Review #1

ME 2984

“We see in order to move; we move in order to see.” – William Gibson

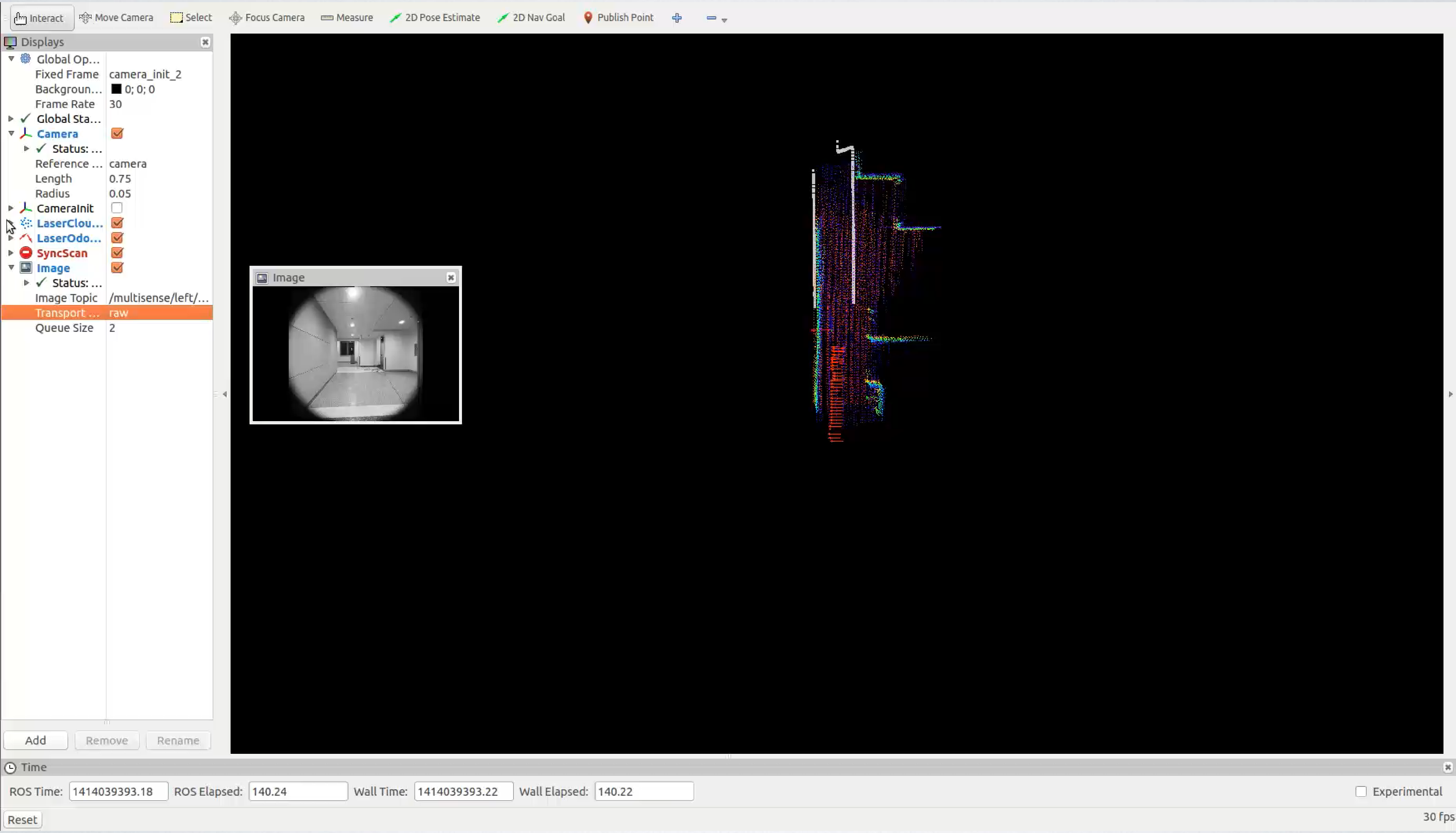
Project Proposals

- Project Proposals are due in Thursday
- 1 page to describe initial proposal for class project
- Start forming teams and putting together ideas
    - 1 proposal per team, every student must ensure a proposal includes them

ROS

- Why are we bothering?
  - ROS allows quick incorporation code from people from all over the world
  - Someone has probably written a node to do what you do.

