

Worksheet 10

Gap Detection

Purpose: Finding Gaps between objects

Ultimately, we want our robot to enter a field cluttered with object and exit at the other side without colliding with any object. This is called *navigation* and is not that straightforward. These activities are a step towards that goal.

2. Finding a Gap

The situation is shown on the right, there are two obstacles and the robot, starting from anywhere, facing roughly towards the blocks should rotate and move through the gap.

The idea is to use the locations of each obstacle to find the centre of the gap. Then we can use this value to get the error from the centre of the retina, as we did for the object detection.

Look at the diagram on the right, where one block is located at x_0 and the other at x_1 .

(a) Write down an expression for x_C the centre of the gap using x_0 and x_1 .

(b) Now write down an expression for the **error** signal.

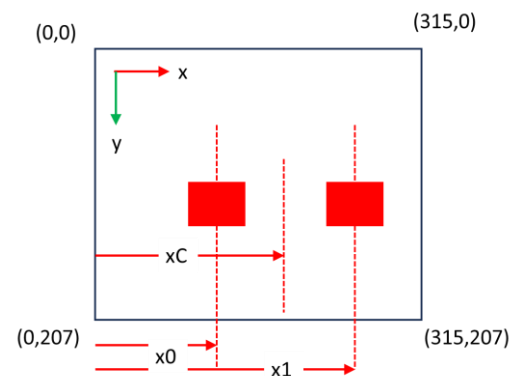
(c) Open the sketch **Pixy2_2403_R_FindGap** and insert code for your expressions for x_C and **error** where indicated.

(d) Try out your solution, first holding the robot above the deck. If all is well, try it out on the arena.

3. Some possible limitations and problems

Learning Outcome 1,4

Book Chapter 5



(a) If one object is farther away than the other, then the algorithm may not work. Do you see why?

(b) The above code is very naïve; it assumes that two blocks are visible on the retina. What happens if the robot rotates too far so it loses sight of one block? How could it behave sensibly in such a situation? Perhaps you could tweak the code to make this work.

4. Moving like an insect

Insects fly around light sources at night,
