

S. Revathy, M.S. Roobini

R Programming

Author :	S. Revathy, M.S. Roobini
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Khanna Publishing House

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

Email: contact@khannabooks.com | Tel: 011-2324 44 47 - 48 | Mobile: +91-99109 09320

Product Description

This comprehensive textbook, R Programming, is meticulously designed to serve as a complete, hands-on guide for mastering R, the world's most popular open-source language for statistical computing and data analysis. The book's core theme is bridging the gap between theoretical data science concepts and practical implementation, offering a seamless learning journey from fundamental programming syntax to advanced analytical applications. It begins by laying a solid foundation in the History and Fundamentals of R, covering installation, package management, control structures, and essential data operations like matrices and strings.

The purpose is to equip readers with the skills to effectively manipulate, analyze, and visualize data, leveraging R's outstanding graphical capabilities. The practical value is immediately evident through its coverage of reading and writing various data interfaces (CSV, XML, Web Data) and generating professional-grade charts and graphs for visualization. Moving beyond basics, the book dedicates extensive sections to applying core Statistical Techniques (including distributions, ANOVA, and time series analysis) and diving deep into Machine Learning paradigms like Classification (Random Forest, SVM), Clustering (K-Means), and Association Rule Mining (Apriori). Finally, it introduces cutting-edge application development using R Shiny to build interactive web applications and scales up analysis with instruction on Integrating Hadoop with R. The target audience includes students (particularly those in courses like SCSA4001), data science professionals, statisticians, and researchers seeking a practical, cross-platform resource for data-driven decision-making.

Salient Features:

• Fundamental R Concepts: Provides a robust introduction to R, covering installation, package management, control structures (loops, conditionals), user-defined functions, and matrix/string operations.

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• Comprehensive Data I/O: Details methods for reading and writing data using R, including common formats like CSV and XML, as well as techniques for scraping and interacting with Web Data.

• Statistical Toolkit: Explores key statistical applications such as descriptive statistics, probability distributions, ANOVA, and time series analysis, utilizing essential R packages like MASS and STATS.

• Hands-on Visualization: Teaches the creation of various graphical representations, including Pie Charts, Bar Charts, Box Plots, and Scatter Plots, to effectively communicate data insights.

• Core Classification Models: Explains the implementation of major classification algorithms like Decision Trees, Random Forest, and Support Vector Machines (SVM) for building predictive models.

• Advanced Data Mining: Covers unsupervised learning with K-Means Clustering, discovers patterns with Apriori Association Rule Mining, and identifies anomalies through Local Outlier Factor (LOF) Analysis.

• Interactive App Development: Guides the user in creating and deploying R Shiny web applications, covering UI.R and Server.R components for dynamic, shareable visualizations.

• Big Data Scalability: Introduces the concept and practical steps for Integrating R with Hadoop using the RHadoop framework, enabling users to perform analysis on massive datasets.

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