

Sonia Jenifer Rayen, Sathyabama Krishna

Introduction to Data Science

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Product Description

In an era where data is the central driver of innovation, Introduction to Data Science offers a comprehensive and structured guide to navigating this transformative field. Designed for a broad audience including students, researchers, and professionals, this book provides a beginner-friendly approach to mastering fundamental concepts, core statistical methods, and essential predictive analytics.

The text seamlessly integrates theoretical principles with practical, real-world applications, empowering readers to not only grasp key concepts but also effectively apply them in diverse scenarios. The curriculum is meticulously structured, beginning with the foundational role and processes of Data Science and advancing through descriptive and inferential statistics, data quality management, and text data handling. It culminates by exploring the challenges and cutting-edge applications of Big Data.

The book demystifies the complete data science lifecycle—from formulating the right research questions and retrieving data to building predictive models, validating results, and deploying final applications. Beyond technical proficiency, it highlights the essential traits of a successful data scientist, such as curiosity, common sense, and communication, making it an invaluable resource for anyone seeking a robust, end-to-end understanding of data-driven decision-making in vital sectors like healthcare, finance, logistics, and AI.

Salient Features:

• Foundational Concepts: Provides a structured, beginner-friendly introduction to the field, covering the need for data science, its core components, and processes.

• Statistical Core: Delves into essential descriptive and inferential statistics, including data distribution analysis, correlation, regression, and crucial hypothesis testing techniques.

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• Data Quality Focus: Dedicated unit on enhancing data quality, covering practical methods like data imputation, standardization, binning, and handling noise and outliers effectively.

• Text Data Analytics: Explores specialized techniques for handling unstructured text data, such as Bag-of-Words, tokenization, regular expressions, and real-world sentiment analysis.

• Predictive Modeling: Introduces the critical modeling phase, emphasizing algorithm selection, execution, and essential diagnostics for building and training performant models.

• Big Data Context: Addresses the challenges and use cases of Big Data, focusing on the three critical V's: Volume, Velocity, and Variety perspective.

• Data Scientist Traits: Highlights the crucial non-technical skills for success in the field, including the importance of curiosity, common sense, and effective communication.

• Real-World Applications: Features practical use cases and business examples across diverse industries like autonomous vehicles, e-commerce, and airline logistics.

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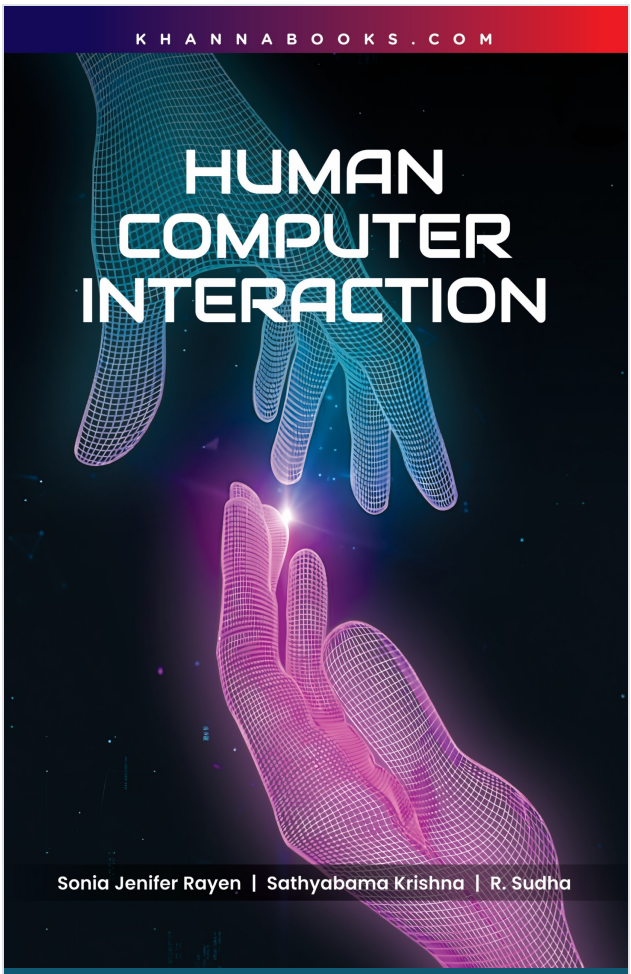
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Human Computer Interaction

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Product Description

Human-Computer Interaction (HCI) is a comprehensive and structured resource designed to explore the principles, methodologies, and evolving landscape of interaction between humans and computing systems. Recognizing the critical role of HCI in shaping modern digital experiences, this book focuses on creating technology that is accessible, efficient, intuitive, and user-centered. It examines not only the technical dimensions of interface design but also the cognitive, psychological, and social factors that influence how people interact with digital systems across diverse platforms and devices.

