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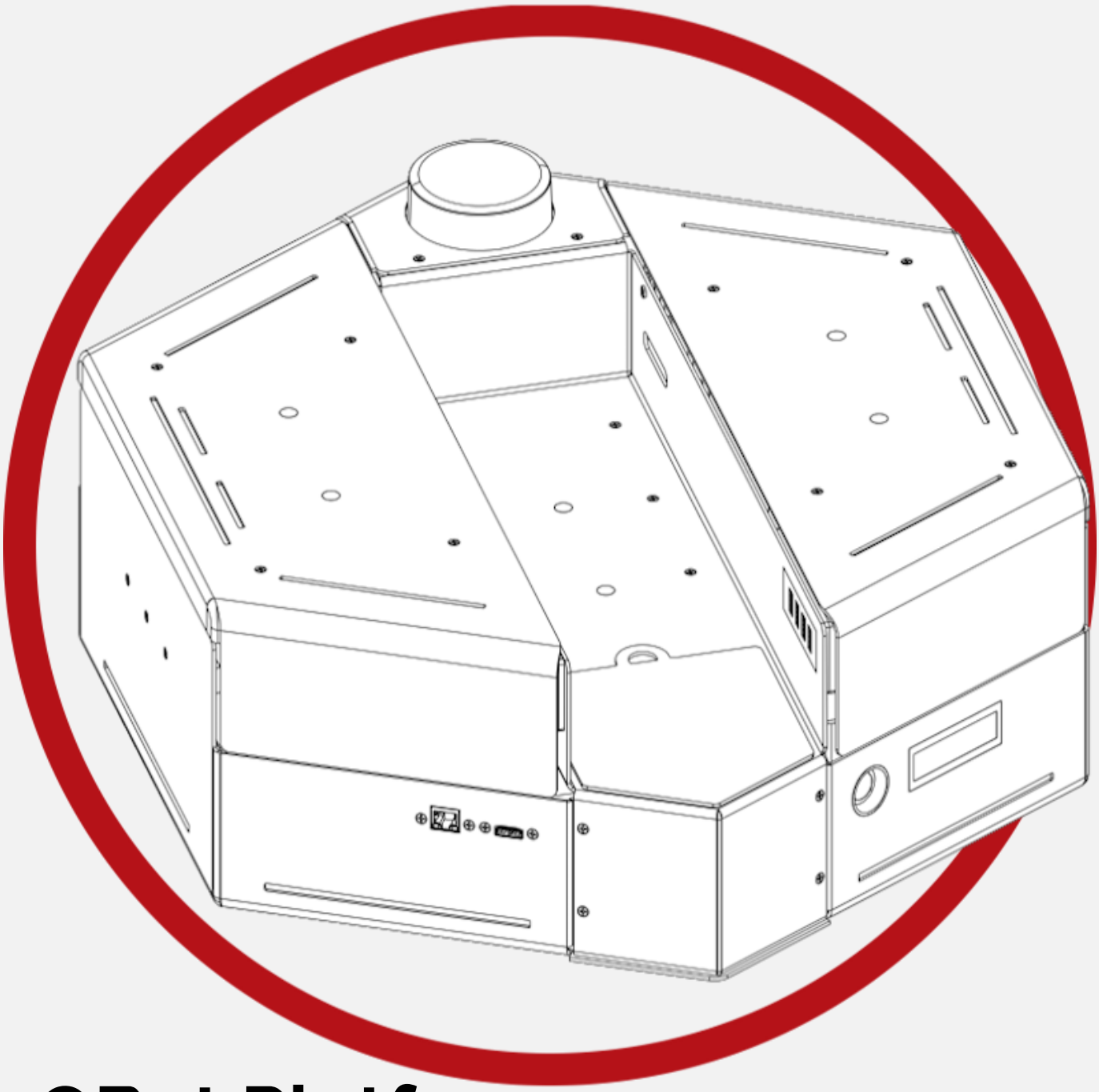

QBot Platform

Line Following

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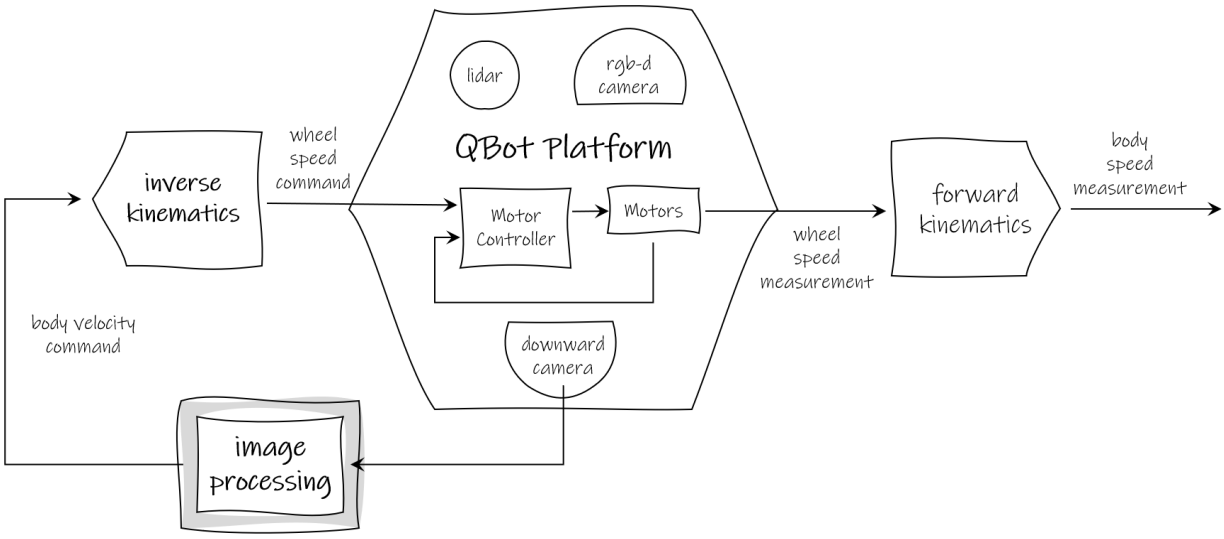
QBot Platform – Application Guide

Line Following

Why implement line following?

With the forward and inverse kinematic formulations implemented, applications such as line following provide opportunities to explore task automation. Both labs encouraged you to follow a line visually, wherein, the operator acted as the visual servoing controller, taking actions for the QBot based on the motion and tracking information observed. With line following, the robot will be able to take decisions to track the line automatically.



Arcade Drive

In this application, the QBot Platform's downward camera will provide visual feedback regarding the line to be followed, and an image processing routine will provide the body velocity command to automate line following. As such, inverse kinematics will be used to map the body velocity to the corresponding wheel velocity commands for the QBot Platform to follow.

Image Processing

This routine will focus on thresholding the image to identify bright markers in the image corresponding to the line, while ignoring the areas around it. Connected component labelling will be utilized to extract positional information about the line in the image, and this information will be translated into body velocity commands.

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. **Forward Kinematics** and **Inverse Kinematics** labs from Skills Progressions 1
2. Ensure that you have read the following concept reviews,
    a. Color Spaces
    b. Image Filters
    c. Blob Detection