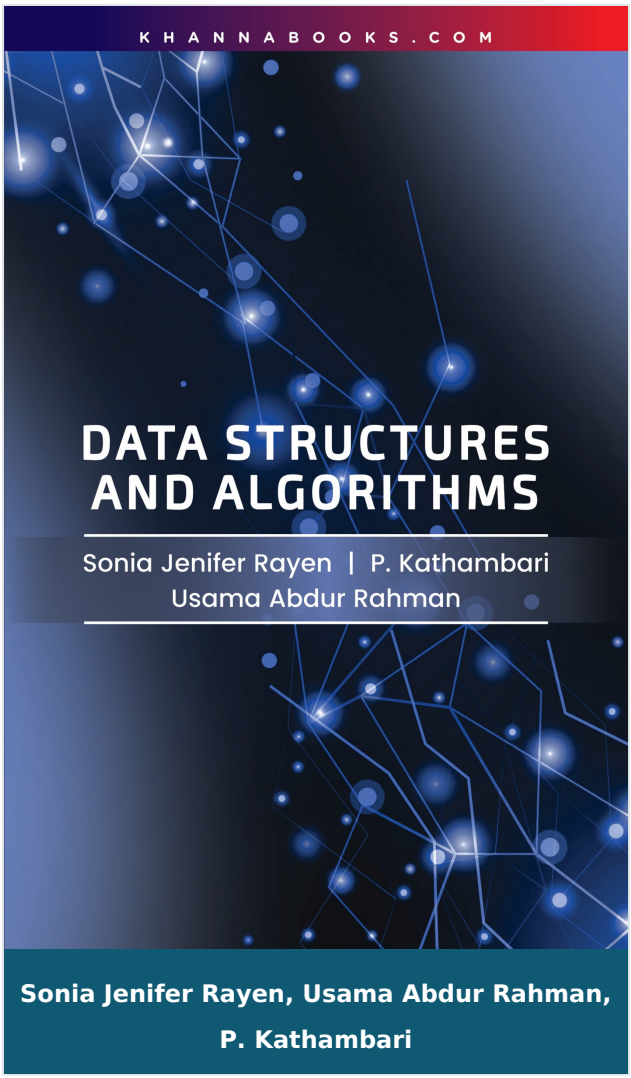

Data Structures and Algorithm

Author :	Sonia Jenifer Rayen, Usama Abdur Rahman, P. Kathambari
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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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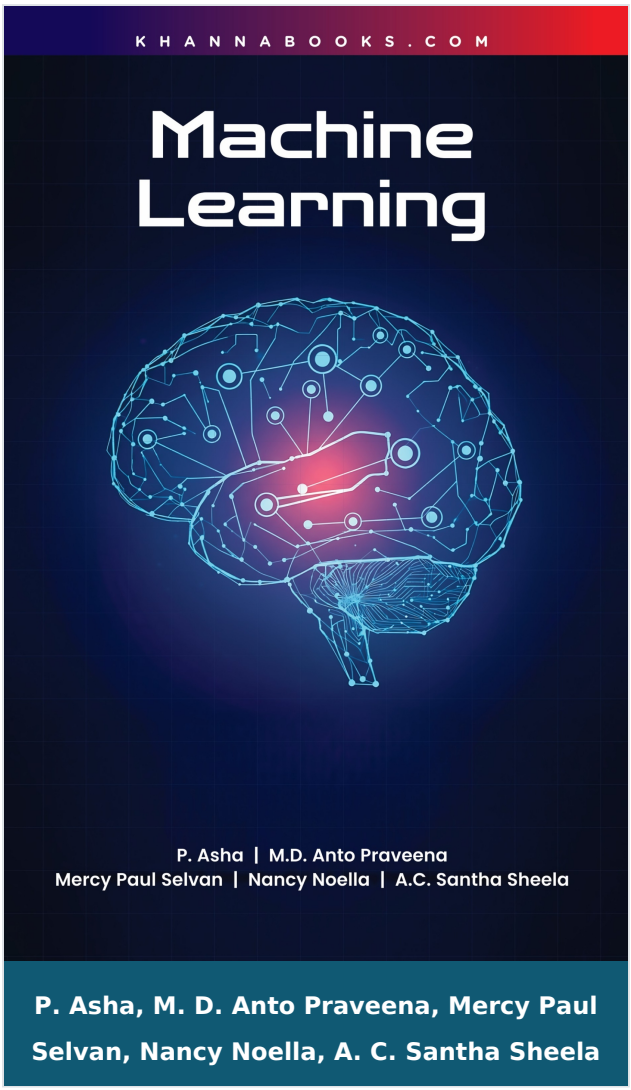

P. Asha, M. D. Anto Praveena, Mercy Paul Selvan, Nancy Noella, A. C. Santha Sheela

Machine Learning

Author :	P. Asha, M. D. Anto Praveena, Mercy Paul Selvan, Nancy Noella, A. C. Santha Sheela
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Product Description

MACHINE LEARNING: A Theoretical and Practical Guide is an essential introductory textbook meticulously designed to equip students and researchers with a robust theoretical foundation and critical practical insights into the rapidly evolving field of data analytics. Addressing the core principles of machine learning (ML), the book systematically explores the diverse ML types—Supervised, Unsupervised, Semi-Supervised, and Reinforcement Learning—while meticulously detailing their mathematical underpinnings and theoretical frameworks.

The book begins with an exploration of fundamental learning concepts, including the Bias-Variance Tradeoff and VC Dimension, before delving into core algorithms. It provides comprehensive coverage of key techniques for real-world problem-solving, such as Association Analysis for recommendation systems, and foundational Classification algorithms like Decision Trees and Naïve Bayesian Classifiers. Complex topics are simplified through a thorough analysis of parametric estimation, multivariate techniques, and crucial dimensionality reduction methods like PCA and LDA. Furthermore, the text offers practical solutions for Clustering and Outlier Detection, which are vital for achieving effective generalization. A dedicated section introduces Neural Networks, from single-layer perceptrons to Multi-layer Perceptrons and Backpropagation, culminating in a discussion of advanced local models and ensemble techniques like Bagging and Boosting. Finally, the book highlights emerging research in Reinforcement Learning, positioning it as a valuable resource for tackling complex engineering and open research challenges. This volume serves as an invaluable roadmap for aspiring data scientists and established academics seeking to master modern ML principles.