The book provides a balanced blend of theoretical foundations and practical applications, enabling readers to develop a deep understanding of user-centered design principles. Beginning with the fundamentals of HCI, it explores human sensory systems, memory, perception, cognition, and information processing before progressing to advanced topics in interaction design and usability engineering. Through systematic coverage of design methodologies and evaluation techniques, readers learn how to create interfaces that improve user satisfaction, efficiency, and accessibility.

A significant emphasis is placed on contemporary application domains, including mobile interfaces, web applications, and interactive systems. The text introduces established cognitive models such as GOMS (Goals, Operators, Methods, and Selection Rules), linguistic models, and cognitive architectures that assist in predicting user behavior and optimizing interface performance. It also examines socio-organizational considerations, stakeholder requirements, and collaborative design approaches essential for successful system development.

Designed for students, researchers, academics, and industry professionals, this book serves as a valuable guide for mastering interface design, usability evaluation, and user experience development. By integrating human factors, cognitive science, and practical

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design methodologies, it equips readers with the knowledge and tools required to build effective, engaging, and user-friendly computing systems.

Salient Features:

- Foundational Principles: Introduces the core objectives of Human-Computer Interaction, including usability, human factors, user-centered design, and the interdisciplinary contributions of computer science and cognitive psychology.
- Human System Analysis: Explores human sensory and perceptual systems, including vision, hearing, touch, memory, cognition, and information-processing mechanisms that influence user interaction.
- Interaction Design: Covers the essential principles of creating intuitive and effective user interfaces, including navigation structures, screen layouts, interaction scenarios, and the role of HCI within the software development lifecycle.
- Cognitive Models: Provides detailed coverage of major theoretical frameworks such as GOMS (Goals, Operators, Methods, and Selection Rules), linguistic models, and cognitive architectures for analyzing and predicting user performance.
- Socio-Technical View: Examines socio-organizational aspects of system design, including stakeholder analysis, communication models, collaboration frameworks, and non-technical factors affecting technology adoption.
- Mobile HCI Deep Dive: Discusses the mobile ecosystem, mobile application frameworks, mobile web technologies, information architecture, and design challenges associated with modern mobile computing environments.
- Web Interface Mastery: Guides readers through user interface design best practices for web applications, including interface components, navigation structures, interaction techniques, and workflow optimization.
- Practical Prototyping: Covers iterative design and prototyping methodologies, including formative and summative evaluation techniques, storyboarding, animation-based prototypes, and limited-functionality simulations for interface

testing and refinement.

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- Modeling HCI
- Web Interface Design

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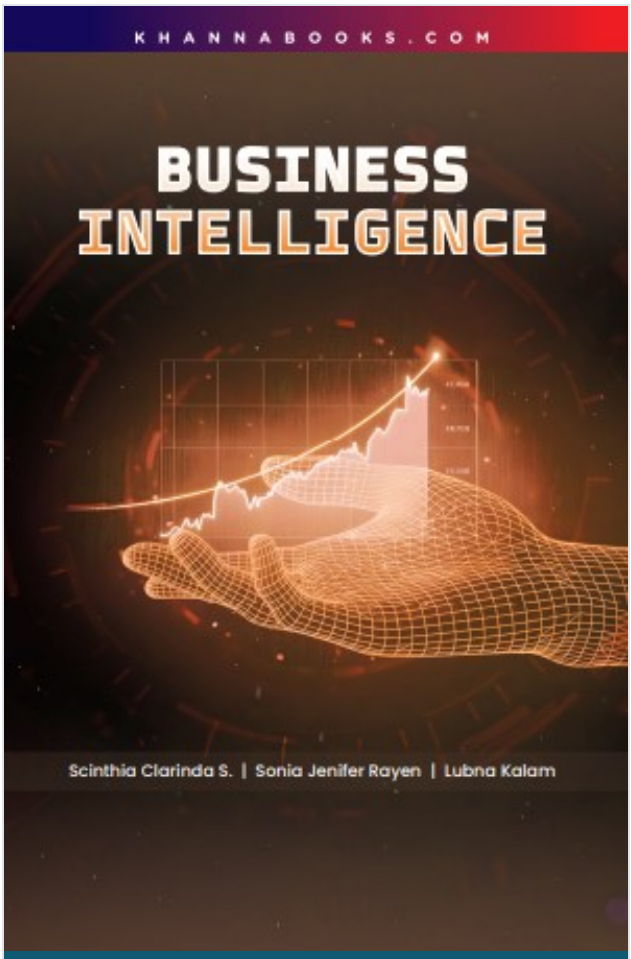
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Business Intelligence

