



SLAM Using Monocular Vision and Inertial Measurements

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Condition: New. Publisher/Verlag: VDM Verlag Dr. Müller | A New Low-cost Approach for Portable Simultaneous Localization and Mapping | Simultaneous Localization and Mapping, comprising estimation of robot ego-motion and building a map of the surrounding environment, is one of the most fundamental tasks of mobile robotics. Many SLAM systems proposed in the past make use of the Global Positioning System (GPS), which renders them both expensive and overly dependent on the presence of the GPS signal. We propose an alternative, low-cost approach for portable SLAM which is based on monocular vision, a promising technique due to its flexibility, ease of use, and ease of calibration. In order to perform this task we use an Extended Kalman Filter, one of the most efficient and robust methods used in SLAM systems. We show how it is possible to improve the estimated position and reduce its uncertainty by fusing data from different sensors, in particular using a simple 3-axis accelerometer. We prove, through careful and intelligent selection and tuning of image analysis algorithms, that real-time, low-cost SLAM is feasible. This work is useful to professionals developing SLAM systems and to people in the larger field of computer vision, especially those interested in feature...



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