Salient Features:

• Foundational Learning Paradigms: Details the four main types of learning: Supervised, Unsupervised, Semi-Supervised, and Reinforcement Learning, providing context for

various algorithms.

• Core Algorithms Analyzed: Provides in-depth coverage of crucial models such as Decision Trees, Naïve Bayes Classifiers, K-Means clustering, and Linear Regression.

• Mathematical Underpinnings: Explains the theoretical frameworks of ML, including Bayesian Decision Theory, PAC Learning, and the Bias-Variance Tradeoff in model building.

• Data Reduction Techniques: Features practical chapters on essential dimensionality reduction methods like Principal Component Analysis (PCA) and Linear Discriminant Analysis (LDA) for data preprocessing.

• Neural Network Deep Dive: Introduces the architecture and training of neural networks, covering perceptrons, Multi-Layer Perceptrons, and the Backpropagation algorithm.

• Advanced Local Models: Includes detailed explanations of competitive learning, Self-Organizing Maps (SOM), and Radial Basis Function (RBF) networks for advanced data grouping.

• Model Optimization Strategies: Explores ensemble methods, specifically Bagging and Boosting (including AdaBoost and Gradient Boosting), for improving model accuracy and stability.

• Future Learning Paradigms: Highlights emerging research in Reinforcement Learning, explaining its workflow, terminologies, and key models like Markov Decision Processes (MDPs) and Q-Learning.

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Table Of Contents

- Introduction to Machine Learning
- Decision Theory
- Clustering and Regression
- Multilayer Perceptions
- Local Models

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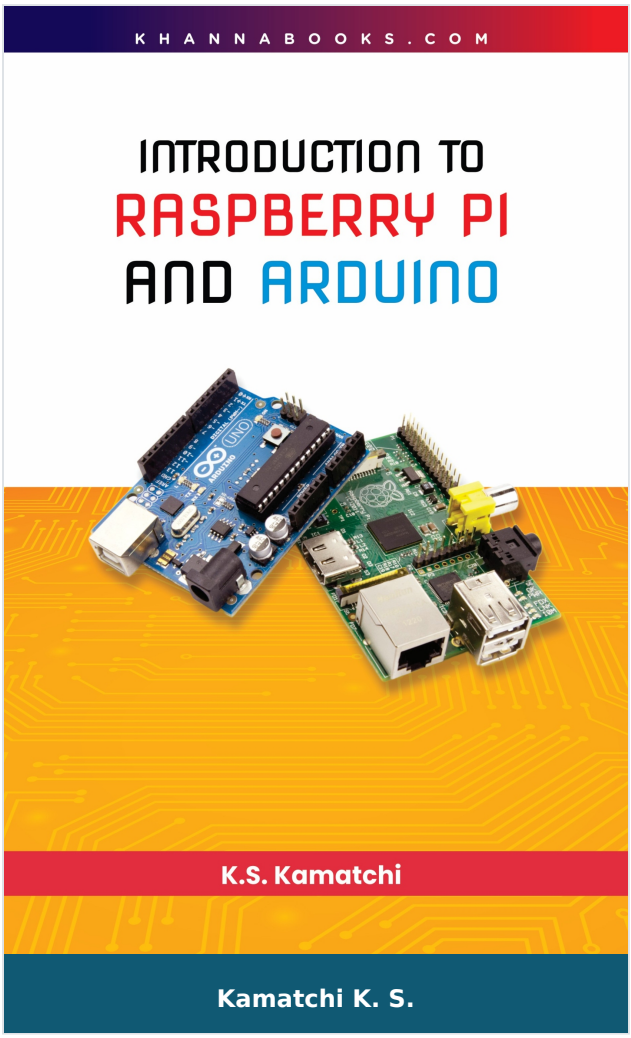

Introduction to Raspberry Pi and Arduino

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Product Description

"Introduction to Raspberry Pi and Arduino" is a comprehensive, practical guide designed to launch aspiring engineers, students, and hobbyists into the dynamic world of the Internet of Things (IoT), embedded systems, and electronics. Recognizing that modern IoT innovation rests upon versatile prototyping tools, this book provides focused, hands-on instruction for the two most popular platforms: Arduino and Raspberry Pi.

The core purpose of this text is to bridge the gap between theoretical electronic concepts and the tangible creation of smart devices. The journey begins by laying the groundwork, introducing the essential components of any IoT ecosystem, such as sensors and actuators. The book then systematically separates the platforms: Arduino is utilized for building interactive and rapid-prototyping applications, while the more powerful Raspberry Pi is leveraged for creating complex, networked, and web-connected projects. Readers will learn to integrate Wi-Fi supported modules like the ESP 8266, manage cloud communication (e.g., Thing Speak, Blynk), and design full-scale home automation systems that combine both microcontrollers.

With its academic yet friendly tone and chapters structured around hands-on examples, this resource guarantees that by the end, you will be equipped with the necessary knowledge and practical skills to create your own innovative IoT solutions, moving from the simplest to the most sophisticated systems. This book is your essential gateway to becoming a builder in the digital age.

Salient Features:

• Dual Platform Focus: Dedicated, practical coverage of both Arduino (for interactive prototyping) and Raspberry Pi (for complex, networked systems), providing versatile skills for any DIY electronics project.

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• Core IoT Components: Detailed introduction to sensors and actuators and their roles in IoT systems, with practical guidance on interfacing various types of sensors (LDRs, DHT-22, etc.) for crucial data collection.

• Hands-on Projects: Every chapter provides hands-on examples and step-by-step guides, enabling readers to follow along, experiment, and immediately build their own IoT applications for real-world problem-solving.

• Cloud Communication: Comprehensive coverage of IoT integration and cloud connectivity, including using the ESP 8266 Wi-Fi module and platforms like ThingSpeak and Blynk for remote data monitoring.

