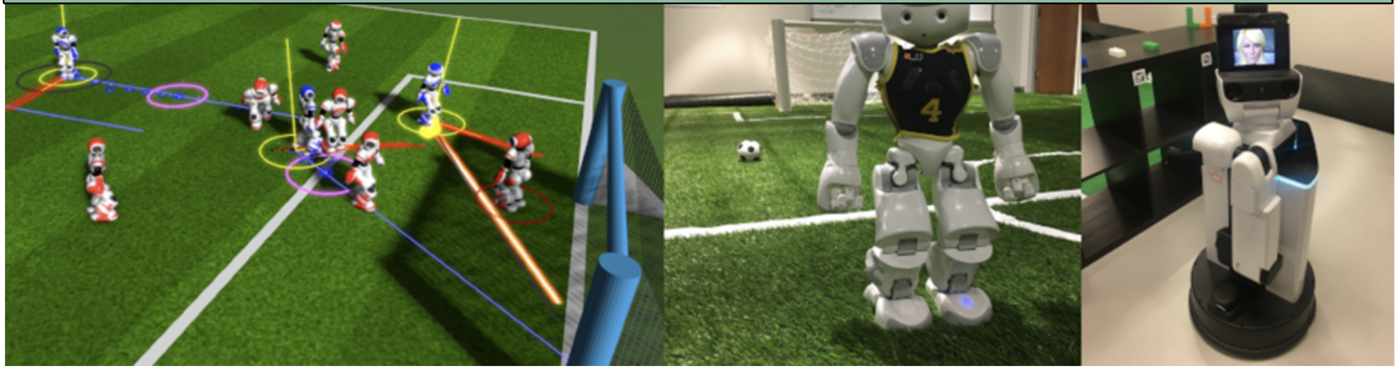
Fall 2024 - CSC398 Autonomous Robots - In-Class Activity 1



Due date: 08/29/2024, 12:30 PM, in-class activity. We will check the results directly in class.

Get to know ROS by inspecting the simulation of an HSR robot.

1. Setup the HSR simulation:
   `cd` into your local repository folder. Update the repository on your lab machine by typing `git pull` in a terminal.

2. `catkin_make` or `'c'` to compile, and `source devel/setup.bash` or `'s'` to source the environment.

3. Run the scene: `./isaac_sim_hsr_start_empty.sh`

4. Start rviz (a ROS-based debugger) in a different terminal. Please remember to source the environment first: `rosrun rviz rviz`

5. Open another terminal and list rosnodes and rostopics using:
   ```
   rosnode list
   rostopic list
   rostopic echo [TOPIC]
   rostopic hz [TOPIC]
   ```
   For more information take a look at the slides or:
   http://wiki.ros.org/rostopic
   http://wiki.ros.org/rosnode

6. Command a desired velocity to the robot from the terminal (rostopic pub [TOPIC). Search for the right command_velocity topic in a new terminal and publish a left turn by using
   `rostopic pub [TOPIC] geometry_msgs/Twist '{linear: {x: 0.0, y: 0.0, z: 0.0}, angular: {x: 0.0, y: 0.0, z: 0.5}}'`. This puts the angular.z component to **0.5**, which will make the robot rotate around the z-axis, resulting in a left turn. How many degrees did the robot turn? Suppose the entire command took 2 sec. Remember, the angular speed is in $\frac{rad}{s}$. And degrees $=$ radians $\times \frac{180^\circ}{\pi}$.

   Publish a 90° left turn, followed by a 1m drive in the x-direction.

7. Use `teleop_twist_keyboard` to control the moves of the robot through a terminal. Run the command
   `osrun teleop_twist_keyboard teleop_twist_keyboard.py cmd_vel:=/hsrb/command_velocity`