Getting to Know Your Robot Part 2

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Class 11

Charlie Kemp
https://charliekemp.com

My Conflict of Interest Statement

Dr. Kemp is both an associate professor at Georgia Tech and the chief technology officer (CTO) of Hello Robot Inc. where he works part time. **He owns equity** in Hello Robot Inc. and is an inventor of Georgia Tech intellectual property (IP) licensed by Hello Robot Inc. Consequently, **he receives royalties** through Georgia Tech for sales made by Hello Robot Inc. He also benefits from increases in the value of Hello Robot Inc.

Summary: If Hello Robot does well, I do well.

Georgia Tech

hello robot

Plans for Today

- Slides
  - openness and transparency
  - iterating to success
- Class discussion
  - [Problem Statement V2.0](#)
  - [The Class Schedule](#)
- Continue getting to know your robots
  - Carefully go through the materials included with your team's robot
  - Start familiarizing yourself with your team's robot
  - Online resources
    i. https://docs.hello-robot.com/
    ii. https://github.com/hello-sanchez/stretch_ros_tutorials
  - I recommend installing Noetic and using it
    i. https://github.com/hello-robot/stretch_ros/blob/dev/noetic/install_noetic.md
    ii. https://github.com/hello-robot/stretch_ros/tree/dev/noetic
  - Reserve time to carefully store your team's robot

Why do I strive for openness and transparency?

- Your team owns your team's work. You can choose to keep it private, make it public, or something in between.
- My personal preference is to be open and transparent.
  - This preference is reflected in my lab, the company I co-founded, and this class.
  - The forces of darkness and fear are pervasive and loud.
  - Openness and transparency promote truth and understanding.
  - The world is complex enough without people intentionally obscuring and misleading.
  - Two of my favorite things in the world resulted from open collaboration.
    - Wikipedia
    - Linux
    - I remember the world before they existed. They've made a big difference in my life.
  - My natural tendency is to be shy. Openness and transparency promote positive habits for me.
  - Helping others is deeply rewarding.
  - I prefer being in communities that are open and transparent.
  - Life is short, and I want to get things out there.

Iterating to Success

- Robotic systems are complex and often incorporate immature technologies
- First, create a minimal implementation of your full system
  - "premature optimization is the root of all evil (or at least most of it) in programming." - Donald Knuth
  - Without implementing a sketch of the whole system, you are doomed to fall into a local minimum.
  - Minimum viable product (MVP) in startup culture
  - Agile development practices
- Then, iteratively improve your implementation via small steps
  - It's easier to go from a working system to a working system.
    - Debugging a robotic system is difficult due to the many ways that it can fail
  - Identify your next step based on
    - Importance of the step to system-level capabilities
    - Difficulty of implementing the step
    - Document each step through photos, videos, notes, and version-controlled code
      - Sometimes you'll want to revert to a former state
  - Related notions include
    - Stochastic gradient descent
    - "Implement and implement often." -- Rod Brooks

Official Getting Started Email from Hello Robot

"Everything you need to get started is in the box. Until then, you can peruse the Stretch documentation at https://docs.hello-robot.com/, as well as our forum https://forum.hello-robot.com - especially the following:

- Stretch Safety guide
- Unboxing guide
- Quick Start guide
- Recommended hardware

Let me also call special attention to our Stretch Battery Maintenance guide. Many of our most common support issues can be avoided by following the recommendations listed in this guide."

Taking Care of Your Robot

- It's a research robot
- There's more than one way to break it
- Backup your code frequently (e.g., Github)
- Take videos of your progress
- Be careful, vigilant and ready for things to go wrong
- Don't hesitate to ask for help
  - It's a new platform that's rapidly evolving
  - There's a real chance that the problem you're encountering is not your fault
  - First, look for answers
    i. Google
    ii. https://forum.hello-robot.com/
    iii. https://github.com/hello-robot
  - Second, ask for help
    i. Private: support@hello-robot.com
    ii. Public: https://forum.hello-robot.com/