Journal of Sensors

Special Issue on
Indoor Tracking, Mapping, and Navigation: Algorithms, Technologies, and Applications

CALL FOR PAPERS

The demand of intelligent systems that can improve our daily lives by providing relevant information is continuously growing. Some examples include 1) finding the nearest exit during emergency events; 2) continuous georeferencing in either outdoor or indoor environments to receive location-based information; 3) tracking people and goods to prevent our assets from being lost; and 4) monitoring of people's physical activities to encourage an active lifestyle or to patrol medical rehabilitation. An important requirement of such systems should be the ability to sense movement and location and possibly predict our behaviour in the short time. Spatial 3D information plays a crucial role in understanding the context and making technologies around us autonomous. However, due to factors such as scene obstructions, movement variations, sensor limitations, and model uncertainty, indoor tracking, mapping, and navigation remain to be a highly challenging problem.

In this special issue, recent advancements in computer vision, machine learning, robotics, engineering, and spatial sciences are brought together to study motion tracking, 2D/3D digitization of indoor spaces, and navigation in the absence of GNSS signals. State-of-the-art algorithms, methods, technologies, and innovative applications are presented to support cross-disciplinary collaboration. We welcome high quality research articles, review articles, and detailed papers describing novel applications.

Potential topics include but are not limited to the following:

- Calibration of optical systems for indoor reconstruction (e.g., cameras, laser scanners, and 3D cameras)
- Pedestrian dead reckoning and inertial navigation, including accelerometers, gyroscopes, magnetometers, and barometers
- Marker and markerless human motion capture
- Gesture and facial reconstruction, tracking, and recognition
- Wearables for activity tracking
- RF positioning (e.g., Wi-Fi, BLE, Ultra-wideband, etc.)
- Robot localization and mapping (e.g., SLAM, visual/LiDAR odometry, place recognition, echolocation, etc.)
- Indoor mobile mapping (e.g., UAV, handheld systems, and trolley-based systems)
- Bundle adjustment, structure-from-motion, and dense matching for indoor applications
- Multimodality sensing and fusion
- Modelling uncertainty and uncertainty handling
- Techniques for automatic indoor 3D modelling
- "As-built" reconstruction of CAD plans/BIM models

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Manuscript Due
Friday, 2 June 2017

First Round of Reviews
Friday, 25 August 2017

Publication Date
Friday, 20 October 2017