Evaluation and Comparison of Performance Analysis of Indoor Inertial Navigation System Based on Foot Mounted IMU

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***Abstract*— This paper proposes to verify the performance & error analysis of pedestrian indoor navigation system using commercially available low-cost inertial sensors. This self-contained approach employs Euler for attitude representation, where the estimation problem is formulated as an Extended Kalman filter (EKF) for INS strap down mechanization equations. The algorithm outputs are the foot kinematic parameters, which include foot orientation, position, velocity, acceleration, and stance phase. The approach is based on a zero-velocity update (ZUPT), Zero angular rate update (ZARU), Heuristic heading drift reduction (HDR) algorithms. The main contribution of the paper is to compare and analyse the heading drift reduction algorithms on Kalman-based IEZ platform and estimating the return position error. Orientation is then determined from the foot's initialized from accelerometer sensor information. Finally, we evaluated using experiments, including both short distance walking with different patterns and long distance walking performed in indoor.**

***Keyword*—Inertial Navigation, zero velocity update, Heading Drift Reduction, sensor fusion, Extended Kalman Filter four**

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