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Product Description

Business Intelligence

This book, BUSINESS INTELLIGENCE, stands as an essential and comprehensive resource for professionals and students seeking to master the principles of data-driven decision-making. The core theme is the systematic use of technology, processes, and tools to convert an organization's raw data assets into actionable insights that drive improved operational performance and strategic foresight. It offers a rigorous, yet accessible, exploration of key BI concepts, covering the distinction between Data, Information, and Intelligence and the fundamental components of BI Architecture, including Data Warehousing, OLAP, and the crucial ETL process.

The practical value of this text is demonstrated through its detailed coverage of the BI Life Cycle, the implementation challenges organizations face, and the necessity of developing a strategic BI Roadmap. It uniquely integrates advanced topics like predictive analytics and the role of organizational culture in BI success. Designed for learners, practitioners, and researchers—from casual business users to professional data analysts—this book is an indispensable asset for anyone committed to leveraging data for business growth and a competitive advantage.

Salient Features:

- **BI Architectural Core**: Details the components of BI architecture like Data Warehousing and OLAP (Online Analytical Processing), showing how they enable rapid, multidimensional data analysis.
- **ETL Process Mastery**: Provides a deep dive into the Extract, Transform, Load (ETL) mechanism, detailing critical steps like data cleaning, filtering, and standardization necessary for building a robust Data Warehouse.

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- **Strategic Planning**: Explores the importance of developing a comprehensive BI Strategy and Roadmap, outlining essential steps for implementation, risk assessment, and achieving a clear Return on Investment (ROI).
- **User-Centric Design**: Focuses on end-user segmentation and the creation of user-friendly dashboards and scorecards. This ensures that complex data is accessible for informed decision-making.
- **Emerging Technology**: Covers the future of Business Intelligence, including the integration of AI/Machine Learning for automated analysis, cloud-based analytics, and real-time data processing.
- **MSBI Toolset**: Offers practical insights into the Microsoft Business Intelligence (MSBI) suite, specifically detailing tools like SSIS (ETL), SSAS (OLAP/Data Mining), and SSRS (Reporting).
- **Predictive Analytics**: Explores advanced analytical techniques like Data Mining and Statistical Analysis to uncover hidden patterns and develop predictive models for future business forecasting.
- **Implementation Challenges**: Discusses critical issues and challenges that organizations face, such as data quality issues, implementation complexity, and the Total Cost of Ownership (TCO).

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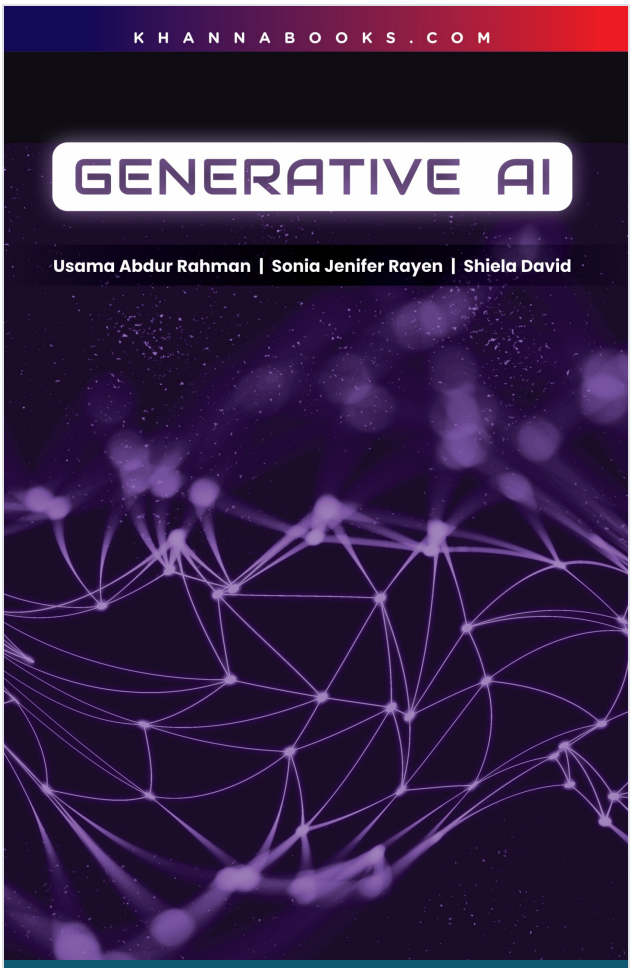
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Generative AI

