Smart Indoor and Outdoor Geographic Information System

Seamless indoor and outdoor geographic information system accommodating indoor positioning and massive telemetry data.

Keywords:
- Smart City, Geographic information system (GIS), Bluetooth Low Energy (BLE), Indoor positioning, Indoor and outdoor navigation
- Internet of Things (IoT), Telemetry Data, Spatial Data, Broadcast network

Problems addressed

- Lack of highly scalable and cost effective indoor and outdoor map service for HK industry
- Typical mapping tools are weak at indoor capability and are not optimized for users' requirements
- Massive real time telemetry spatial IoT data is not visualized geographically over a scalable system
- BLE device management is insecure, costly and power consuming in large area

ASTRI's Smart Indoor and Outdoor Geographic Information System makes use of map server, distributed map rendering design, distributed cache mechanism and secure BLE Broadcast network to resolve the difficulties mentioned above. This invention helps to promote smart city applications.

Innovations

It is a highly scalable and cost-effective system which provides seamless indoor and outdoor map service with real time telemetry spatial data support.

The innovation outline:
- Map Server is used to manage telemetry spatial IoT data and serves image map request for interactive map application
- Distributed cache is used to improve overall cache hit rate and offload large amount of data traffic from the centralized Map Server
- Route server combines corridors across multiple buildings and outdoor pedestrian paths to provide shortest navigation route
- Smart positioning algorithm design can help the user to navigate between different locations (both indoor and outdoor)
- BLE Broadcast Network is used for large scale BLE device deployment in a secure, cost effective, and power efficient manner

Key impact

- Enhance the operating performance of map service
- Connect massive telemetry spatial data with a scalable GIS
- Enhance the pedestrian navigation experience
- Protect broadcasted data from unauthorized access

Innovation snapshot

Project completed

- 14 August 2018

Applications

- Indoor location/navigation application
- BLE IoT data collection
- BLE device management
- Smart city application

Patent(s)

- US Patent No. 10,039,057;
  CN Patent No. ZL201780000656.5 and
  HK Patent No. HK18106248.7

ASTRI Patent Search

Commercialisation opportunities

- IP licensing
- Technology co-development