

Sandbox

The problem

The assignment for today is simple but very important: install and get acquainted with ARGoS. Please follow the installation instructions in the file `argos.pdf` to install the ARGoS simulator. Afterwards, go through the reference documents for Lua (`lua.pdf`) and the foot-bot (`footbot.pdf`) and get acquainted with writing control software for robot swarms in ARGoS.

Experiment layout

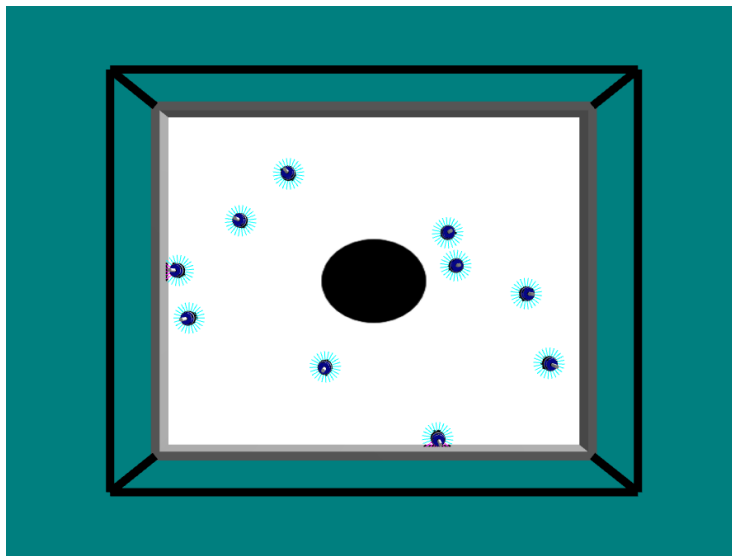


Figure 1: The sandbox experiment.

In this experiment, ten footbots are distributed randomly in the experimental arena. The arena contains a black patch in the middle and is bounded by walls.

Robot layout

In this experiment, the robot has access to the following sensors and actuators:

Available sensors	Available actuators
<code>robot.id</code>	<code>robot.wheels</code>
<code>robot.random</code>	<code>robot.leds</code>
<code>robot.range_and_bearing</code>	<code>robot.range_and_bearing</code>
<code>robot.colored_blob_omnidirectional_camera</code>	
<code>robot.proximity</code>	
<code>robot.motor_ground</code>	

Objective

There is no explicit objective for this exercise. Instead, try to make yourself familiar with ARGoS and Lua. For a start you can try to implement the following behaviors:

1. Move the robot forward with a velocity of 15 cm/s.
2. Rotate the robot in place.
3. Move the robot backwards and following an arch trajectory.
4. Move the robot in circles, and print the readings of the proximity sensors on the screen.
5. Move the robot forward until it finds an obstacle in front, then change the velocity and move it backwards until it senses an obstacle in the back. Repeat this cycle continuously.

Maybe you can try your hand also at more complex behaviors?

1. Move the robots and have them change the color of their LED when they pass over the spot in the middle.
2. Move the robots and have them change the color of their LED according to detected obstacles. Red, when the robot faces an obstacle in the front; blue, when it senses obstacles in the back; green, when there are no nearby obstacles.
3. Move the robots and have them communicate with each other. Print the IDs of all robots that are in communication range of each other on the screen.
4. Have the robots choose a random LED color at the beginning of the experiment. During the experiment, move them and print the colors of all LEDs that the robots can see on the screen.

The goal here is to get as familiar with the simulator and the robot as possible in order to facilitate the future exercise sessions. The more you do now, the better!