ROS-based Robot Vision and Control: "Catch me if you can!"

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Robot Vision and Control: Why so important?

- Vision:
  - Pattern and color recognition
  - Feature detection
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- Applications include:
  - Search and rescue missions
  - Inspection
  - Automated repairs

Outline

Robot Detection and Tracking

Goal:

- Detect and follow a randomly-moving miniature robot

[1] The OctoRoACH results from a collaborative effort between U.C.Berkeley and Motile Robotics Inc.
The Create is designed and distributed by IRobot, Inc.

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Incorporate:

- Integration in ROS environment
- Visual detection using a built-in laptop camera
- Path planning and collision avoidance control routines

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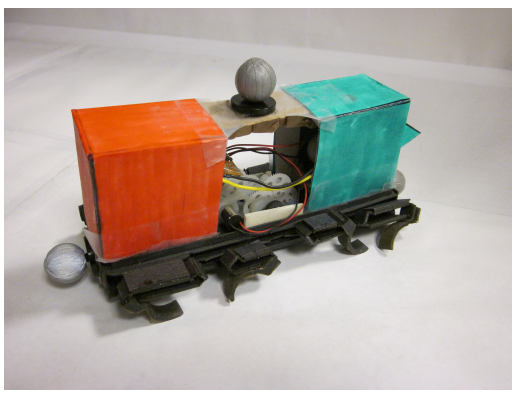
Hardware[1]:

OctoRoACH



IRobot's Create

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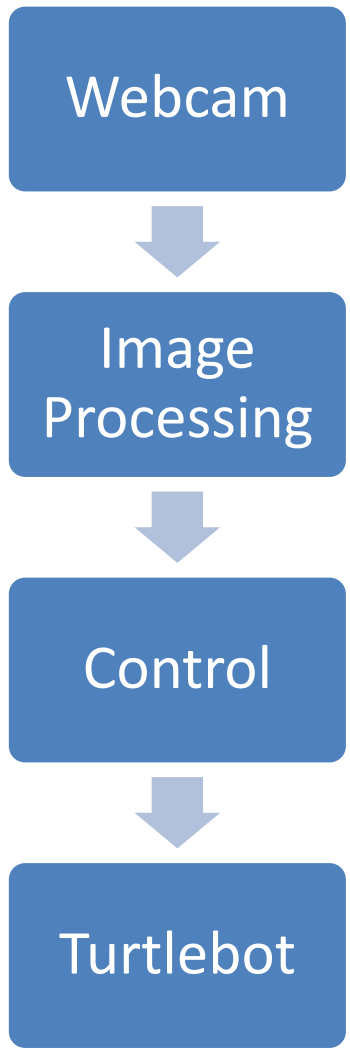
Procedure in ROS