• Web-Connected Control: Teaches how to leverage the Raspberry Pi's potential for web-connected projects, covering key concepts like setting up a LAMP Web-server and controlling GPIO pins over a web browser.

• Visual Programming: Includes exploration of the Node-RED Visual Editor, which simplifies home automation and IoT design using a flow-based programming model to connect hardware, APIs, and online services.

• Integrated Automation: Explains the design and implementation of home automation systems that leverage both platforms, covering communication protocols like MQTT and providing blueprints for smart devices and solutions.

• Code Practicality: Provides executable code and programming guidance in both C/C++ (for Arduino sketches) and Python (for Raspberry Pi GPIO and networking), preparing the reader for full-stack embedded development.

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Table Of Contents

- Introduction to Sensors
- IoT with Arduino
- Programming ESP 8266 Module
- Introduction to Raspberry Pi
- IoT Design Using Raspberry Pi
- Exrcises

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Lekshmi S. Raveendran, Minu Susan Jacob, Selvapriya

Artificial Intelligence Search Methods & Reasoning

Author :	Lekshmi S. Raveendran, Minu Susan Jacob, Selvapriya
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Product Description

Artificial Intelligence Search Methods and Reasoning serves as an essential guide to the foundational principles and core algorithmic strategies that power modern intelligent systems. This book uniquely blends the basic cognitive science behind AI—exploring concepts of intelligence, memory, computation, and learning—with the practical, rigorous algorithms used for problem-solving in complex environments. Its core theme is to demystify how intelligent agents perceive, reason, and act by systematically searching for optimal solutions.

The primary purpose of this resource is to equip learners with a deep, practical understanding of both uninformed (e.g., BFS, DFS) and informed search techniques (e.g., A*, Greedy Best-First Search), adversarial search, and constraint satisfaction problems (CSPs). The text further extends into crucial domains like knowledge representation using logical agents (propositional and first-order logic) and probabilistic reasoning (Bayesian networks, Hidden Markov Models). It culminates in a detailed examination of various learning algorithms, including supervised, unsupervised, reinforcement, and ensemble methods.

The target audience for this book includes undergraduate and graduate students in Computer Science, Artificial Intelligence, and Electrical Engineering, as well as researchers and professionals seeking a robust, algorithm-focused foundation in AI theory and implementation. It offers practical value through numerous case studies, such as the N-Queens Problem, the Wumpus World, and the application of Nature-Inspired Computation like Ant Colony Optimization for the Traveling Salesman Problem. It is a vital resource for building intelligent systems capable of autonomous decision-making.

Salient Features:

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• Foundational AI Concepts: Provides a unique introduction to the cognitive roots of AI, detailing the science behind intelligence, human memory models, and their translation into computational systems.

• Exhaustive Search Algorithms: Offers comprehensive coverage of Uninformed Search methods (BFS, DFS, IDDFS, UCS, Bidirectional Search) & advanced Informed Search strategies, including heuristics & A*.

• Logic and Reasoning: Systematically explores the role of knowledge and its representation using propositional and First-Order Logic, enabling agents to perform complex inference via Forward and Backward Chaining.

• Probabilistic Approaches: Dedicated unit on planning and reasoning under uncertainty, covering essential topics like Bayes' Rule, Bayesian Networks, Hidden Markov Models, and Kalman Filters.

• Constraint Solving & Games: Detailed breakdown of Constraint Satisfaction Problems (CSPs), including a case study on the N-Queens problem, alongside an exploration of Adversarial Search strategies for competitive environments.

• Modern Learning Paradigms: Includes extensive chapters on learning intelligence, covering Supervised, Unsupervised, and Ensemble Learning techniques (e.g., Boosting/AdaBoost), vital for contemporary AI applications.

• Real-World Case Studies: Features practical application examples like solving the Wumpus World problem and a special unit on Nature-Inspired Computation, demonstrating Ant Colony Optimization for the Traveling Salesman Problem (TSP).

• Intelligent Agent Design: Focuses on the Rational Agent approach, detailing the PEAS framework (Performance, Environment, Actuators, Sensors) and exploring agent rationality, learning, and autonomy.

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Table Of Contents

- Foundations of Artificial Intelligence
- Searching Towards Solution
- Knowledge: Role and Representation
- Approaches Behind Planning and Reasoning
- Learning an Communication

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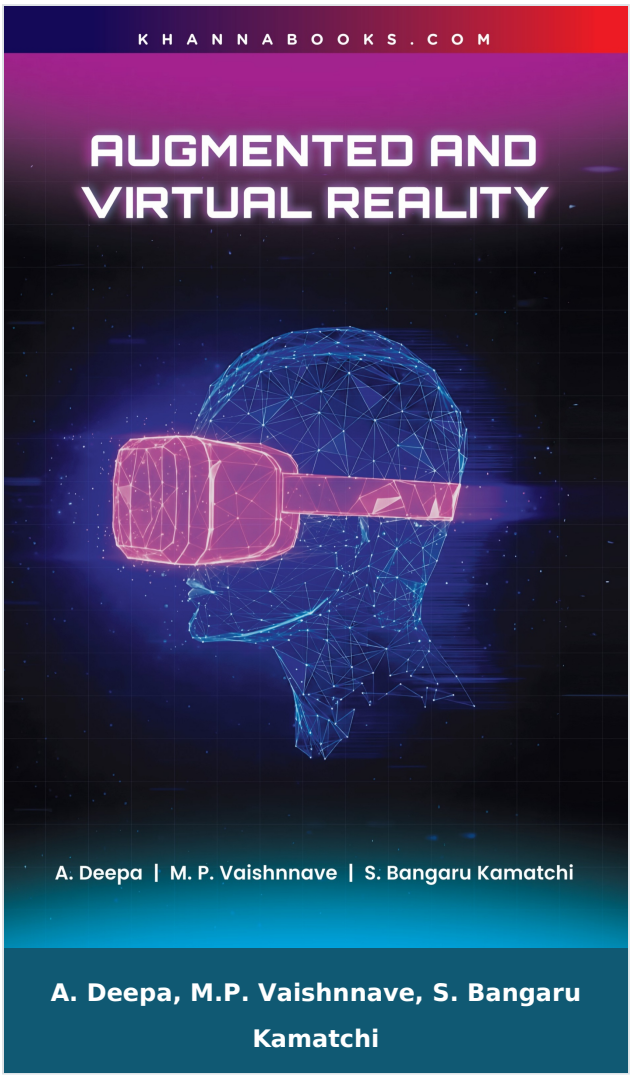

