Department of
Mechanical Engineering
The University of Hong Kong

DEPARTMENT OF MECHANICAL ENGINEERING
THE UNIVERSITY OF HONG KONG

SEMINAR

Decentralized Swarm Trajectory Generation for Visibility-aware Aerial Tracking in Cluttered Environments

Date: 21 April, 2023 (Friday)
Time: 4:00 p.m.
Venue: Room 7-34, Haking Wong Building, HKU

Speaker: Mr. Longji Yin (PhD candidate)
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Abstract:

Autonomous aerial tracking with UAVs has wide potential in various applications, such as cinematography, target surveillance, and industrial inspection. Recent literature has increasingly focused on target tracking using multiple UAVs, or aerial swarms, which offer greater system redundancy and team cooperation capabilities than single UAV systems. One of the primary technical challenges in swarm tracking is designing a trajectory planner that maintains high target visibility while ensuring collision-free maneuvers in cluttered scenes. To facilitate real-world deployments, the planning framework should also be decentralized and computationally efficient. Traditional local control methods for swarm tracking rely on leader-follower-based feedback laws, which are reactive and limited in their ability to plan over a horizon. To address the deficiency, optimization-based frameworks have been introduced to generate high-quality trajectories for swarm tracking. However, existing trajectory planners mainly rely on prescribing fixed formations to chase the target, which still suffer from potential target occlusions. This seminar will discuss recent progress in optimization-based tracking methods and introduce a new hierarchical planning framework that generates visibility-aware trajectories for swarm tracking in cluttered environments. The proposed framework is fully decentralized and resource-efficient, making it a promising solution for autonomous aerial tracking with UAV swarms.

ALL INTERESTED ARE WELCOME

For further information, please contact Dr. F. Zhang at 3917 7909.