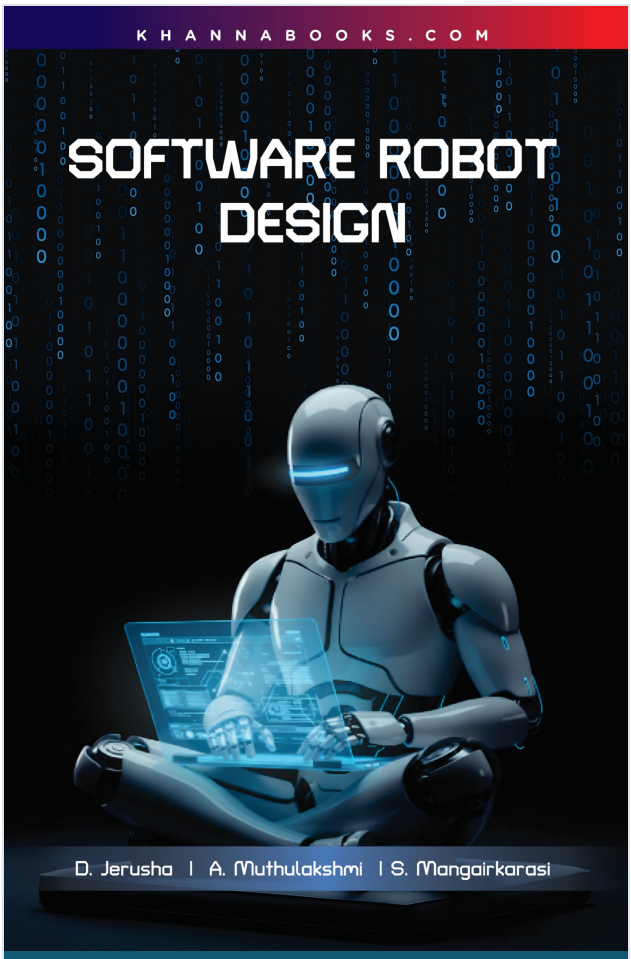


S. Mangairkarasi, D. Jerusha, A. Muthulakshmi

Software Robot Design

Author :	S. Mangairkarasi, D. Jerusha, A. Muthulakshmi
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Product Description

In a world where robotics is advancing at an unprecedented pace, driven by advancements in artificial intelligence and machine learning, a strong grasp of the foundational tools is essential. SOFTWARE ROBOT DESIGN serves as a comprehensive and indispensable guide to the Robot Operating System (ROS), the versatile, open-source framework that has revolutionized the way intelligent and autonomous robots are designed, programmed, and deployed.

Authored by esteemed scholars—Dr. D. Jerusha, Dr. A. Muthulakshmi, and Dr. S. Mangairkarasi—this book equips readers with the practical and theoretical knowledge necessary to develop robust robotic systems, expertly bridging the gap between theoretical concepts and hands-on implementation. The book adopts a structured approach, meticulously covering the journey from setting up the essential Ubuntu/Linux environment and ROS basics to tackling complex subjects like sensor integration (LIDAR, cameras, IMUs), programming robotic actuators (motors, joints), and performing simulation in Gazebo.

Crucially, it delves into ROS Navigation, providing detailed instruction on robot localization using AMCL, map handling, and path planning using the move_base stack. Designed to be a valuable resource, this text is essential for students aspiring to enter the field, researchers exploring advanced applications, and industry professionals seeking to implement complex ROS-based solutions. The inclusion of practical examples, code snippets in C++ and Python, and dedicated chapters on interfacing ROS with embedded boards like Arduino and Raspberry Pi, ensures the knowledge is academically rigorous and directly aligned with industry demands.

Salient Features:

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• ROS Core Architecture: Provides in-depth coverage of fundamental ROS concepts, including Nodes, Topics, Services, and Messages, to establish a solid, modular foundation for distributed robot software development.

• Sensor-Actuator Programming: Offers practical guidance on interfacing and programming essential robotic sensors (LIDAR, IMU) and actuators (motors, joints), enabling precise control over a robot's perception and physical interaction.

