Experiments

Infrared#1

Infrared sensors test

Goal

Test the integrated infrared sensors of the Roomba, and see if they are working properly.

Setup

We will place the Roomba at different distances from the wall, and for each sensor compare the distance measured by the sensor with the real distance.
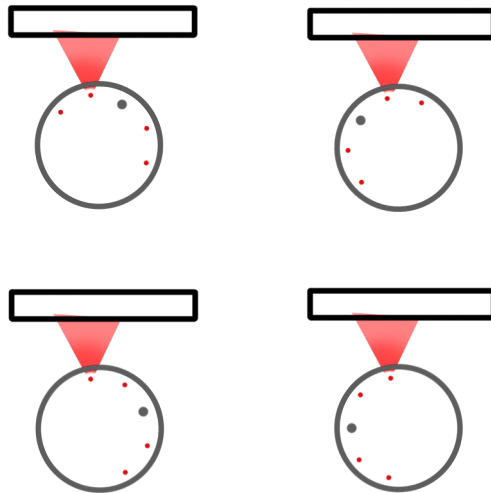

Figure 1: The experiment will be performed with each sensor

Real distance	Measurement	Error
	S1_a1	
S1_A	S1_a2	S1_E_a
	S1_a3	
	S2_a1	
S2_A	S2_a2	S2_E_a
	S2_a3	
...	...	...

The distances that we will measure are: 5 cm, 10 cm, 15 cm, 20 cm, 30 cm, 40 cm, 50 cm, 75 cm and 100 cm.

For each sensor and for each distance, we will take three measurements, and use its mean to calculate the error.

Expected Results

We expect that error to be similar among all sensors, that it increases with the distance, and it to be around 10%.

Motors#1

Wheel motors test

Goal

Test the motors of the Roomba, and see if they are working properly. This is necessary to command and track movement.

Setup

We will make the Roomba move forward different distances, and for each distance we will make three measurements of the distance traveled by the Roomba. We will check that the Roomba is moving towards the expected position.

The Roomba will move forward for the following distances: 20 cm, 40 cm, 60 cm, 80 cm, 100 cm.

We will repeat the experiment three times for each distance. We will take the mean of the three measurements to calculate the error.

Expected Results

We are expecting that the Roomba to move forward without deviation for each distance. The error should be around 5%.
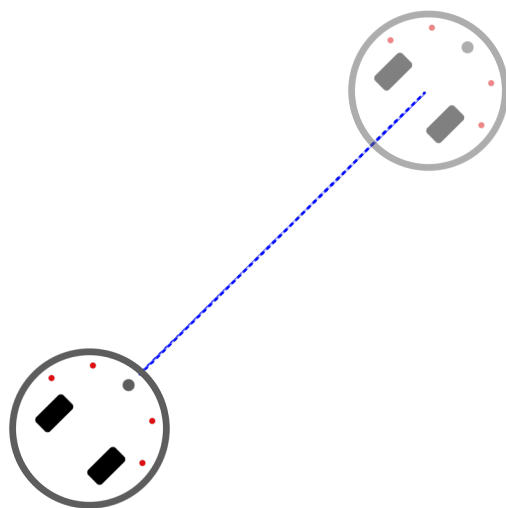
Figure 2: The Roomba to should move forward without deviation