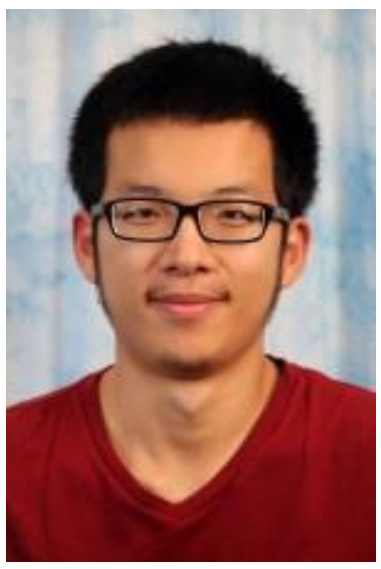
The Field Robotics Center

Seminar Series

Tuesday, 21st November **NSH 1507 3:30 – 4:30pm**



Food will be served

Ming Hsiao
Ph.D. student
Robotics Institute

Dense Planar-Inertial SLAM for Large Indoor 3D Reconstruction

Abstract: Reconstructing the dense 3D models of indoor environments in real-time is key to many robotics applications, such as navigation, inspection, and augmented reality. It is also a challenging problem due to the accumulation of drift, large amount of data, limited computation, and occasional lack of visual features. We develop an RGB-D simultaneous localization and mapping (SLAM) system that takes the commonly observed indoor planar structures (e.g.: walls and floors) as landmarks, and outputs dense 3D point cloud models with refined maps of the landmark planes. Incorporating planes in the SLAM system reduces the accumulated drift, and allows a more efficient global optimization. Then, an inertial sensor is added into the system to further correct the drift and increase the robustness. With additional structural constraints between planes (e.g.: orthogonality and parallelism) and loop closure functions integrated with the dense planar-inertial SLAM system, our final solution can reconstruct accurate dense 3D models of large indoor environments in real-time on CPU only. We demonstrate the state-of-the-art performance of our solution by comparing it with other existing methods on public datasets and evaluating it using a ground truth model from a survey lidar.

Speaker Bio: Ming Hsiao is a Ph.D. student in the Robotics Institute at Carnegie Mellon University, advised by Prof. Michael Kaess. He previously received his M.S. in Electrical Engineering at National Taiwan University. His interests are in SLAM, 3D perception, and optimization.

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