

QBot Platform

Object Detection

© 2024 Quanser Inc., All rights reserved.

Quanser Inc.
119 Spy Court
Markham, Ontario
L3R 5H6
Canada

info@quanser.com
Phone: 19059403575
Fax: 19059403576
Printed in Markham, Ontario.



For more information on the solutions Quanser Inc. offers, please visit the web site at:
<http://www.quanser.com>

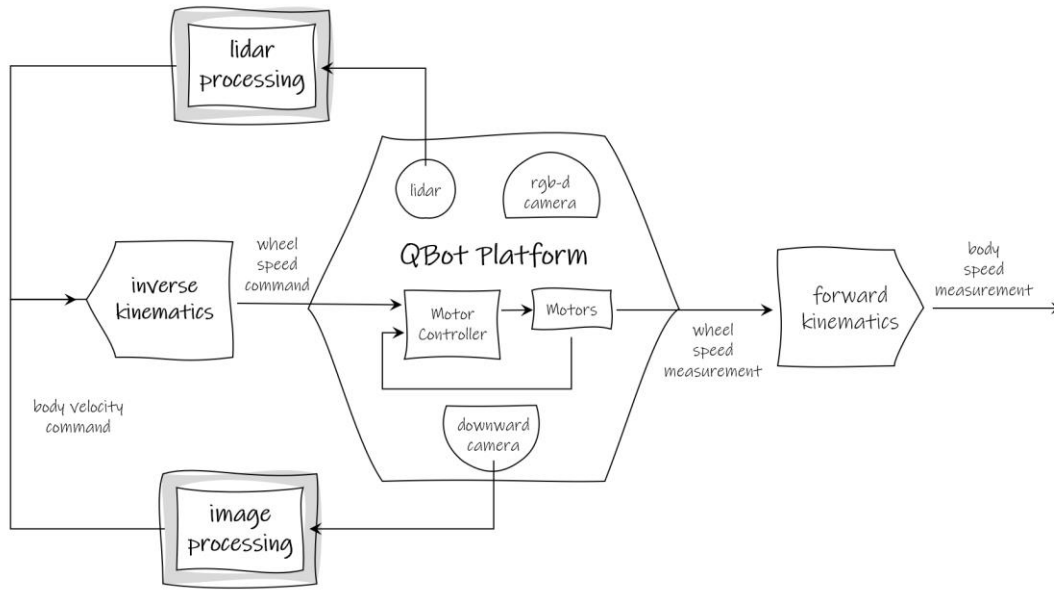
This document and the software described in it are provided subject to a license agreement. Neither the software nor this document may be used or copied except as specified under the terms of that license agreement. Quanser Inc. grants the following rights: a) The right to reproduce the work, to incorporate the work into one or more collections, and to reproduce the work as incorporated in the collections, b) to create and reproduce adaptations provided reasonable steps are taken to clearly identify the changes that were made to the original work, c) to distribute and publicly perform the work including as incorporated in collections, and d) to distribute and publicly perform adaptations. The above rights may be exercised in all media and formats whether now known or hereafter devised. These rights are granted subject to and limited by the following restrictions: a) You may not exercise any of the rights granted to You in above in any manner that is primarily intended for or directed toward commercial advantage or private monetary compensation, and b) You must keep intact all copyright notices for the Work and provide the name Quanser Inc. for attribution. These restrictions may not be waved without express prior written permission of Quanser Inc.

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,