

Worksheet 9

Object Detection

1 Getting to know the image coordinates.

Here you will use some function calls from Pixy's API to locate an object's position on the retina and its width and height.

(a) Load the sketch **Pixy2_2403_R_Investigate** and look for any code referring to the object **pixy**. Look for the following:

- Where the camera is initialized
- Where the 'blocks' in the image is retrieved
- Where attributes (x, y, width, height) are read.

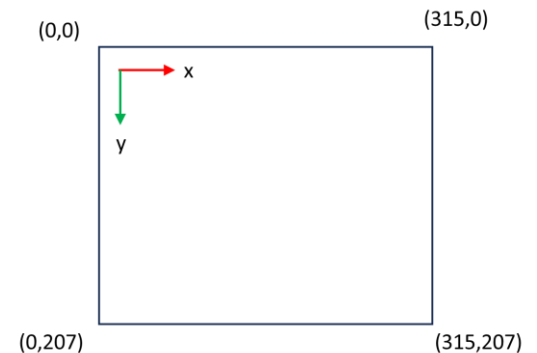
(b) Connect Pixymon and place a red object into the camera's FOV. Make sure the object is cleanly identified (you may need to adjust **File-> Configure** and turn on the LEDS **Action-> Toggle lamp**).

(b) The retina coordinate system is shown on the right. Move the object to the left and the right and note down values of **x** in particular where **x=0** is located. Also note down the **x** when the object is in the middle of the FOV.

(c) Now move the object towards and away from the camera and look at how **width** and **height** change. Is this what you would expect?

Learning Outcome 1,4

Book Chapter 5



2. Moving towards an Object

When we want to move straight towards an object then the object must lie at the centre of the retina. Let's see how to do this. Open up the sketch **Pixy2_2403_R_ObjectTrack**,

(a) We need to compute the **error** value which is zero when the object is at the retina centre. Write code to do this. HINTS: you will need to use **x** and **halfFieldWidth**. Since the latter is an **int**

you will need to typecast it to a float like this **(float)halfFieldWidth**.

(b) Now use the **error** in the lines for **driveL** and **driveR** to make the motors turn in opposite directions. Think or find out by trial and error.

(c) Hold the robot off the deck, face the object and rotate the robot so the object moves across the visual field. Do the wheels correctly rotate to centre the robot? If no, then check your drives.

(d) Now test your robot in the arena. Move the object by hand and see if the robot can track the object.

3. Getting your robot to follow another.

Try to get this working!

4. Moving like an insect

Insects fly around light sources at night, and their trajectories are often spirals. One way this could happen is if the light is not centred on the retina but offset from the centre to one side. This produces spirals.

Modify your code to make this happen.

Robot Vision 3