AUTOMATIC FINE-GRAINED RADIO MAP CONSTRUCTION AND ADAPTATION

Tech ID: 29939 / UC Case 2019-062-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,340,295	06/24/2025	2019-020
United States Of America	Issued Patent	12,035,166	07/09/2024	2018-164
United States Of America	Issued Patent	11,894,880	02/06/2024	2019-062

BRIEF DESCRIPTION

The real-time position and mobility of a user is key to providing personalized location-based services (LBSs) – such as navigation. With the pervasiveness of GPS-enabled mobile devices (MDs), LBSs in outdoor environments is common and effective. However, providing equivalent quality of LBSs using GPS in indoor environments can be problematic.

The ubiquity of both WiFi in indoor environments and WiFi-enabled MDs, makes WiFi a promising alternative to GPS for indoor LBSs. The most promising approach to establishing a WiFi-based indoor positioning system requires the construction of a high quality radio map for an indoor environment. However, the conventional approach for making the radio map is labor intensive, time-consuming, and vulnerable to temporal and environmental dynamics.

To address this situation, researchers at UC Berkeley developed an approach for automatic, fine-grained radio map construction and adaptation. The Berkeley technology works both (a) in free space – where people and robots can move freely (e.g. corridors and open office space); and (b) in constrained space – which is blocked or not readily accessible. In addition to its use with WiFi signals, this technology could also be used with other RF signals – for example, in densely populated and built-up urban areas where it can be suboptimal to only rely on GPS.

SUGGESTED USES

Automatic, fine-grained radio map construction and adaptation to provide location-based services - such as navigation.

ADVANTAGES

- Easy to implement
- Efficient
- Non-intrusive

RELATED MATERIALS

- WinIPS: WiFi-Based Non-Intrusive Indoor Positioning System with Online Radio Map Construction and Adaptation Han Zou, Ming Jin, Hao Jiang, Lihua Xie, Costas Spanos - 12/12/2017

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INVENTORS

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OTHER INFORMATION

KEYWORDS

Location-based Services, WiFi, Radio Mapping, Indoor Positioning System, WinIPS

CATEGORIZED AS

- **Communications**
  - Internet
  - Wireless
- **Computer**
  - Software
- **Environment**
  - Sensing
- **Sensors & Instrumentation**
  - Other

RELATED CASES

2019-062-0, 2018-132-2, 2018-164-2, 2019-020-2

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Device-Free Human Identification System
- Unsupervised WiFi-Enabled Device-User Association for Personalized Location-Based Services

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