

# Worksheet 8

## PixyCam Setup

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To configure the PixyCam to respond to red objects.

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**Learning Outcome 1, 4**

### 1. Mounting the Camera

Mount the camera to the front of the robot as shown on the right. Plug into the ribbon cable already connected to the Arduino.

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**Book Chapter 5**

### 2. Learning a red object

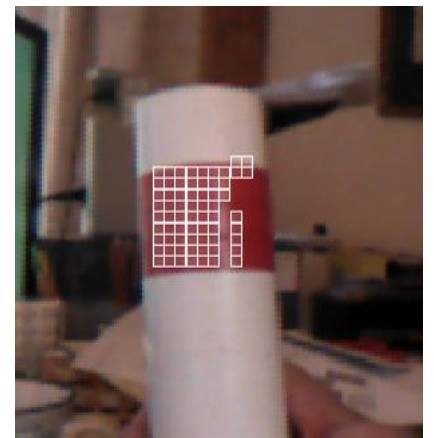
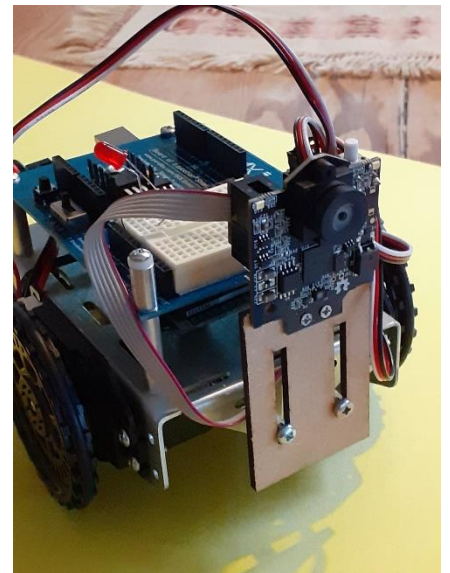
Here we shall investigate what the PixyCam sees, and how to tweak it to recognize red objects in its field of view.

- Download and install **Pixymon** exe from the webpages. Fire this up.
- Carefully connect the cam to the PC through the USB cable – you should see what the cam sees
- Now do the following steps

- Wait till all the cam's LEDs have stopped flashing
- Hold down the white button – the LEDs will cycle through colors. Release the button when you get a red (after around 10 secs)
- Move the red object (on the cylinder) in the cam's field of view. You should see something similar to the image on the right.
- Move the object so that the grid covers as much of the red part as possible.
- Press and release the white button. You should get something similar to the image below.

You can see that the cam has segmented and labelled the red component. Now move the object around and you should see the cam tracks it easily. Maybe you need to repeat the above

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steps, until you are happy that the cam can detect the object at small and large distances.

### 3. Tweaking the Camera

(a) You may find you're getting *false positives* and *false negatives*. To tweak the detection, bring up the Configure dialogue box **File > Configure** then under **Pixy Parameters** select the **Tuning** tab. Move slider 1 to the left if you want it to be less inclusive (false positives) and to the right if you want it to be more inclusive (false negatives). Look at the example below.

The screenshot illustrates the configuration of the Pixy camera's detection parameters. The top section shows a video feed with three red bounding boxes labeled 's=1' on a white cylindrical object, indicating a high detection rate. Below this, the 'Pixy Parameters' dialog box is shown with the 'Tuning' tab selected. The 'Signature 1 range' is set to 4.000000, and the 'Signature 2 range' is set to 3.500000. The bottom section shows the same video feed with only one red bounding box labeled 's=1', indicating a more selective detection. Below this, the 'Pixy Parameters' dialog box is shown with the 'Signature 1 range' set to 2.200000, and the 'Signature 2 range' is set to 3.500000. This demonstrates how adjusting the Signature 1 range can reduce false positives.

#### **4. Estimating the Camera's Field of View and Range**

(a) Keeping the object at the centre of the camera's FOV move it close and far and estimate the range at which the object is detected.

(b) Place the object at half the maximum range and move it from side to side. Estimate the maximum angle from *forward* where the object is detected.

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