

# Comp2403 Navigation between Objects

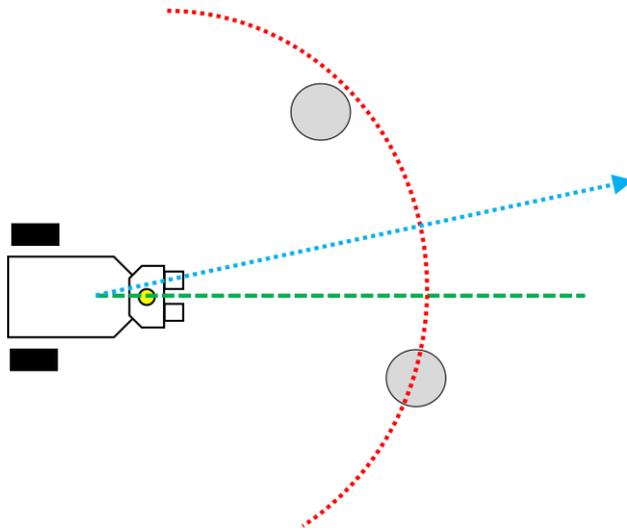
C.B.Price Almost October 2021

<b>Purpose</b>	(i) To navigate between two objects
<b>Files Required</b>	Arduino Sketchbook and Octave scripts on the web-pages.
<b>ILO Contribution</b>	LOs 1
<b>Send to Me</b>	nix
<b>Homework</b>	Read chapter 4

## Activities

### 1 The Scenario

Here's the scenario we shall investigate. The robot scans 180-degrees in front of it and locates the angular location of objects. It then finds the centre of the gap between the objects, rotates towards this gap and moves through it



The green dotted line shows the current robot *pose*, the blue dotted line is the direction the robot should move in, grey circles are obstacles, and the red dotted line is a threshold distance, the robot only responds to objects at or closer than this distance. This is currently set as

```
#define distThreshold 300
```

(b) Open the sketch **CBP\_2403\_R\_Gap\_Navigation**. Let's assume the turret servo is centred, so we can start of in **STATE\_SCANNING**. Add code to do the following, in this order, inside the **for(...)** loop

- get the **dist** to any object
- if **dis** is less than **distThreshold** then set the value of **labelArray[...]** at this **angle** to 1
- else set it to 0

Test the sketch and you should see labels = 1 being assigned when the object is detected, else 0 where there is no object.

(c) Now change the exit condition to transit into **STATE\_ANALYSING**

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## 2 Completing the STATE\_ANALYSING

(a) Complete the code in the **for(...)** loop to extract each **index** from **labelArray[angle]** and if it is 1, then add 1 to **totalAngle** and also increment **count**;

(b) Then, outside the **for(...)** loop use **totalAngle** and **count** to calculate the **averageAngle**.

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## 3 Complete the STATE\_ROTATE\_TO\_GAP

(a) Get the robot to rotate to the **averageAngle**.

(b) Now get the robot to move through the gap. You'll need another state.

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