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Accuracy Evaluation of Stereo Vision Aided Inertial Navigation

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Abstract. Accurate knowledge of position and orientation is a prerequisite for navigation, mapping, or environmental modelling. GPS-aided inertial navigation applications. Nevertheless a similar solution for navigation tasks in difficult environments is needed. Therefore a stereo vision aided inertial navigation system is presented for local navigation for indoor applications.

A method is described to reconstruct the ego motion of a stereo camera system used to constrain the inertial sensor drift. The optical information is derived from tracked over consequent stereo image pairs. Using inertial data for feature tracking costs and at the same time increases the reliability due to constrained scene repetitive structures typical for indoor environments.

An Integrated Positioning System (IPS) was deployed and tested on an indoor environment for accuracy, robustness, and repeatability in a common office environment. Inertial data derived from the navigation cameras, a high density point cloud is generated using a stereo vision algorithm.

[Conference Paper](#) (PDF, 1352 KB)

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