

High speed visual odometry with embedded stereo camera

Description:

Towards aggressive maneuvers of mobile robots, fast localization and mapping is required. Many existing pipelines usually require intense computational power, which limits their applications for resource constrained mobile robots, e.g., micro aerial vehicles (MAVs). In this project, the students are expected to explore the possibility to port one of those pipelines for a resource constrained MAV by exploiting an embedded stereo camera. In particular, the students are expected to extend an existing semi-dense/dense visual odometry pipeline for a FPGA accelerated stereo camera, which can provide high speed dense depth map.



[1] J. Engel et al., LSD-SLAM: Large-scale direct monocular SLAM, ECCV 2014.

[2] D. Honegger et al., Real-time and low latency embedded computer vision hardware based on a combination of FPGA and mobile CPU, IROS 2014.

Requirements / Tools:

Required: C++, OpenCV

Supervisor:

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