Robotour 2016: Cogito

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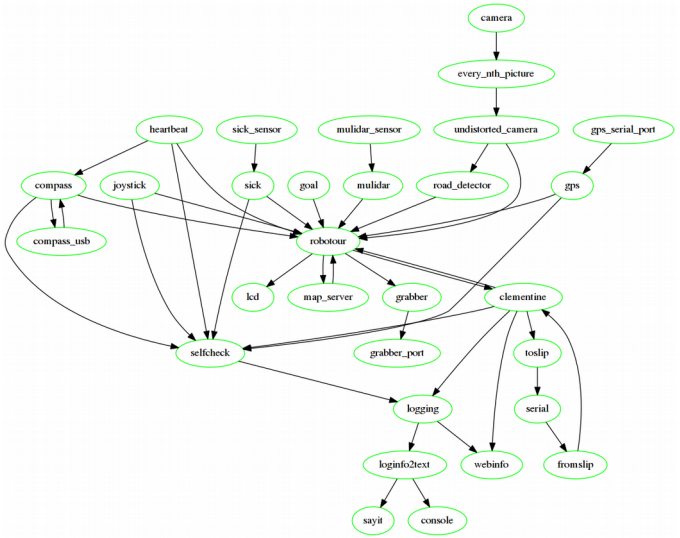
https://sites.google.com/site/cogitoteam/robotour-2016

Interesting hardware

- MuLidar - a self-made planar lidar used to detect obstacles (LIDAR Lite v2 + Arduino Nano + DRV8825 + a small stepper motor).
- Leopard Imaging LNC DualCam - Stereo HD IP camera. Works only if it is not dark. Used to detect road. If there are some CPU cycles left, it can also be used to detect obstacles.
- 2x 57STH56 NEMA-23 bipolar stepper motor with 4.25:1 gearbox for differential steering.
- Interconnect: USB + ethernet

Interesting software

- Highly modular architecture with extreme logging.
- Road detection: Deep convolutional neural network.
- Localization: Particle SLAM estimating robot's location and width of road segments at the same time.
- Planning: UCT (bandit algorithm) with random playouts (similar to top Go playing programs such as AlphaGo).
- Debugging: Stereo visualization



What worked

- Robot fits into a car trunk (foldable mast).
- Robot worked after unpacking.
- Picking up the beer can.
- Water-resistant (but not water proof).
- Road detection.

What could be better

- Water shields on lidars.
- Remote data input. (Bluetooth?)
- Faster computer(s).

Conclusion

- Thanks to organizers! Happy to be here!