ROS Examples

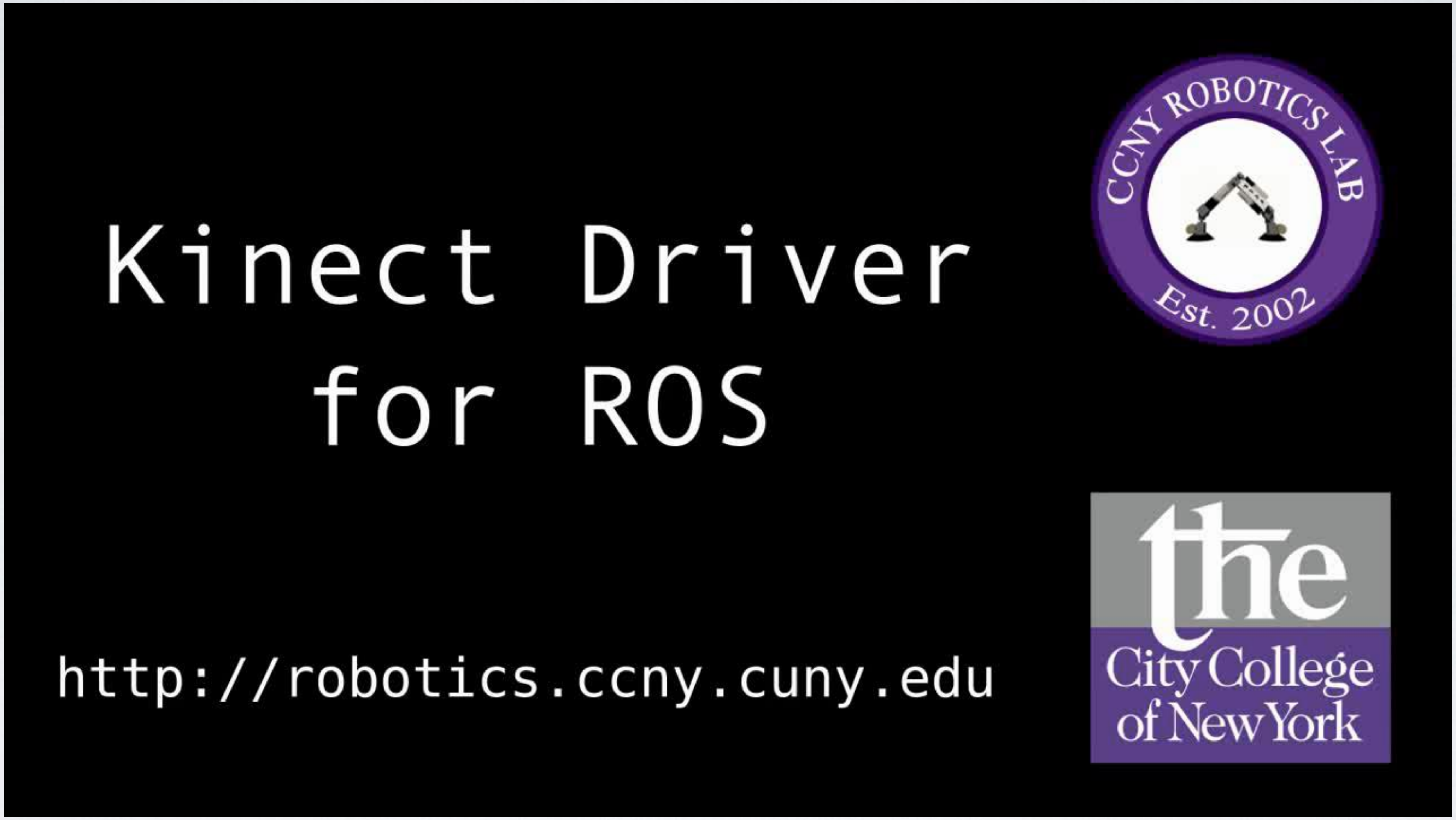


```
▼ Global Op...
    Fixed Frame      camera_init_2
    Backgroun...     ■ 0; 0; 0
    Frame Rate       30
▶ ✓ Global Sta...
▼ Camera             ☑
  ▶ ✓ Status: ...
    Reference ...    camera
    Length           0.75
    Radius           0.05
▶ CameraInit         □
▶ LaserClou...       ☑
▶ LaserOdo...        ☑
▶ SyncScan           ☑
▼ Image              ☑
  ▶ ✓ Status: ...
    Image Topic      /multisense/left/...
    Transport ...    raw
    Queue Size       2
```

