



FAKULTÄT FÜR
INFORMATIK

Kickoff Software/Team Project Swarm Lab

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Chair of Intelligent Systems

Organization

- Time and location:
 - Start: 20.04.2015
 - End: 05.08.2015
 - Lab: G29-035

- Meetings:
 - Individual meetings for each group: every week (time will be set by the lecturer)
 - Get together meetings for all: every two weeks (Wednesdays 13:00 – 14:30 G29-035)

Teams

- 4 teams of maximum 4 students
- Team organization: one team leader and two or three members
- Team leader:
 - Distributes the subtasks and takes care of the entire process
 - Communicates with the lecturer
 - Responsible for the documentation
- Presentations must be done by all the members
- Prerequisites:
 - Courses: PKES + TI2 | Swarm Intelligence
 - Programming: C++ | Python | Lua fluently
 - Enthusiasm and teamwork

Evaluation

You must deliver

- Working Prototype
 - Code
 - Documentation
 - Project management
 - A talk of maximum 20 minutes on August 5th , 2015
 - Video or Demo depending on task
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- Bachelor students may get a “ungraded certificate”
 - Master students get an individual grade

Topics

- Avoiding Walls with Quadcopters
- Cooperative Control of Height
- Controlling Quadcopters using external Signals
- Flying in Formation

Avoiding Walls with Quadrocopters

- Task on real FINken Robots: https://github.com/ovgu-FINken/user_manual
- Flying in Arena
- Stable Control
- Avoiding Walls
- Controlling Height
- Existing Software: <https://github.com/ovgu-FINken/paparazzi>
- Analysis of Sensory Input

Cooperative Control of Height

- Showcase using real FINken: https://github.com/ovgu-FINken/user_manual
- 1D Swarm behaviour
- Height control using distance sensor to observe other robots
- Goal: Robots change height cooperatively if one is stimulated
- Existing Software: <https://github.com/ovgu-FINken/paparazzi>
- Special Arena guiding 4 Quadcopters in parallel

Controlling Quadcopters using external Signals

- Showcase using 1 real FINken: https://github.com/ovgu-FINken/user_manual
- Beamer projects “Landscape”
- FINken analyses landscape using color sensor
- FINken movement depends on landscape
- Goal: Implement basic behaviors like “Move to dark” or “stay at red”
- Also possible in Simulation

Flying in Formation

- Simulation Task
- Uses FINken simulation environment
- Copters are simulated using dynamic model
- Goal: Create different formations based on existing model
- Control API: Thrust, Attitude
- FINken may not collide and shall show designated formation
- Example formations: triangle, circle