PERFORMANCE OF NAVIGATION SYSTEM UTILIZING VISUAL ODOMETRY AIDED MEMS IMU/GPS INTEGRATION

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Abstract: GPS/INS integration can provide an accurate solution by means of using GPS positioning data to calibrate the solution of INS, it can also overcome the shortage of both navigation systems. Nevertheless, it still exists some occasions that will lead to bad performance of integration. For instance, errors in GPS signals produced by multipath effect and coverage in urban area. Without correction from precise positioning data of GPS, the errors of solution from MEMS IMU will deteriorate with time very fast. This study implements Visual Odometry with MEMS IMU/GPS integration. Visual Odometry estimates the motion of camera based on sequential input images. The fundamental of this approach is to track point features from the images of the moving camera. First, detecting the point features in each frame. Second, matching point features between sequence images. In the last, by tracking these point features so that the trajectory of moving camera can be produced. In our experiments, we utilize the position estimation from Visual Odometry with GPS/INS integration based on loosely coupled. The results show the effectiveness of integrated system.

Keywords**:** GPS, MEMS IMU, Visual Odometry, integrated system, positioning