ROS Time: 1414039393.18 ROS Elapsed: 140.24 Wall Time: 1414039393.22 Wall Elapsed: 140.22 □ Experimental

30 fps

ROS Examples



Kinect Driver for ROS

http://robotics.ccny.cuny.edu

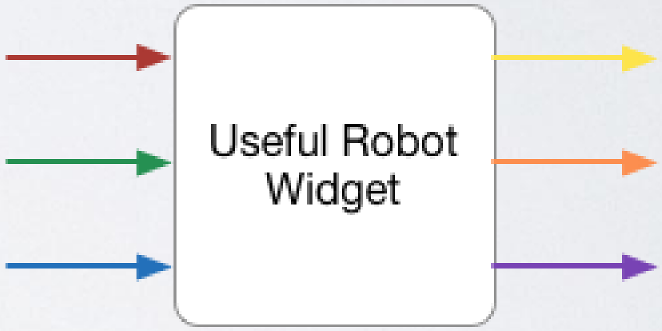
ROS Structure

- Discussed in Lecture 2
- Key is Publish Subscribe architecture
  - Messages or Topics get published to network
  - Similar to Twitter feeds
    - You only get messages you subscribe to
    - Even if you publish that doesn’t mean it’s seen

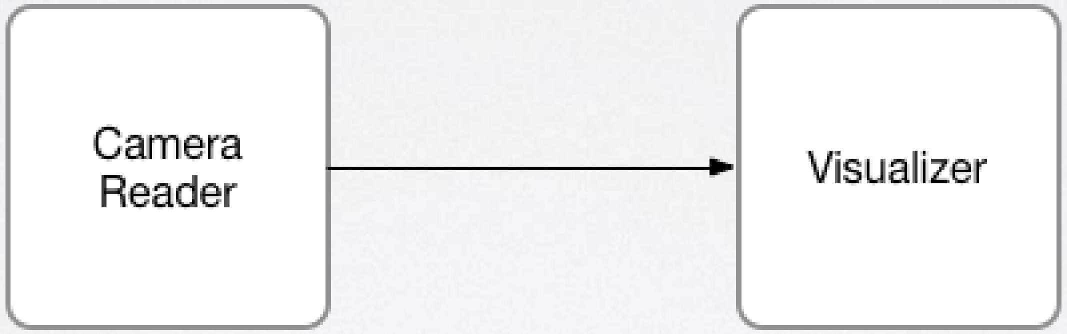
VirginiaTech Invent the Future®

MESSAGE PASSING

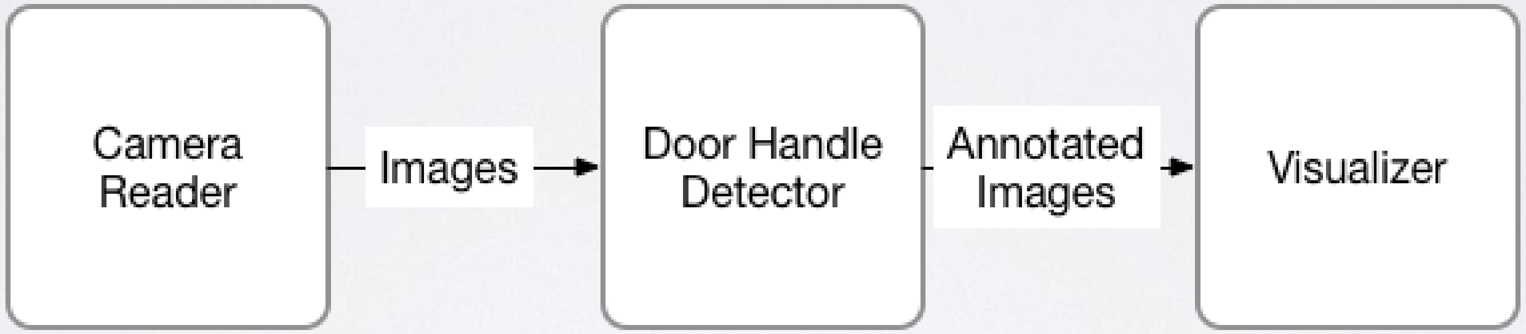
- Data Driven
  - Don’t care about locations
- Flexible
  - Can adjust connections
- Scalable
  - Connections can span computers



