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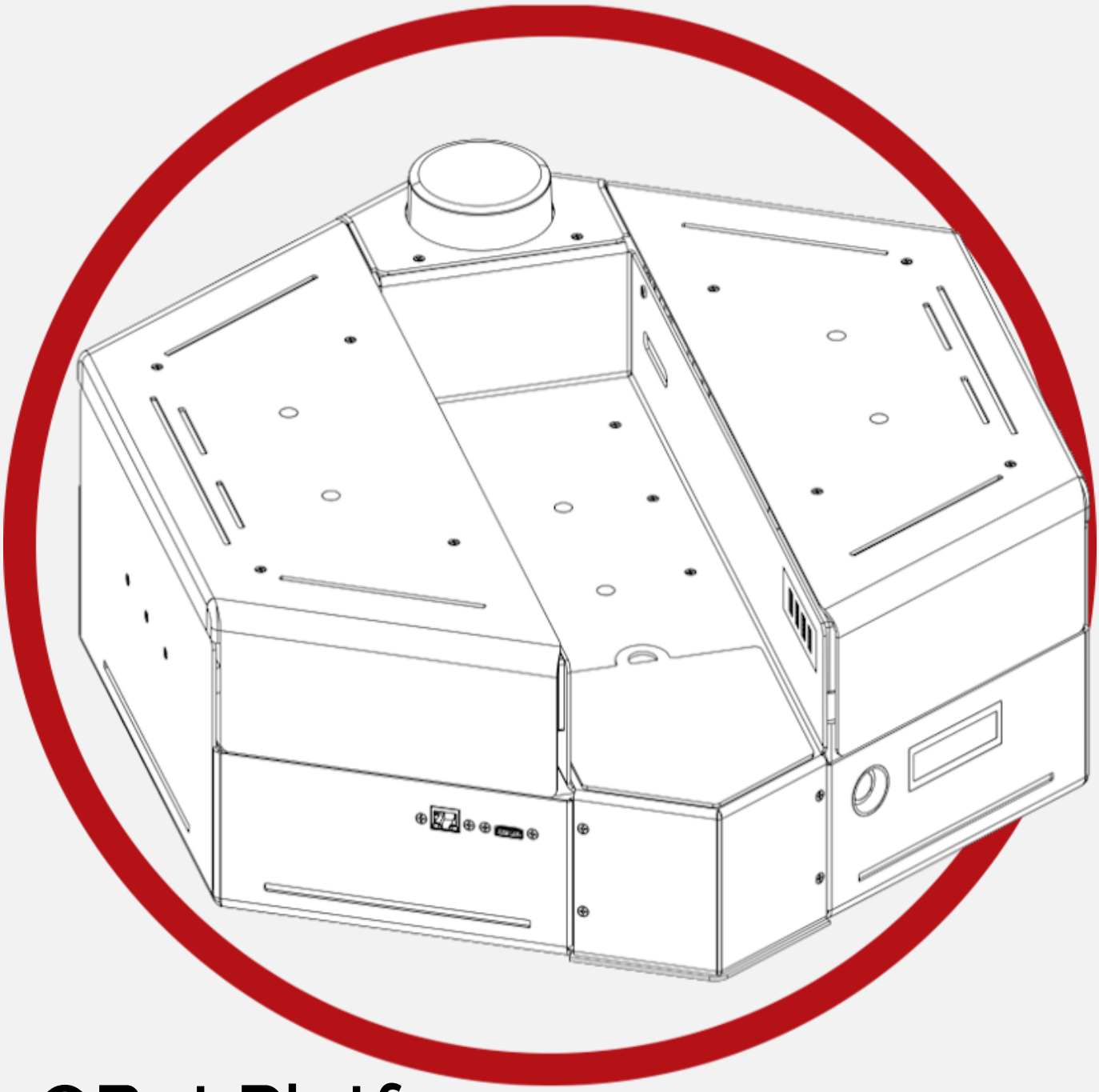

QBot Platform

Object Detection

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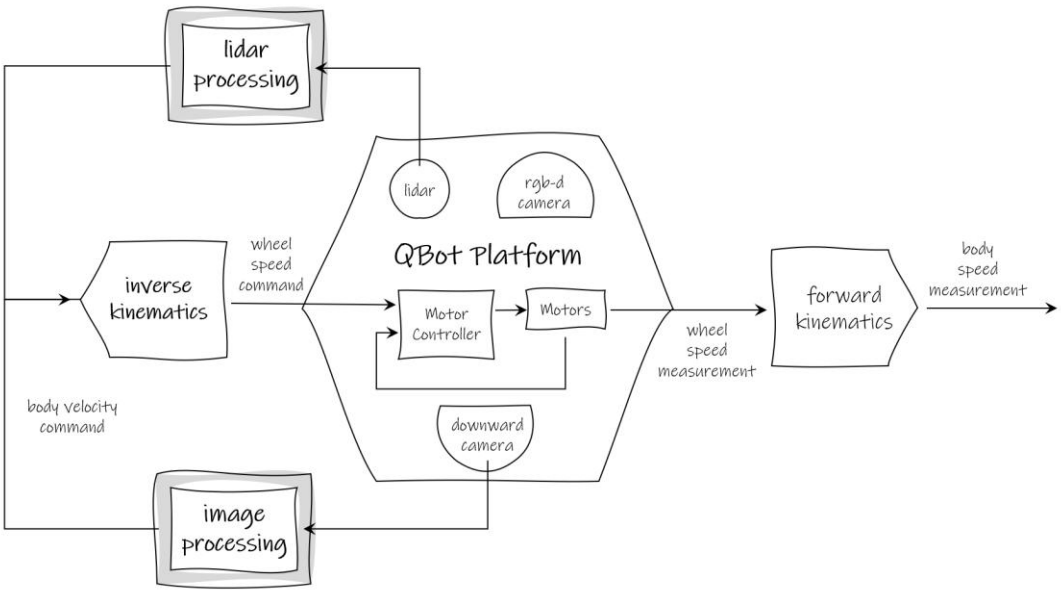
QBot Platform – Application Guide

Object Detection

Why implement object detection?

Having completed the line following application in the previous lab, your QBot Platform should navigate lines autonomously. This automation brings with it a risk. With increasing autonomy, comes decreasing user involvement in controlling the motion of a robot gone rogue. If it misses the line, or approaches an obstacle while searching for it, it should have the added capability to stop before damaging itself or the environment.



Line Following

With the line following application implemented in the previous lab, your QBot Platform should autonomously traverse white lines on the reconfigurable maps that were provided. Your joystick should also let you manually move the QBot back in case it misses the line.

Lidar Processing & Obstacle Detection

In this lab, you will capture scans from the 2D Lidar on the QBot Platform and adjust the measured data to account for the Lidar's forward displacement. Resampling for a fewer number of points will also allow you to speed up future processing.

Following this, you will create a safety window in front of the QBot, whose size and direction will change based on the commanded forward and turn speeds of the robot. This will allow the QBot Platform to scan for obstacles in directions it is about to move.

If the Lidar provides an obstacle scan inside the safety window, motion will be disabled, providing the high-level autonomous safety required by this lab.

Before you begin

Please review the following before beginning this lab,

1. Ensure you have completed the following labs in your language of choice,
    a. **Play** lab from Skills Progressions 0
    b. **Line Following** lab from Skills Progressions 1
2. Ensure that you have read the **Lidar Inverse Measurement Model** concept review,