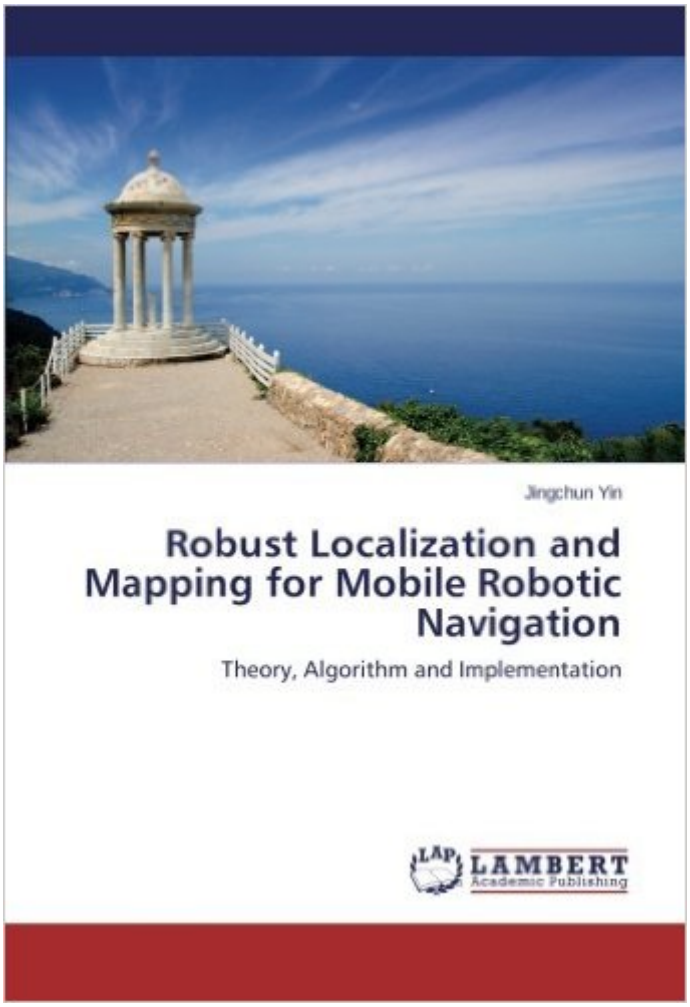
# Robust Localization And Mapping For Mobile Robotic Navigation: Theory, Algorithm And Implementation



## Synopsis

How can mobile robot navigate autonomously without the knowledge of its own state of pose and the model of the surrounding environment? Simultaneous Localization and Mapping (SLAM) is the mobile robot's significant and critical perceptual capability to achieve autonomous navigation, and it is applied in a wide range of application fields. Graph-based SLAM constructs a hierarchical topological graph to address the issues of localization and mapping, where the local relative spatial displacement of roto-translation and the global trajectory of the mobile robot are estimated, respectively. Then each local map can be transformed and integrated to the unique global frame for the construction of the global map. The theory, algorithm, and implementation of Graph-SLAM are explained in detail in this book. Scan matching is performed to estimate the local relative roto-translation, batch optimization is executed to estimate the global mobile robotâ ™s trajectory, and the global line-feature-based mapping is applied to construct the global line-feature model of the environment. The results in the experiments will verify the effectiveness of the proposed graph-based SLAM algorithm.

## Book Information

Paperback: 132 pages
Publisher: LAP LAMBERT Academic Publishing (April 30, 2014)
Language: English
ISBN-10: 3838360117
ISBN-13: 978-3838360119
Product Dimensions: 5.9 x 0.3 x 8.7 inches
Shipping Weight: 8.6 ounces (View shipping rates and policies)
Average Customer Review: Be the first to review this item
Best Sellers Rank: #9,898,821 in Books (See Top 100 in Books) #74 inÂ Books > Computers & Technology > Programming > Software Design, Testing & Engineering > Localization

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