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Product Description

Generative AI (Gen AI) has rapidly evolved from a theoretical concept into a transformative technology capable of simulating human creativity, generating content, producing innovative ideas, and enabling autonomous decision-making. This book serves as a comprehensive and structured guide to understanding the foundations, architectures, applications, and future directions of Generative Artificial Intelligence. Designed for students, researchers, professionals, and technology enthusiasts, it provides both theoretical insights and practical perspectives on one of the most influential fields in modern computing.

The text begins by tracing the historical evolution of Artificial Intelligence, highlighting key milestones that shaped the development of machine learning and intelligent systems. It then builds a strong conceptual foundation by introducing Neural Networks and the revolutionary Transformer Architecture, which forms the backbone of modern generative systems. Special emphasis is placed on the Attention Mechanism, encoder-decoder architectures, and the emergence of Large Language Models (LLMs) that power advanced conversational and content-generation systems.

Beyond foundational concepts, the book explores advanced generative techniques such as Generative Adversarial Networks (GANs) and Variational Autoencoders (VAEs), explaining their architectures, workflows, and practical applications. Readers gain insights into how generative models create realistic text, images, and multimedia content, while also understanding the principles behind AI Agents, prompt engineering, and modern AI development frameworks.

The practical relevance of Generative AI is demonstrated through extensive real-world applications across healthcare, finance, manufacturing, software engineering, media, and entertainment. The text also addresses critical contemporary topics including model

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evaluation metrics, ethical considerations, responsible AI development, and emerging innovations such as Quantum AI and Neuromorphic Computing. By combining academic rigor with practical implementation, this book provides a complete roadmap for mastering the rapidly evolving landscape of Generative Artificial Intelligence.

Salient Features:

- Foundational AI Concepts: Provides a detailed overview of the history and evolution of Artificial Intelligence, establishing a strong foundation in neural networks, machine learning, and the development of generative technologies.
- Transformer Architecture Deep Dive: Thoroughly explains Transformer Models, the Attention Mechanism, and the distinctions between encoder-based architectures (such as BERT) and decoder-based Large Language Models.
- Large Language Model Mastery: Covers the principles, architectures, and applications of LLMs, including their use in natural language processing, content generation, summarization, translation, and conversational AI systems.
- Advanced Generative Models: Presents comprehensive coverage of Variational Autoencoders (VAEs) and Generative Adversarial Networks (GANs), detailing their components, workflows, training methodologies, and practical applications.
- Practical AI Agents & Frameworks: Introduces AI Agents and modern development frameworks such as Lang Chain, enabling readers to build scalable and production-ready Generative AI applications.
- Cross-Industry Applications: Demonstrates the transformative impact of Generative AI across multiple sectors, including healthcare, manufacturing, finance, software development, and digital media.
- Model Evaluation Techniques: Explains important evaluation metrics such as Perplexity, BLEU Score, and ROUGE Score, helping readers assess and benchmark the performance of generative and language models.

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- Future & Ethical Directions: Explores emerging topics including Multimodal AI, prompt optimization techniques (Top-K and Top-P sampling), ethical AI practices, Quantum AI, and Neuromorphic Computing.

