Visual Navigation for Flying Robots

Exercise 3 – Control

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Course Evaluation Forms

- Please fill them out now and return after exercise
- We are very interested in your feedback
  - Suggestions for improvements
  - Anonymously or not anonymously
  - In person/via evaluation form/by email/…
Organization: Exam Dates

- Registration deadline: June 30
- Course ends: July 19
- Examination dates: August 9+14 (Thu+Tue)
  - Oral team exam
  - Sign up for a time slot starting from now
  - List placed on blackboard in front of our secretary
## VISNAV Oral Team Exam

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Submissions

- 9 submissions
- Evaluation
  - Control in local frame vs. control in global frame
  - No conversion from global frame to local frame (wrong in 3 solutions!)
  - Angle normalization missing (1 solution)
Sheet 4: Project Proposal

- Choose your final project
- Prepare 3-5 slides for 5(!) minute presentation

Agenda
- June 21: Proposal presentation (next week!)
- July 5: Mid-term presentation
- July 19: Final presentation (with demo/video)
What is good project?

- Open (challenging) scientific problem
- Catchy topic / cool application / visionary
- Try out a (novel) method on real robot

Further (desirable) properties:
- Solvable (by you/your team)
- Scalable (dividable into sub problems, or can form the basis for subsequent project)
- Relevant
Project Presentation - Structure

1. Motivation / application
2. Problem specification
3. Approach
4. Implementation plan
5. Future work
Project Presentation - Structure

1. Motivation / application
   - Illustrate what problem you want to solve
   - Argue why this problem is important/relevant
   - Add an image or sketch, visually appealing
   - This slide needs to draw the attention/interest of the audience

2. Problem specification

3. Approach

4. Implementation plan

5. Future work
Project Presentation - Structure

1. Motivation / application
2. Problem specification
   - State your research question
   - Specify the problem (mathematically)
   - Argue why it is challenging/open
3. Approach
4. Implementation plan
5. Future work
Project Presentation - Structure

1. Motivation / application
2. Problem specification
3. Approach
   - How do you want to solve the problem?
   - Give some technical details
4. Implementation plan
5. Future work
Project Presentation - Structure

1. Motivation / application
2. Problem specification
3. Approach
4. Implementation plan
   - Break down the problem into tasks
   - Specify milestones
   - Formulate the challenges/risks (and possibly contingency plans)
5. Future work
Project Presentation - Structure

1. Motivation / application
2. Problem specification
3. Approach
4. Implementation plan
5. Future work
   - Discuss potential applications
   - Discuss future research directions (e.g., towards the master thesis)
A Few Ideas for Your Project

- Your own idea – be creative!
- Add magnet to quadrocopter for picking objects
- Marker-based SLAM (with unknown marker map)
- Estimate position from natural features (no marker)
- Depth map estimation (covered next week)
- Person following (colored shirt or wearing a marker)
- Flying camera for taking group pictures (possibly using the OpenCV face detector)
- Fly through a hula hoop (brightly colored, white background)
- Navigate through a door (brightly colored)
- Navigate from one room to another (using ground markers)
- Avoid obstacles using optical flow
- Landing on a moving platform
- ...
Open HiWi Position

- Dissemination of our research

- Tasks would include
  - Ask people about cool research results
  - Produce Youtube videos
  - Write small posts and put on social media (our website, Facebook, Google+)

- No background in computer vision/computer science required

- Tell your friends/flatmates/...