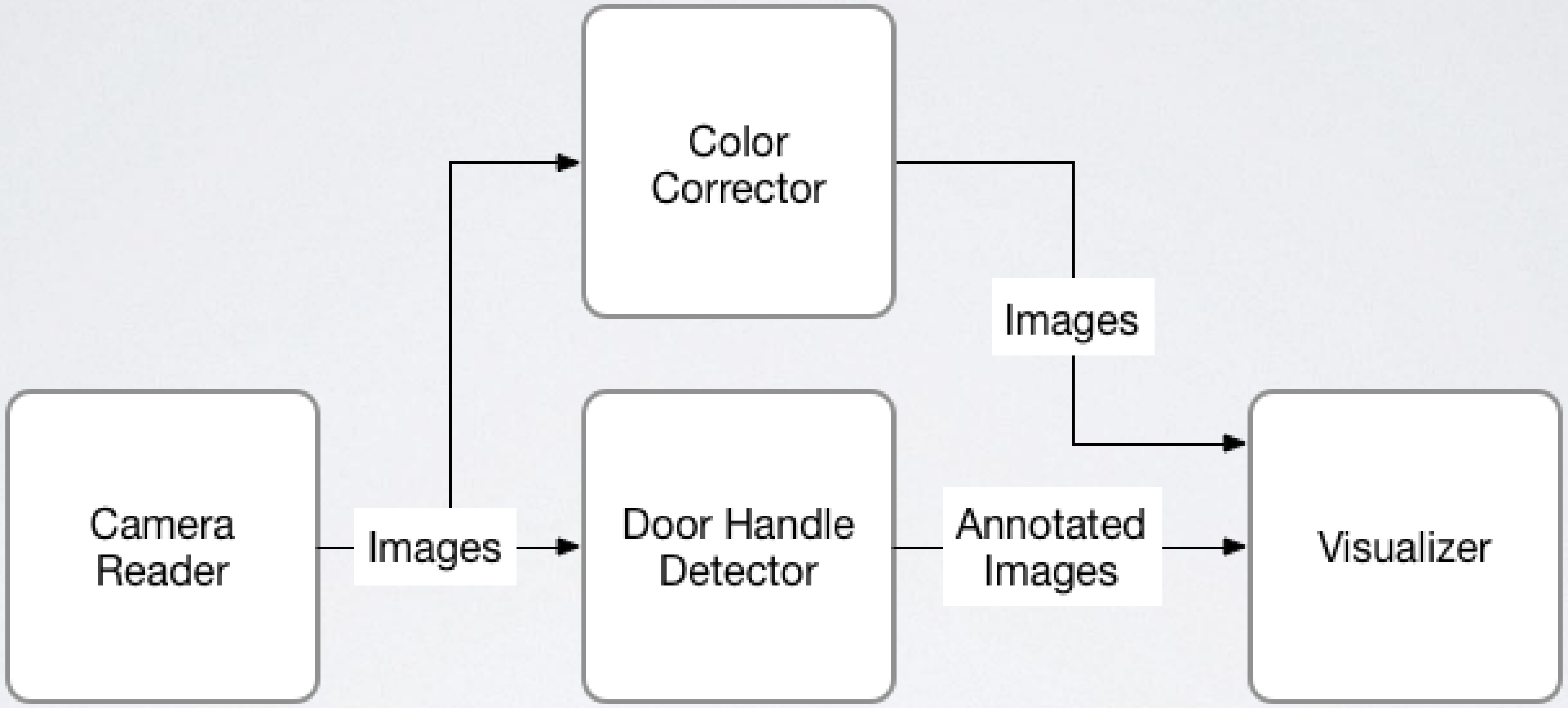
MESSAGE PASSING



MESSAGE PASSING



MESSAGE PASSING



PYTHON

- Tutorials added to scholar list
    - Understand the basics
        - Boolean Logic
        - Loops
        - If Then Statements
    - Object Oriented Programming
        - Understand Objects and Classes
        - Python naturally designed for it

How Do I Code A Controller?

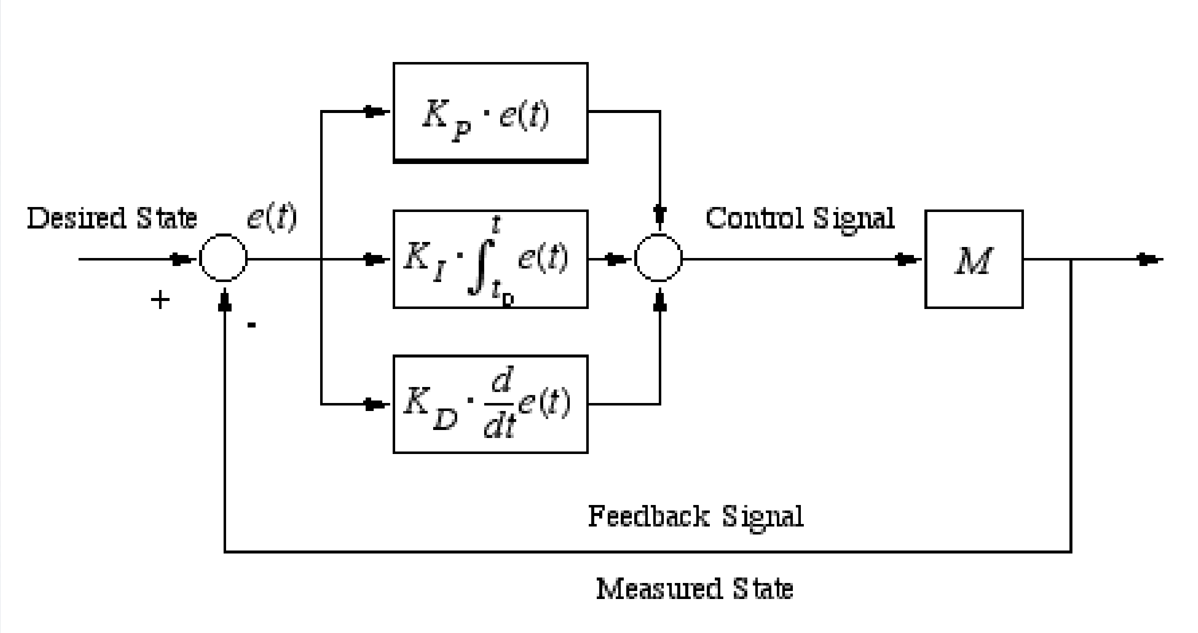


Image Credit: Floating Vectors

- Cruise Control
  - Input: MPH
  - Measured State: MPH
  - Control Signal: % Throttle

Add Math

```
Controller (Input, Measured_State)
Error=Input-Measured_State
Control_Signal=(Kp*Error)+(Ki*integral(Error))+(Kd*derivative(Error))
Output(Control_Signal)
```

GIT

- Tutorials added to Scholar
- Key Commands
  - Status – Checks Branch and Status oof Changes
  - Add – Adds changes to a commit
  - Commit – Saves changes, like a snapshot
  - Push – Send your changes to the server
  - Pull – Get latest version from the server
  - Checkout – Loads Branches, or files from specific commits

QUESTIONS?