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- Transformer
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- Image Generation
- Model Evaluation and Future of Generative AI

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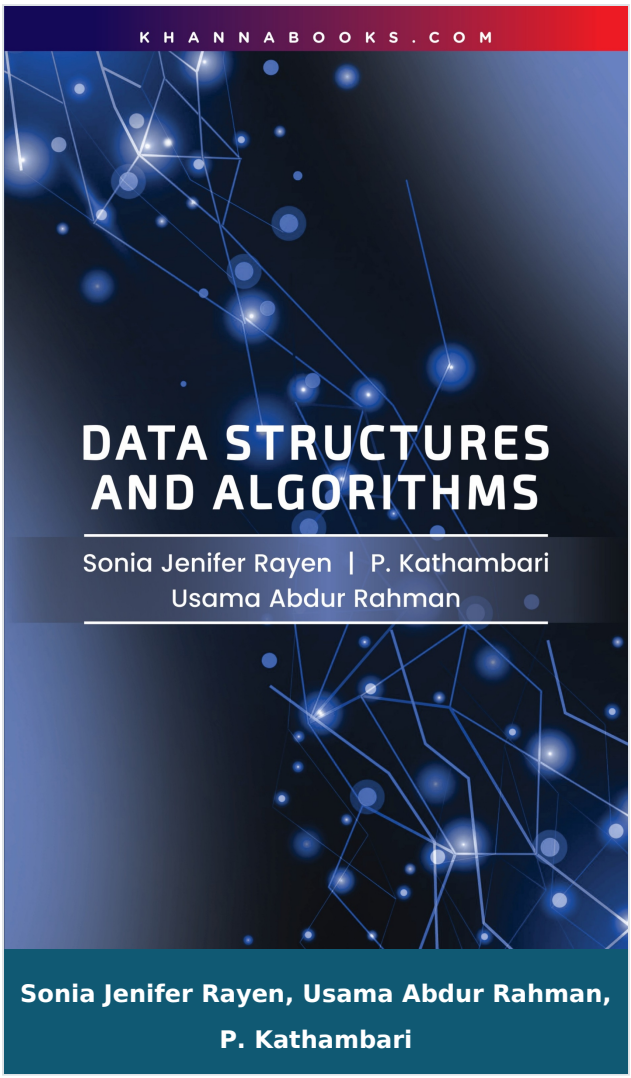
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Data Structures and Algorithm

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Product Description

In the rapidly evolving landscape of computer science and technology, a foundational mastery of data structures and algorithms is paramount for efficient problem-solving and system design. This essential textbook is specifically designed to offer Computer Science, Information Technology, and allied students, along with educators and aspiring programmers, a broad and easy-to-understand exposition of these key principles.

The book's core purpose is to build a strong, clear, and practical understanding of fundamental concepts, integrating theoretical principles with applied implementation so readers can not only grasp the inherent logic but also implement solutions in real-world computing environments. The text systematically covers traditional structures like Arrays, Linked Lists, Stacks, and Queues, alongside complex non-linear structures such as Trees and Graphs. It then advances to essential algorithm design techniques, including Divide and Conquer, Greedy Algorithms, and Dynamic Programming, and comprehensively covers Searching and Sorting methods.

A key highlight is the dedicated focus on Algorithm Analysis, thoroughly explaining concepts like Time and Space Complexity and Big O notation to ensure readers can develop efficient, optimized solutions. Maintaining an academic yet friendly tone, the book ensures clarity by breaking down complex concepts, supplemented with numerous diagrams, real-life examples, and code snippets, primarily using Python for readability. This text is an indispensable guide for establishing the analytical and coding skills necessary for academic and professional success.

Salient Features:

• Foundational DS: Systematically covers primitive and non-primitive structures like arrays, linked lists, stacks, queues, trees, and graphs, forming the core of computing.

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• Performance Analysis: Explains the crucial concepts of Big O notation, time, and space complexity analysis, enabling the design of optimized and efficient coding solutions.

• Advanced Techniques: Details advanced algorithm design paradigms, including Divide and Conquer, the Greedy approach, Dynamic Programming, and Backtracking for complex problem-solving.

• Practical Coding: Adopts a hands-on approach with numerous code snippets, examples, and diagrams, utilizing Python for clear, readable implementation of concepts.

• Search & Sort Mastery: Provides clear, step-by-step coverage of fundamental operations like linear search, binary search, and various efficient sorting methods (Quick, Merge, Heap).

• Applied Solutions: Explores real-world applications of data structures, such as polynomial manipulation via lists and shortest path problems using Dijkstra's algorithm.

• Conceptual Clarity: Establishes a strong basis by thoroughly defining and differentiating between data, information, and Abstract Data Types (ADT) before implementation.

• Student Focused: Includes chapter-end exercises and problems to reinforce learning, making it an ideal, syllabus-aligned guide for academic and professional preparation.

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