Augmented and Virtual Reality

Author :	A. Deepa, M.P. Vaishnnave, S. Bangaru Kamatchi
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Product Description

This book serves as a comprehensive guide to mastering the rapidly evolving world of Augmented Reality (AR) and Virtual Reality (VR), technologies that are fundamentally reshaping human-computer interaction. Designed to bridge the gap between theoretical knowledge and practical implementation, the core purpose of this text is to equip readers with the foundational concepts and hands-on expertise necessary to design, develop, and deploy functional AR/VR applications.

The journey begins with an exploration of the historical evolution, scope, and key distinctions of AR/VR, including the critical concepts of Immersion vs. Presence. It quickly progresses to essential design principles, focusing heavily on User Experience (UX), graphical metaphors, and prototyping within immersive environments. The practical value of this book is demonstrated through detailed instructional units on Unity, the industry-leading development platform, and its integration with the powerful AR toolset, Vuforia. Readers will gain proficiency in scripting, handling Unity Physics (Colliders and Rigidbodies), and creating interactive 3D experiences, culminating in a case study on real-time application development.

This resource is ideally intended for students, developers, designers, and enthusiasts seeking a strong, structured foothold in the AR/VR domain. It is an essential tool for those looking to harness these transformative technologies for applications across gaming, healthcare, education, and manufacturing.

Salient Features:

• Foundational Concepts: Covers the historical evolution, definitions, and scope of AR/VR, including multimodal displays and the key differentiation between Strong vs. Weak AR and Immersion vs. Presence.

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• Interaction Design: Dedicated focus on User Experience (UX) guidelines, perception, and cognition. It details how to design for user needs, apply Affordances, and perform prototype evaluation in AR/VR environments.

• Unity Development: Provides a comprehensive overview of the Unity platform, covering its interface, navigation, asset management, hierarchy, and fundamental scripting concepts using MonoBehaviours.

• Vuforia and AR: Explores the Vuforia development engine, detailing its features, setup process, and practical use for implementing Image Targeting and custom image recognition in AR applications.

• Scripting and Physics: Offers in-depth coverage of introductory and advanced scripting, focusing on manipulating components and programming interactions. It also introduces essential concepts of Unity Physics.

• Advanced Interactivity: Explains crucial implementation details like creating Trigger Events, using Colliders and Rigidbodies, and navigating world space for both objects and the user in the virtual environment.

• Real-World Applications: A final unit presents a Case Study on building a complete, real-time application using AR and VR, with applications demonstrated across fields like Education, Healthcare, and Retail.

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Table Of Contents

- Introduction to Augmented Reality and Virtual Reality
- Interaction for AR/VR Environments Design
- Introduction to Unity
- Introduction to Vuforia and Physics in Unity
- Expanding on Scripting and Interactions
- Sample Question Paper

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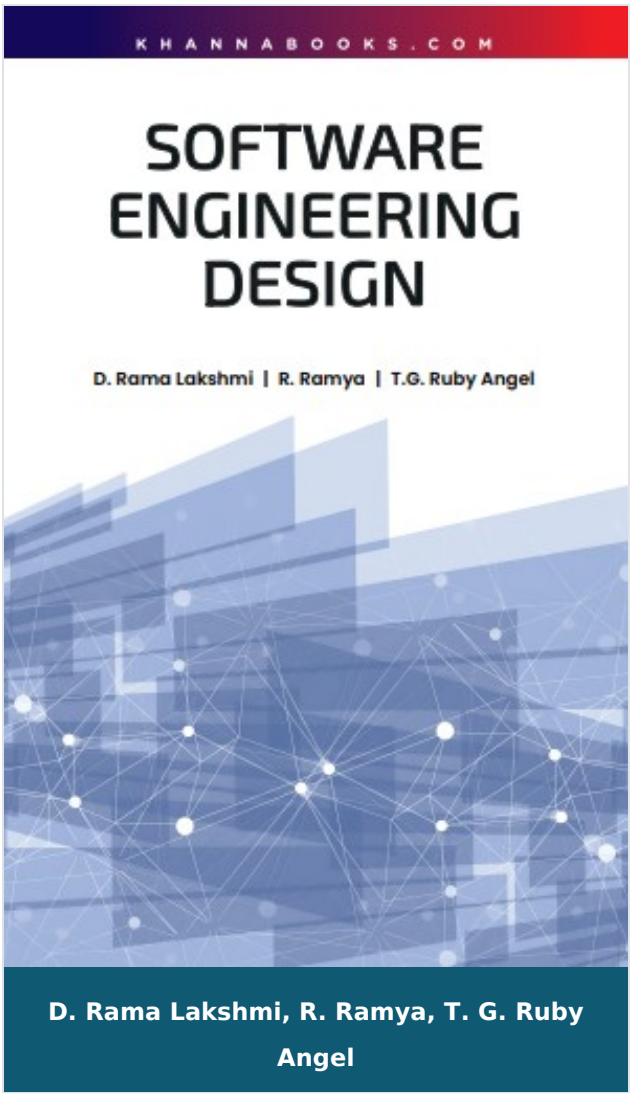

D. Rama Lakshmi, R. Ramya, T. G. Ruby Angel

Software Engineering Design

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Product Description

Software Engineering Design

Software Engineering Design is a comprehensive guide to the foundational discipline that dictates the success, scalability, and maintainability of all modern software systems. Recognizing that software design is at the heart of technological advancements, this essential resource transforms the complex challenges of system design into a structured, manageable process. Its core purpose is to bridge the gap between theoretical foundations and real-world applications, ensuring that readers gain both a vital conceptual understanding and practical expertise in creating robust software solutions.

