THE UNIVERSITY OF HONG KONG

DEPARTMENT OF MECHANICAL ENGINEERING

SEMINAR

Online

Title: **Fast and Tightly-coupled Sparse-Direct LiDAR-Inertial-Visual Odometry**

Speaker: **Mr. Zheng Chunran (MPhil candidate)**
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Date: **28 April, 2022 (Thursday)**

Time: **2:00 p.m. (Hong Kong Time)**

Zoom meeting:

1) **Link to join the meeting:**

https://hku.zoom.us/j/94473734652?pwd=U3JYMWZZbXVtMU91THNtUWJxQm9oUT09

2) **Meeting ID: 944 7373 4652**

3) **Password: 972319**

Abstract:
To achieve accurate and robust pose estimation in Simultaneous Localization and Mapping (SLAM) task, multi-sensor fusion is proven to be an effective solution and thus provides great potential in robotic applications. FAST-LIVO is proposed as a fast LiDAR-Inertial-Visual Odometry system, which builds on two tightly-coupled and direct odometry subsystems: a VIO subsystem and a LIO subsystem. The LIO subsystem registers raw points (instead of feature points on e.g., edges or planes) of a new scan to an incrementally-built point cloud map. The map points are additionally attached with image patches, which are then used in the VIO subsystem to align a new image by minimizing the direct photometric errors without extracting any visual features (e.g., ORB or FAST corner features). To further improve the VIO robustness and accuracy, a novel outlier rejection method is proposed to reject unstable map points that lie on edges or are occluded in the image view. Experiments on both open data sequences and our customized device data are conducted. The results show our proposed system outperforms other counterparts and can handle challenging environments at reduced computation cost. The system supports both multi-line spinning LiDARs and emerging solid-state LiDARs with completely different scanning patterns, and can run in real-time on both Intel and ARM processors.

ALL INTERESTED ARE WELCOME
For further information, please contact Dr. F. Zhang at 3917 7909.

Research areas: Robotics and Control