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Pedestrian Navigation based on Tightly-Coupled Integration of WiFi and Inertial Sensors

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Background

A team of researchers from the University of Calgary's Department of Geomatics Engineering led by Dr. Naser El-Sheimy has developed an enhanced pedestrian navigation technology that is based on a tightly-coupled integration of WiFi and inertial sensors. By tightly-coupling the sensor data, tests have shown that pedestrian location accuracy is not only improved over conventional loosely-coupled methods of integrating trilateration-based WiFi positioning solutions and inertial sensors, but location accuracy is also enhanced in environments where WiFi trilateration cannot be performed, such as those with only 1 or 2 WiFi base stations available.

Pedestrian navigation technologies based on WiFi signals are typically based on either trilateration or fingerprinting. In addition to improving location accuracy in environments where trilateration is unavailable, this tightly-coupled pedestrian navigation method does not require the surveying and database maintenance overhead required by fingerprinting methods.

Area of Application

- Indoor Localization
- Pedestrian Navigation

Competitive Advantages

- Improves location accuracy over loosely-coupled methods
- Reduces the drifts of inertial sensors, even with only 1 or 2 WiFi base stations available
- No surveying and database maintenance

Stage of Development

- Method has been tested on several different indoor pedestrian trajectories with varying WiFi signal availability, and compared against many other pedestrian navigation methods

Intellectual Property Status

- Patent Pending