

## Machine Learning for Indoor Localization and Navigation

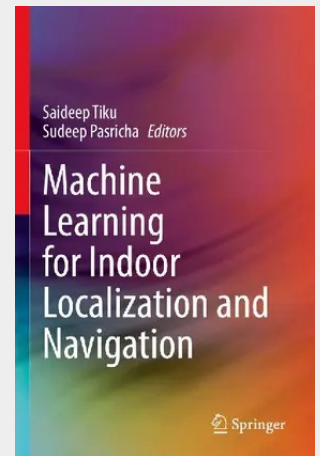
While GPS is the de-facto solution for outdoor positioning with a clear sky view, there is no prevailing technology for GPS-deprived areas, including dense city centers, urban canyons, buildings and other covered structures, and subterranean facilities such as underground mines, where GPS signals are severely attenuated or totally blocked. As an alternative to GPS for the outdoors, indoor localization using machine learning is an emerging embedded and Internet of Things (IoT) application domain that is poised to reinvent the way we navigate in various indoor environments. This book discusses advances in the applications of machine learning that enable the localization and navigation of humans, robots, and vehicles in GPS-deficient environments. The book explores key challenges in the domain, such as mobile device resource limitations, device heterogeneity, environmental uncertainties, wireless signal variations, and security vulnerabilities. Countering these challenges can improve the accuracy, reliability, predictability, and energy-efficiency of indoor localization and navigation. The book identifies several novel energy-efficient, real-time, and robust indoor localization techniques that utilize emerging deep machine learning and statistical techniques to address the challenges for indoor localization and navigation.

In particular, the book:

- Provides comprehensive coverage of the application of machine learning to the domain of indoor localization;
- Presents techniques to adapt and optimize machine learning models for fast, energy-efficient indoor localization;
- Covers design and deployment of indoor localization frameworks on mobile, IoT, and embedded devices in real conditions.

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**90,94 €**

84,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

**Artikelnummer:** 9783031267147

**Medium:** Buch

**ISBN:** 978-3-031-26714-7

**Verlag:** Springer

**Erscheinungstermin:** 01.07.2024

**Sprache(n):** Englisch

**Auflage:** 2023

**Produktform:** Kartoniert

**Gewicht:** 873 g

**Seiten:** 567

**Format (B x H):** 155 x 235 mm

