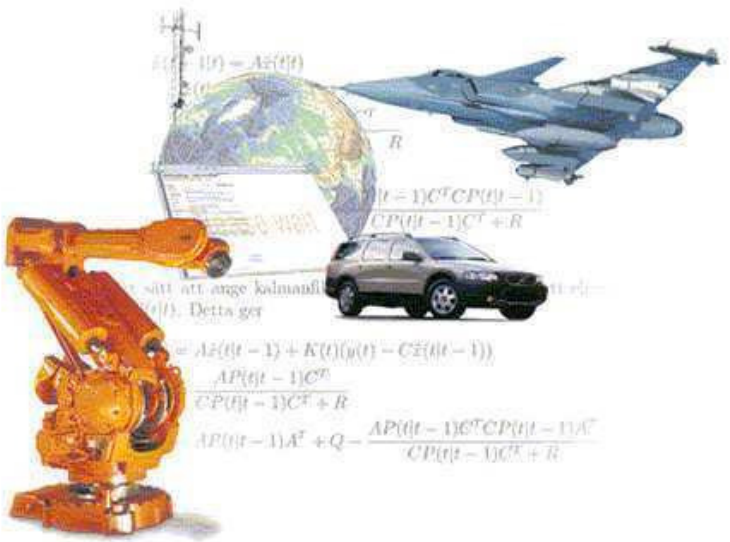
PhD Course: Applied Control and Sensor Fusion



Martin Enqvist, David Törnqvist

Background

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- Questions about implementation issues are frequent when supervising students in our **project course**.
- We have a need for nice **demonstration examples**.
- It is often **really fun** to work with real applications.

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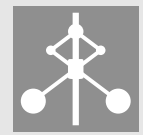
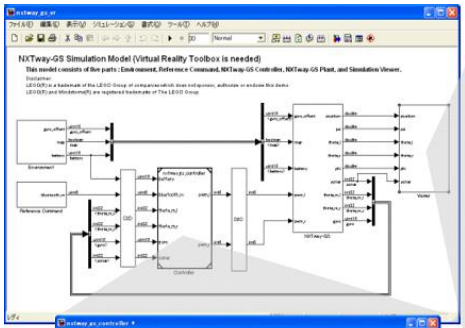
Here are some project suggestions. . .

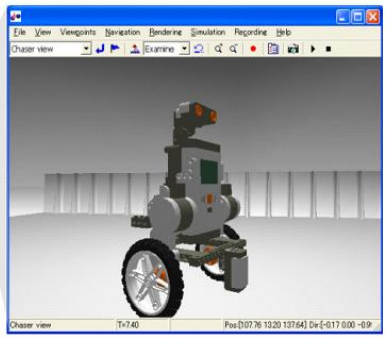


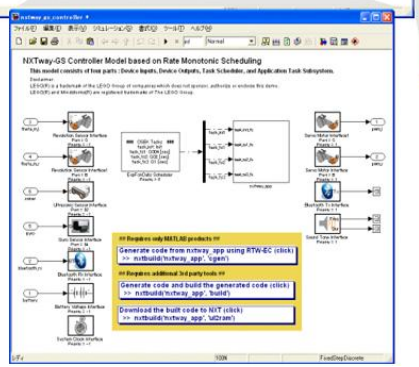
Lego Segway Robot

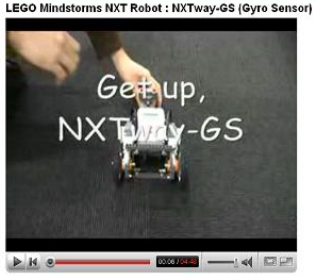
Features:

- State estimation and control
- IMU or light sensor
- DC motors





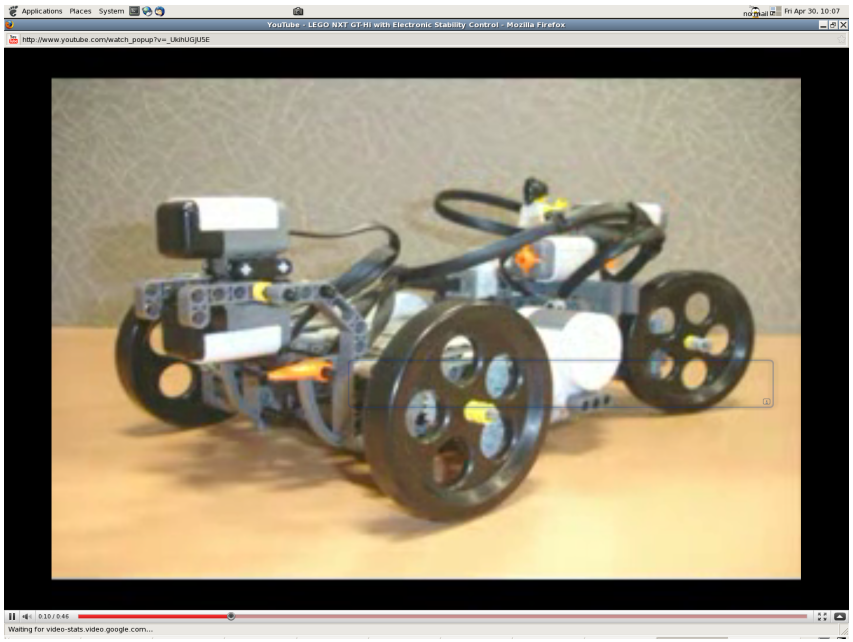


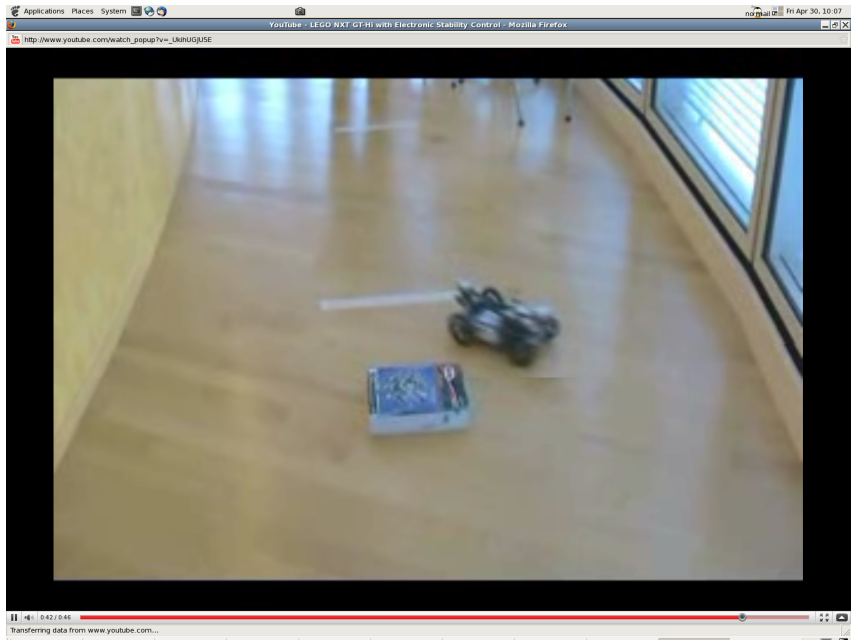


Lego Car with Electronic Stability Program

Features:

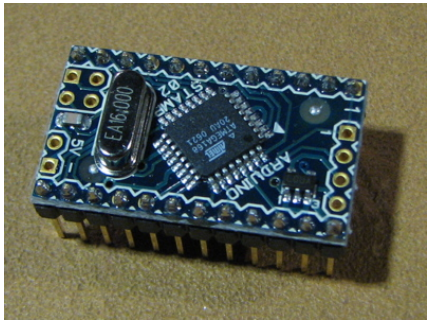
- Control
- Gyro/IMU
- DC motors

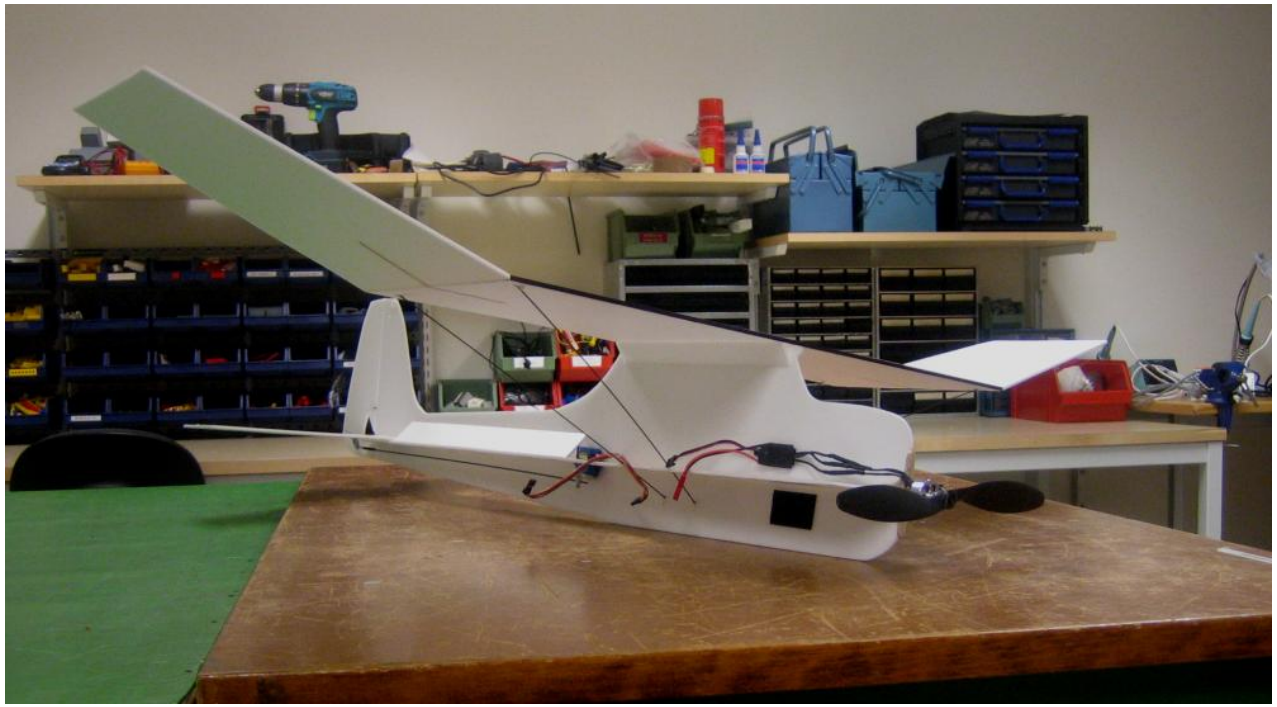




Features:

- Arduino microcontroller
- GPS
- Waypoint control





Tracking Applet for iPhone

Features:

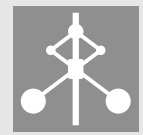
- iPhone & Pioneer programming
- OpenCV for iPhone
- Target tracking and adaptive following

Features:

- DSPIC platform
- DSP programming
- Sound application:
  Real-time sound effects,
  air drums, etc.

Other Ideas

- DC motor with ultra sound sensor for reference values
- Square root implementation of Kalman filters using some suitable platform
- . . . (Own ideas are most welcome!)



Organization

- Credits: 6hp
- Project work: 100h
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- 1–3 PhD students in each project group
- It is not mandatory to complete all projects (some will be more like a pre-study)
- Some projects might be continued as student projects, MSc theses or PhD student projects (or as internal development projects)

Time Plan

- May 17: Sign up for a project
- June 14: Project proposals are due
- September 15: Final reports and exercise for others to do completed. Brief presentation around this date.
- October 15: Exercises from other projects done.