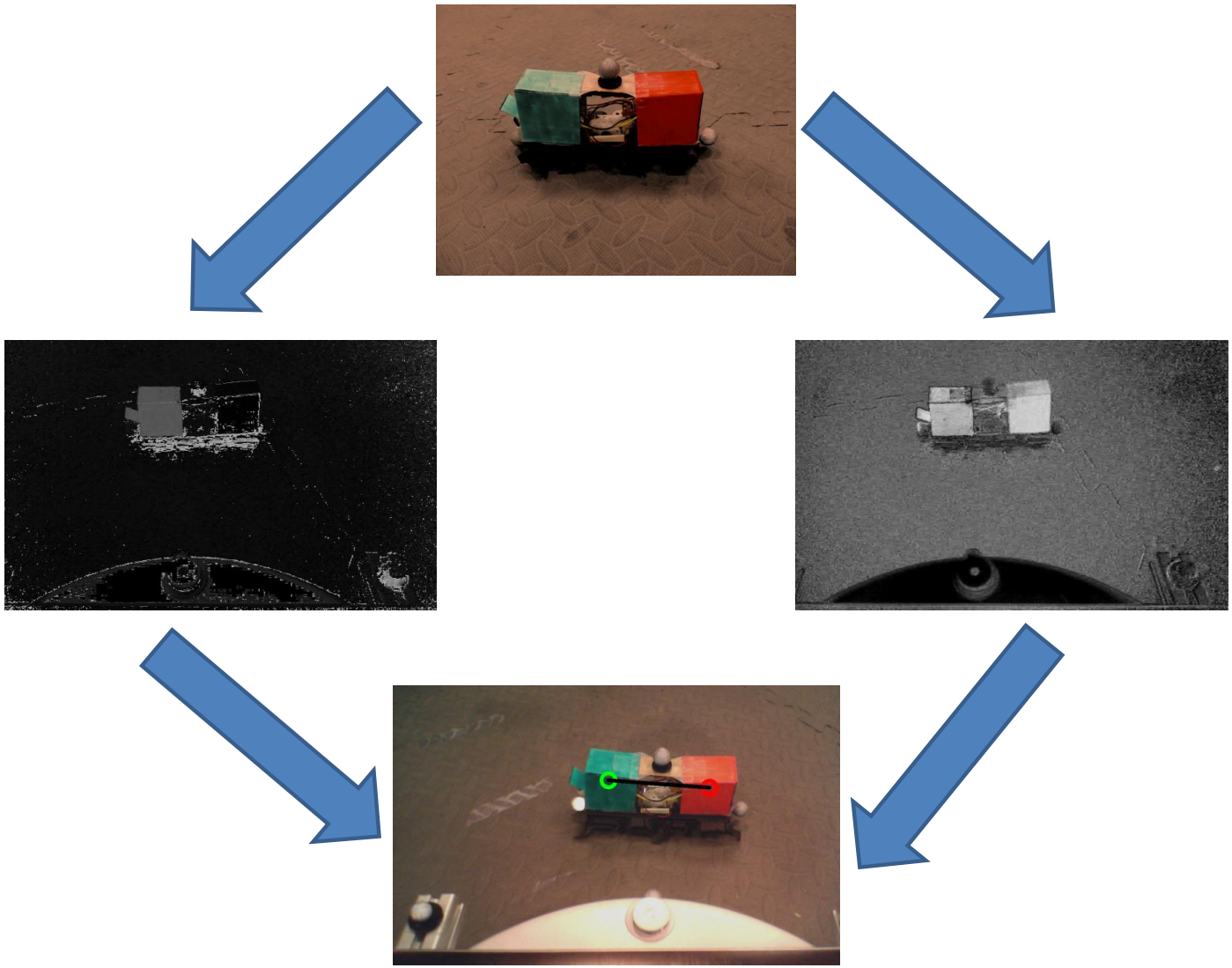
gscam-pkg
Pub: Image msg

Sub: Image msg
Pub: Red point (xyz)
Green points (xyz)

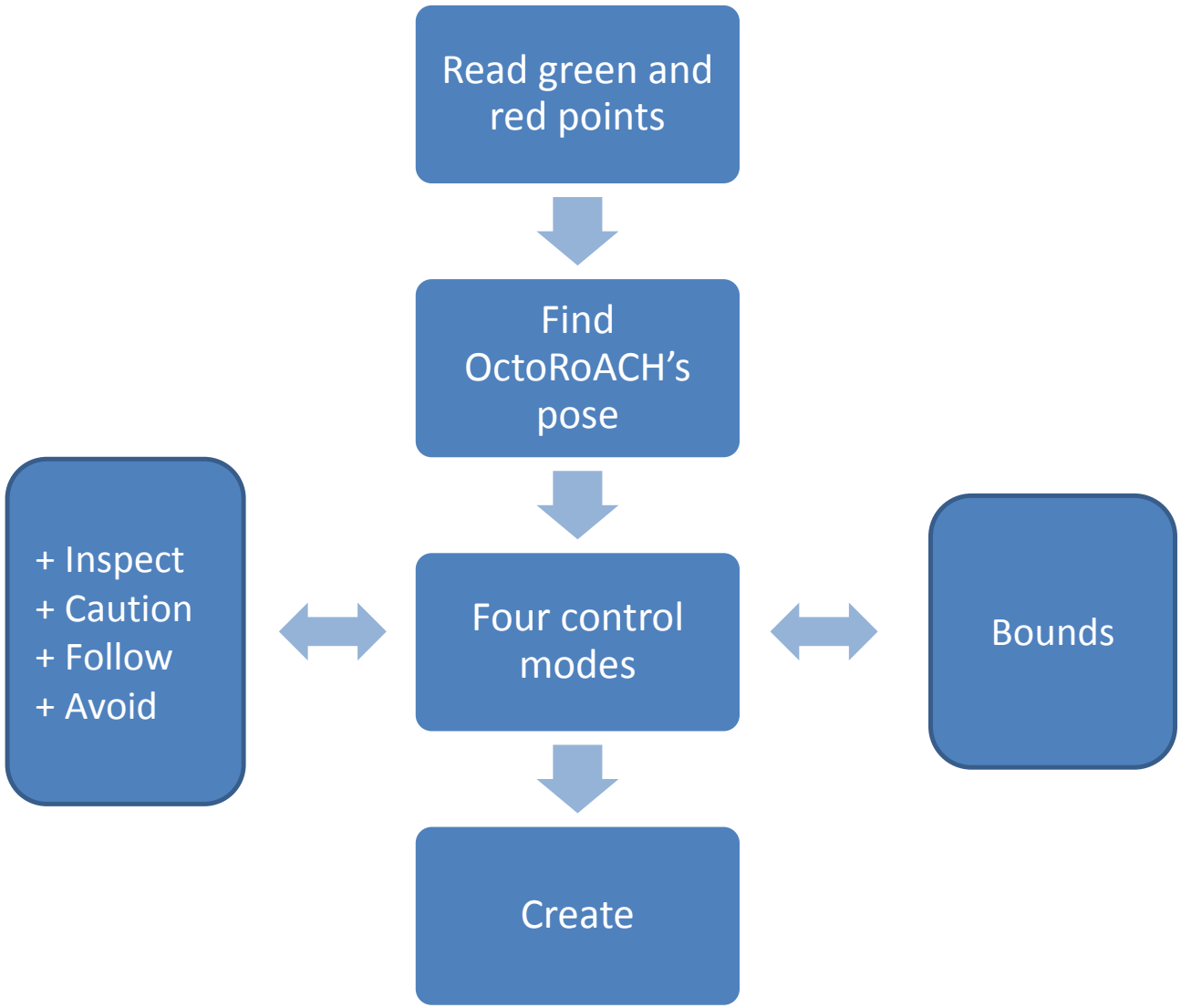
Sub: Red point (xyz)
Green points (xyz)
Pub: Velocities (linear, yaw)

