

A Hand-held Indoor Positioning System Based On Smartphone

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Extended Abstract—The system collects data using the accelerometer, gyroscope and gravity sensors embedded in the smartphone. The accelerometer and gravity data are used for zero-velocity detection and calculating the vertical displacement of each walking step, and then the inverted pendulum model is applied to calculate the step length of every step. The angle of direction is estimated by processing gyroscope data with the quaternion method. The step length and the direction angle of each step are combined to determine the coordinates of each step. A Kalman filter is used in zero-velocity-update (ZUPT) to reduce the vertical speed offset caused by accelerometer drift errors.

Keywords—*IPIN Competition; Smartphone-based (on-site); Multi-sensor positioning*