The book covers the entire spectrum of the software development lifecycle. It begins with an exploration of various Software Life Cycle Models—from linear methods like the Waterfall Model to adaptive Agile methodologies. The text then provides a deep dive into Requirement Engineering, focusing on crucial tasks like requirements modeling (DFD, ERD) and rigorous validation, before moving into the central System Design phase. Here, readers learn about popular architectural paradigms (Layered, Data-Centered) and objective metrics, such as Coupling and Cohesion, used to measure the "goodness" of a design. The content concludes with a focus on Testing & Quality Assurance (Verification and Validation) and key management aspects, including risk mitigation (RMMM) and project estimation (COCOMO).

This text is specifically tailored for a broad audience: students beginning their academic journey, as well as experienced professionals and practitioners seeking to refine their design skills. By imparting technical knowledge and fostering a necessary design-oriented mindset, this book serves as an invaluable companion for building systems that are efficient, reliable, and sustainable.

Salient Features:

- **Structured Life Cycles**: Explore fundamental Software Life Cycle Models (Waterfall, Spiral, Prototyping) and modern, iterative approaches like Agile methodologies to ensure efficient project management and successful risk mitigation.
- **Precise Requirements:** Details the systematic process of Requirements Engineering, covering elicitation, visual modeling (DFD, ERD), and rigorous validation to align the final product with core business and user needs.
- **Core Design Architectures**: Focuses on System Design principles, exploring essential architectural paradigms such as Layered Systems, Data-Centered Systems, and the critical transition from requirements analysis to a final blueprint.
- **Design Quality Metrics**: Provides essential methods for quantifying design effectiveness, specifically detailing the metrics of Coupling and Cohesion to guide students and professionals toward building maintainable and robust software.
- **Quality Assurance & Testing**: Integrates the continuous processes of Verification and Validation (V&V), covering the various Levels of Testing and approaches (Functional/Non-Functional) required to achieve a high-performance system.
- **Project Management Tools**: Covers Umbrella Activities such as Risk Management (RMMM), Software Quality Assurance (SQA), and project cost/time estimation using industry models like the well-known COCOMO model.
- **Evolution & Reengineering**: Discusses software evolution through different forms of Maintenance (Corrective, Adaptive, Preventive) and the techniques of Software Reengineering to enhance system longevity and scalability.
- **Agile and DevOps Focus**: Offers a practical overview of Agile methodologies (Scrum, Kanban, Lean) and the principles of DevOps to facilitate rapid development, continuous integration, and seamless collaboration across teams.

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Table Of Contents

- Software Life
- Requirements Engineering
- Software Design
- Testing
- Umbrella Activities & Project Management and Estimation

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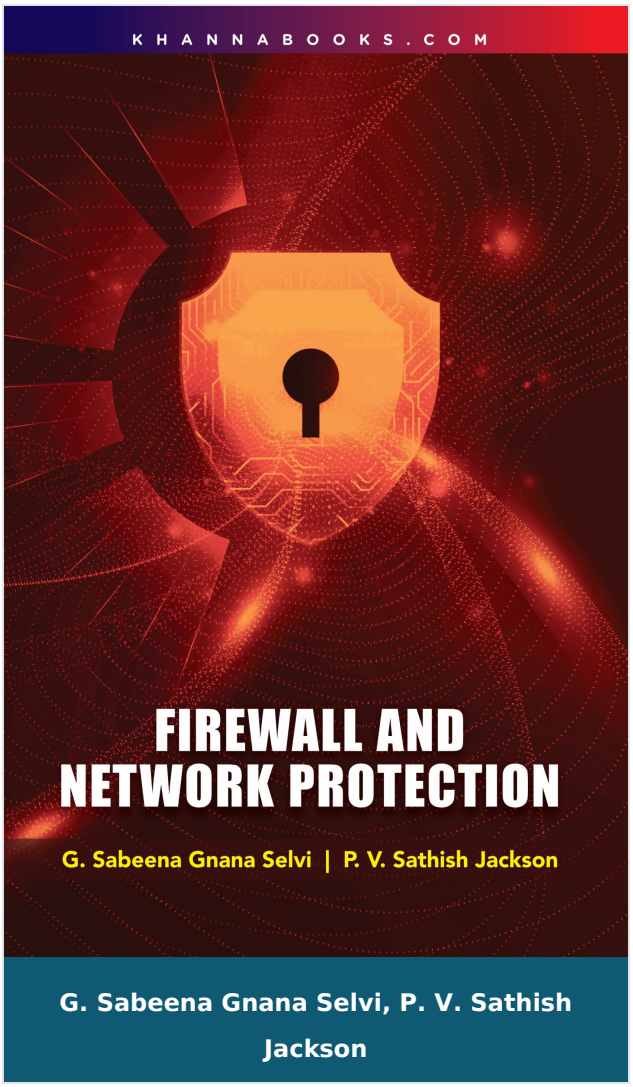

G. Sabeena Gnana Selvi, P. V. Sathish Jackson

Firewall And Network Protection

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Product Description

Firewall And Network Protection

This book offers a comprehensive exploration of modern network security, establishing a robust foundation for protecting digital assets in today’s threat landscape. It begins by grounding readers in the essential security principles—Confidentiality, Integrity, and Availability (CIA Triad)—and outlines the current spectrum of complex threats, including ransomware and zero-day attacks, preparing readers to understand the adversary.

The content moves seamlessly from foundational theory to practical implementation. It dedicates significant coverage to the mathematics of cryptography, analyzing both symmetric ciphers like AES and asymmetric systems like RSA and Diffie-Hellman, alongside practical case studies in cryptographic solutions. Crucially, the text provides an in-depth look at implementing layered defense controls, including Intrusion Detection Systems (IDS) and the core role of Firewalls as network access controls. It details various firewall types (Packet Filtering, Stateful Inspection, and Proxy) and best practices for rule management and network segmentation. Furthermore, the book addresses securing emerging technologies such as Cloud, IoT, and Web Applications.

This resource is an invaluable guide for students in Computer Science and Cybersecurity, as well as IT and security professionals who need to design, implement, and maintain resilient security architectures in an evolving digital world.