Sub: Velocities (linear, yaw)

Image processing flowchart

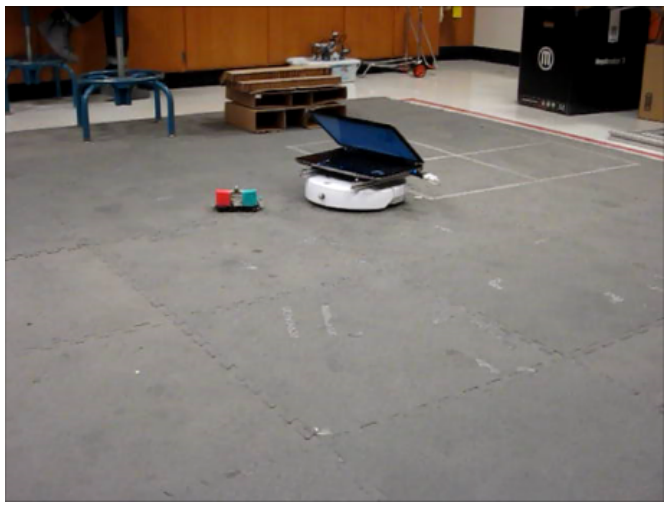


Control policy flowchart

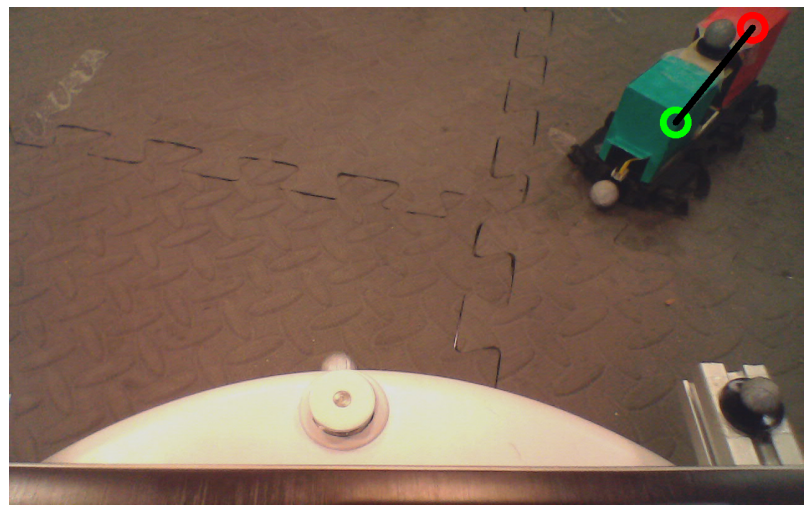


Results

Observer's view



Robot's view



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  - Can be adapted for other platforms as well

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- Conclusions:
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- Improvements:
  - Robustification of image filtering
  - Adaptive control mode bounds
  - Completely random motion
  - Testing in more complex environments

Thank you!