• Real-World Navigation: Details the complete ROS Navigation Stack, including global and local path planning, AMCL localization, and costmap configuration for autonomous, obstacle-avoiding movement.

• Practical Coding Examples: Utilizes C++ and Python, the primary languages in robotics, to provide extensive code snippets and exercises, bridging theoretical understanding with hands-on development of ROS packages and nodes.

• Embedded System Interfacing: Includes dedicated chapters on integrating ROS with Arduino and Raspberry Pi, allowing developers to extend the framework to low-level hardware control and cost-effective robotic platforms.

• Simulation and Modeling: Teaches readers how to create robot models using the Unified Robot Description Format (URDF) and how to test and visualize their systems using Gazebo and RViz.

• Linux Environment Setup: Begins with a comprehensive review of Ubuntu Linux and essential Shell Commands, ensuring readers are proficient in the core operating environment required for all ROS development.

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Table Of Contents

- Programming the Robots Sensors and ROS
- ROS Fundamentals
- ROS Programming
- Robotics Projects Using ROS
- ROS Navigation

Author

S. Mangairkarasi

S. Mangairkarasi Associate Professor, Dept of CSE, Sathyabhama Institute of Science and Technology

D. Jerusha

D. Jerusha

A. Muthulakshmi

A. Muthulakshmi

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4C/4344, Ansari Road, Daryaganj, New Delhi-110002

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S. Mangairkarasi, N. Senthamilarasi, V. Subapriya

Data and Information Science

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Product Description

Data and Information Science

This book provides a comprehensive and practical guide to the multidisciplinary fields of data science and information science. In an increasingly data-driven world, the text addresses the critical need to understand, manage, and extract actionable value from massive data sets in sectors ranging from business to government. It is an essential resource for students, professionals, and hobbyists seeking to master the techniques of this transformative domain. The book systematically explores the entire data lifecycle, from initial data acquisition, preprocessing, and cleaning to advanced subjects like Artificial Intelligence, Big Data Analytics, and Data Ethics.

It successfully bridges the gap between theoretical concepts and practical application by detailing key methodologies, essential tools of Business Intelligence (BI), and providing real-world insights. Readers will gain an in-depth understanding of how to combine computer science, statistics, and machine learning principles to detect patterns, predict outcomes, and drive superior decision-making. Ultimately, this material is designed to equip you with the critical skills needed to utilize data effectively, spur creativity, and confidently participate in the ongoing data-driven revolution.

Salient Features:

- **Full Data Lifecycle**: Presents a complete framework covering all steps of the data lifecycle, from acquisition sources (Web APIs, Relational Databases) to data processing and final analysis.
- **Practical Tool Focus**: Integrates practical tools and libraries like Pandas, NumPy, and Matplotlib for real-world data preparation and implementation in Machine Learning models.

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- **Data Quality Mastery**: Offers detailed strategies for improving data quality, including Data Wrangling, handling missing values, and utilizing Binning, Regression, and Clustering for noisy data.
- **Big Data Principles**: Introduces the fundamental concepts and challenges of Big Data (Volume, Variety, Velocity) and discusses effective strategies for processing and utilizing massive datasets.
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- **Visualization and BI**: Provides essential skills in data visualization basics, including creating compelling charts and dashboards using the leading Business Intelligence tool, Tableau.
- **Data Transformation Depth**: Explores the nuances of data transformation, detailing structural changes, normalization, discretization, and the difference between ETL and ELT processes.
- **Open Data Resources:** Highlights key sources for obtaining data, including internal/external systems, Cloud Data Warehouses, and open-source repositories like Kaggle and the UCI Machine Learning Repository.

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Table Of Contents

- Data Acquisition
- Data Processing and Preparation
- Data Quality and Transformation
- Handling Text Data
- Business Intelligence Strategy and Road Map

Author

S. Mangairkarasi

S. Mangairkarasi Associate Professor, Dept of CSE, Sathyabhama Institute of Science and Technology

N. Senthamilarasi

N. Senthamilarasi Associate Professor, Dept of CSE, Sathyabhama Institute of Science and Technology

V. Subapriya

V. Subapriya Associate Professor, Dept of CSE, Sathyabhama Institute of Science and Technology

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