Salient Features

- **Foundational Security Principles**: Clearly covers the core security model, the CIA Triad (Confidentiality, Integrity, Availability), and expands on essential concepts like Accountability and Non-repudiation.
- **Symmetric/Asymmetric Crypto**: Provides detailed instruction on modern cryptographic algorithms, contrasting the performance of AES with the security

offered by RSA for practical data protection.

- **Firewall Deep Dive**: Explores the characteristics and necessity of effective firewalls, detailing different types—Packet Filtering, Stateful Inspection, and Proxy—for robust perimeter defense.
- **Practical Network Defense**: Focuses on implementing layered security controls, covering the deployment and management of Intrusion Detection Systems (NIDS/HIDS) and VPNs for secure remote access.
- **Malware and Attack Taxonomy**: Categorizes and explains major network threats like DDoS, Phishing, IP Spoofing, and sophisticated malware (Ransomware), providing context for effective defense strategies.
- **Emerging Tech Security**: Addresses the unique security challenges in contemporary environments, dedicating chapters to securing Cloud infrastructure, IoT devices, and Web Applications (WAF, HSTS).
- **Cryptographic Case Studies**: Includes analysis of both successful and failed cryptographic solutions, offering essential lessons learned and promoting the use of modern, strong cryptographic protocols.

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Table Of Contents

- : Foundation of Network Security
- : Cryptography and Secure Communication
- : Securing the Internet and Emerging Technologies
- : Combating Malicious Software and Attacks
- : Intrusion Detection and Firewalls

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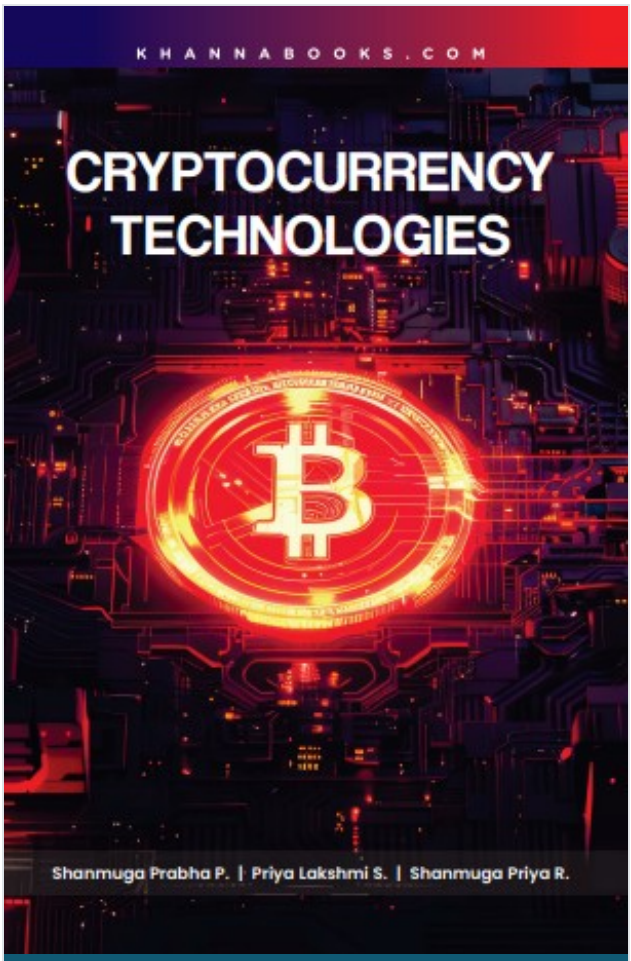

Shanmuga Prabha P., Priya Lakshmi S., Shanmugaa Priyaa R.

Cryptocurrency Technologies

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Product Description

Cryptocurrency Technologies

This book addresses the explosive growth of digital money, which has resulted in an entirely novel phase of decentralized structures, led prominently by the advancements in Bitcoin. As Bitcoin has evolved from an innovative concept into a multi-trillion-dollar business, it fundamentally challenges existing finance paradigms and recasts the concept of trust in digital communication.

Serving as a crucial, detailed resource, this text offers a comprehensive guide to the fundamental concepts, technological advances, and practical implications of digital currencies. It provides a detailed overview of the industry's current condition and possibilities for the future, covering essential topics such as blockchain basics, smart contracts, decentralized finance (DeFi), and emerging digital currency tendencies. Crucially, the text extends beyond core technology to explore the practical uses, legal issues, and wider societal ramifications of decentralized digital assets.

The book's mission is to equip individuals with the knowledge required to engage in and recognize the underlying bitcoin system, guiding readers through the complexity of cryptocurrency technologies in a simple and practical manner. The target audience is broad, encompassing complete beginners, enthusiasts, sector specialists, learners, researchers, programmers, and investors who seek to comprehend the foundations of this constantly evolving world. This academic yet friendly resource provides the necessary understanding to leverage the power of decentralized digital records.

Salient Features:

- **Core Fundamentals**: Systematic review of physical money, digital money, fiat currencies, and interbank payment systems, setting the essential historical context for decentralized finance.

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- **Advanced Cryptography**: Dedicated coverage of cryptographic tools crucial for blockchain security, such as Hash Functions, Digital Signatures (ECDSA), and the principle of Zero Knowledge Proof.
- **Blockchain Architecture**: Detailed explanation of the underlying network structure, covering essential concepts like Nodes, Distributed Consensus, and the Merkle Patricia Tree for data integrity.
- **Bitcoin and Ethereum**: In-depth units on the primitives and workings of Bitcoin (including mining and decentralization) and the Ethereum ecosystem, which revolutionized smart contracts.
- **Smart Contract Development**: Practical instruction on programming Smart Contracts on Ethereum and an overview of the specialized object-oriented Solidity Language used for development.
- **Regulatory Framework**: A comprehensive unit on the Legal Aspects and Regulation of cryptocurrency, discussing stakeholders, exchanges, and its impact on the black market and global economy.
- **Emerging Applications**: Exploration of real-world use cases, including the integration of blockchain with the Internet of Things (IoT), Medical Records Management Systems, and the future trends of the technology.

