

Field Robotics Center Seminar Series

Tuesday, August 24th, 2010 GHC 2109 noon - 1pm

Pizza will be served



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Evaluating Pose Estimation Methods for Stereo Visual Odometry on Robots

Abstract

In this talk we present a quantitative and qualitative evaluation of several pose estimation algorithms used in real-time visual odometry for mobile robots. Pose estimation plays a critical role in the stereo Structure-from-Motion visual odometry framework. Feature points are extracted at every frame and used to triangulate 3D structure. Correspondence between feature points at every frame allows estimating the rigid motion of the camera, typically in a hypothesize-and-test framework. Tracking across multiple frames allows nonlinear refinement of the estimated motion and optionally the structure of the world. Robust pose estimation algorithms need to be able to handle incorrect correspondences and noisy data that are typical in real world sequences. In this work, we compare two classes of algorithms; namely Absolute Orientation (AO) and Perspective-n-Points (PnP). AO algorithms estimate the pose of the camera from 3D/3D correspondences, while PnP methods rely on 3D/2D correspondences. We show empirically that PnP methods are more robust and reliable than AO for stereo visual odometry. We also show empirically that P3P performs best in indoor and outdoor environments.

Speaker Bio

Hatem Alismail is a Masters student at the Robotics Institute, advised by Brett Browning and Bernardine Dias. His research interests include the utilization of computer vision for navigation and mapping for mobile robots, and technology for developing communities.

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