Self-Modeling for Aerial Vehicles

Master Thesis Proposal in Automatic Control

Autonomous aerial vehicles represent a challenging control problem with high-dimensional. Multirotor helicopters are widely regarded to be significantly harder to control than fixed-wing aircraft. At the same time, Multirotor helicopters provide unique capabilities, such as in-place hover and low-speed flight, important for many applications. The control of autonomous helicopters thus provides a challenging and important testbed for learning and control algorithms. The aim of this thesis is to implement self-modeling algorithm to model the dynamic of the multirotor helicopter and then to find a controller that is optimized for the resulting model and reward function.

- The main aim is to use the data sets from the flight of the multi rotor helicopter for modelling it.
    - The machine learning techniques such as reinforcement Learning is suggested for self-learning.
    - The learning procedure should be fast and convenient.
- The optimal control algorithm should be used to find a controller that is optimized for the resulting model.
- The project needs a good end demonstration and the participant should test her/his model in experiment.
- Knowledge in machine learning techniques is a plus, but not needed.
- The method should be implemented in ROS in order to be validated and directly placed to the real platform for experiments.
- The participant has a weekly discussion with her/his supervisor in order to be guided.

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