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Table Of Contents

- Digital Money and Cryptography
- Cryptography and Blockchain Technology
- Cryptocurrency and Blockchain Technology
- Ethereum and Solidity
- Cryptocurrency Regulation and Blockchain Application

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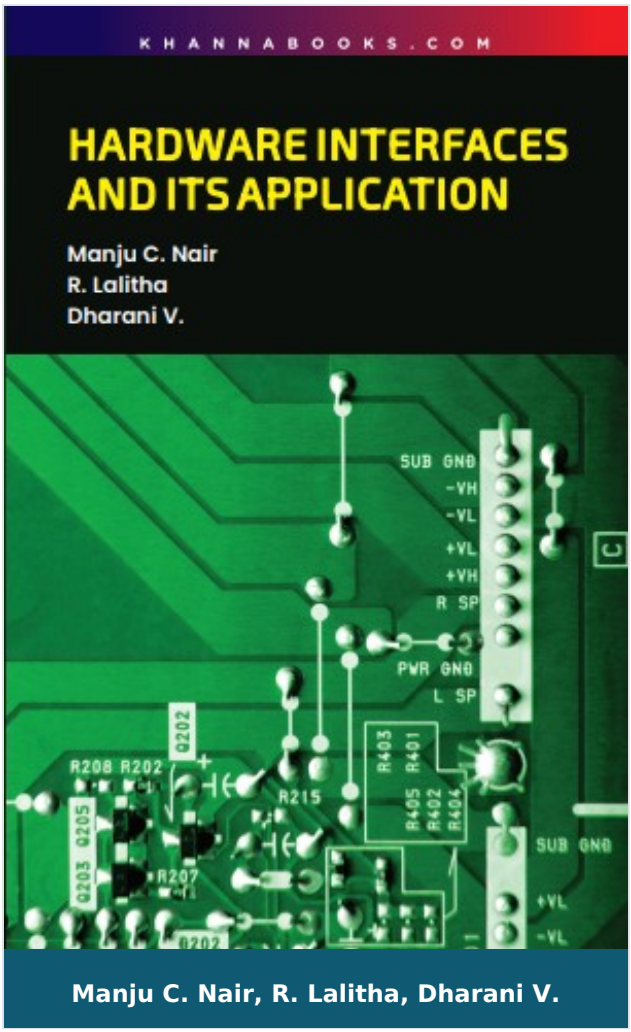

Hardware Interfaces and Its Application

Author :	Manju C. Nair, R. Lalitha, Dharani V.
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Product Description

Hardware Interfaces and Its Application

The foundation of modern technology—from high-performance computing to advanced networking and Artificial Intelligence—rests on the seamless integration of hardware interfaces. Hardware Interfaces and Its Application serves as a comprehensive and structured guide, providing a crucial understanding of the intricate connections that determine the performance, reliability, and functionality of modern computing systems. This book meticulously covers the evolution of personal computers, delves into essential components like processors, memory, and storage, and explores the crucial interfaces of motherboard designs, power management, and bus architectures.

The core purpose of this resource is to bridge the gap between foundational theoretical concepts and real-world, practical applications. It progresses logically, beginning with the history of computing and culminating in advanced topics such as modern CPU concepts, high-speed storage interfaces (NVMe, Hybrid), and network security protocols. The text ensures readers gain both theoretical expertise and practical insights for system optimization and maintenance.

Tailored for a broad audience, including students, aspiring engineers, IT professionals, and researchers, the content is carefully curated to cater to different levels of expertise. Whether you are a beginner seeking solid grounding or an experienced professional aiming to deepen your knowledge, this book is an invaluable reference for navigating the complexities of modern hardware architecture and staying updated with emerging industry trends.

Salient Features:

- **Foundational Architecture**: Explores the evolution of computing from mechanical devices to modern AI-powered systems and establishes the core principles of the

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Von Neumann architecture.

- Modern CPU Concepts: Detailed coverage of processor modes (Real, Protected, Virtual) and modern multi-core architectures, including CPU overclocking and performance optimization techniques.
- **Advanced Storage Solutions**: Comprehensive comparison of HDD vs. SSD technologies and in-depth discussions on RAID configurations, cloud storage, and high-speed NVMe interfaces for data management.
- **System Interconnectivity**: Focuses on core interfaces, including motherboard form factors, chipset roles, BIOS/UEFI firmware, and bus architectures like PCI Express and Thunderbolt.
- **Practical I/O & Networking**: Dedicated units on I/O peripherals (Serial/Parallel Ports) and network components (Switches, Routers, Cabling), crucial for system integration and performance.
- **Real-World Troubleshooting**: Includes practical case studies and solved problems for troubleshooting power failures, boot issues, and implementing efficient thermal management (air/liquid cooling).
- **Sustainability Focus**: Integrates discussions on environmental sustainability, e-waste management, and the ethical responsibilities associated with technology upgrades and hardware maintenance practices.

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Table Of Contents

- INTRODUCTION TO PC AND MEMORY
- MOTHERBOARD DESIGNS
- STORAGE DEVICES AND DATA INTERFACES
- MEMORY MANAGEMENT AND OPTIMIZATION
- ADVANCED STORAGE TECHNOLOGIES

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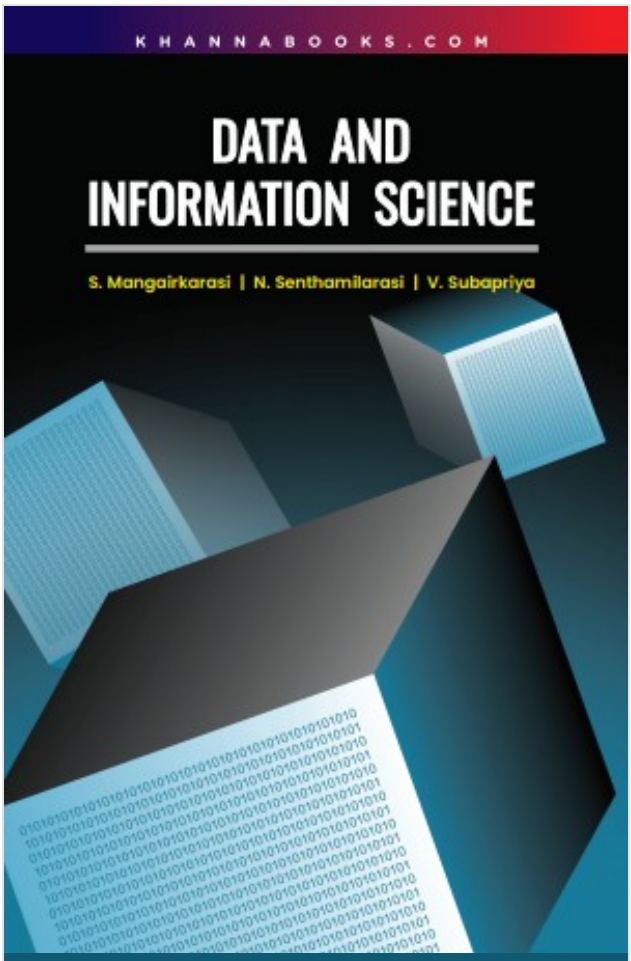

S. Mangairkarasi, N. Senthamilarasi, V. Subapriya

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.
- **Text Analysis Techniques**: Dedicated coverage of text-based data handling, exploring methods such as Bag of Words, Regular Expressions, and the practical application of Sentiment Analysis.
- **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

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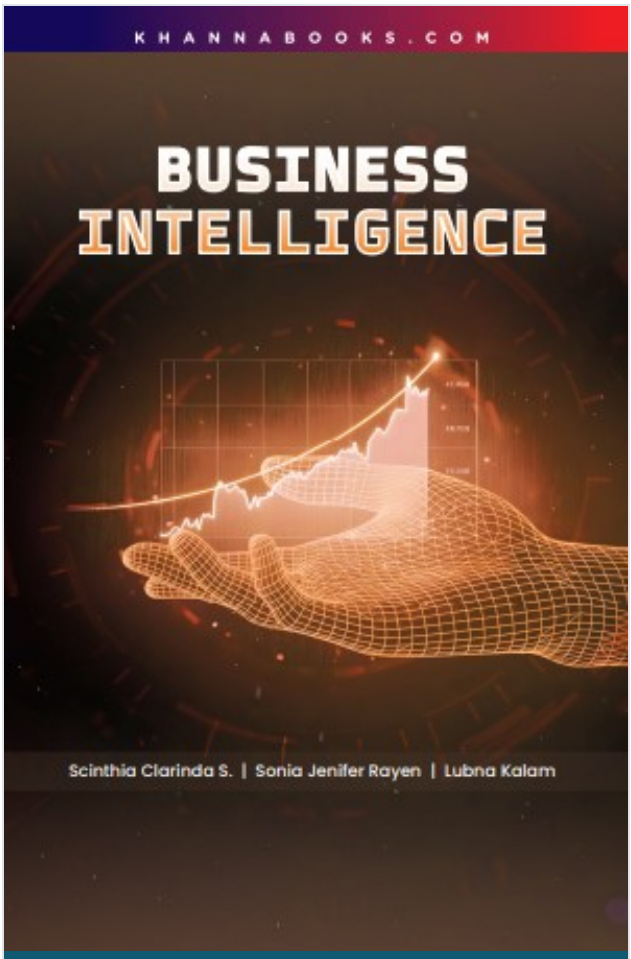

Scinthia Clarinda S., Sonia Jenifer Rayen, Lubna Kalam

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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Table Of Contents

- Business Intelligence Introduction
- Business Intelligence Life Cycle
- Business Intelligence User Model
- Business Intelligence Issues and Challenges
- Business Intelligence Strategy and Roadmap

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Smarter City

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Product Description

Smarter City

The concept of the Smarter City represents the future of urban living—a paradigm where technology, data, and interconnected infrastructure converge to enhance sustainability, efficiency, and the quality of life for citizens.

Smarter City provides an essential roadmap for understanding this complex evolution. It begins by laying the foundational pillars, exploring the convergence of IoT (Internet of Things), Cloud Computing, and Big Data as the technological engine of urban transformation. The book moves beyond theory to detail practical, real-world use cases, such as Connected Street Lighting that improves energy efficiency, Smart Traffic Control that dynamically reduces congestion, and Connected Environmental Monitoring systems that track air and water quality in real time.

This text is vital for urban planners, engineers, policymakers, and technologists seeking to grasp the architecture, implementation, and long-term impact of smart city initiatives. It is the definitive guide to building a truly intelligent, resilient, and sustainable urban future.

Salient Features:

- **Foundational Technology**: Deep dive into the core technologies enabling smart cities: IoT (Internet of Things), Cloud Computing, and Big Data Analytics.
- **Key Pillars of Smart Cities**: Comprehensive coverage of the main components, including Smart Governance, Smart Economy, Smart Mobility, Smart Environment, Smart People, and Smart Living.
- **IoT Architecture and Sensors**: Detailed explanation of the IoT architectural layers (Perception, Network, Application) and the role of various sensors (temperature,

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humidity, air quality) in data collection.

- **Practical Use Cases**: Real-world examples of successful smart city deployment, including:

1. Connected Street Lighting for energy saving and remote monitoring.
2. Smart Traffic Control for dynamic signal adjustment and congestion reduction.
3. Connected Environmental Monitoring for air quality tracking and pollution detection.

- **Cloud and Data Integration**: Analysis of how Cloud Platforms provide the necessary infrastructure for scalable data storage and how Big Data Analytics translates raw sensor data into actionable insights for city management.
- **Citizen-Centric Design**: Emphasis on how smart city initiatives directly benefit citizens by enhancing public safety, reducing commute times, and improving environmental sustainability.

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Table Of Contents

- Preface
- Introduction to Smart Urban Infrastructures and Smart Cities
- Smart Urban Energy Systems
- Smart Urban Transportation Systems
- Smarter City Management and Smarter Human Services
- Smarter City and IoT

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