1. Record Nr. UNINA9911018957403321

Autore	Swathika O. V. Gnana
Titolo	Resilient Community Microgrids
Pubbl/distr/stampa	Newark : , : John Wiley & Sons, Incorporated, , 2025 ©2025
ISBN	9781394272549 1394272545 9781394272525 1394272529 9781394272532 1394272537
Edizione	[1st ed.]
Descrizione fisica	1 online resource (605 pages)
Altri autori (Persone)	KarthikeyanK
Soggetti	TECHNOLOGY & ENGINEERING / Environmental / Waste Management
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Cover -- Series Page -- Title Page -- Copyright Page -- Contents -- Preface -- Chapter 1 AI-Based Virtual Advisor for Smart Climate Farming -- 1.1 Introduction -- 1.2 Research on Smart Farming Technologies and AI Applications -- 1.3 AI and IoT in Smart Farming -- 1.4 Sustainable Agriculture and Climate-Smart Farming -- 1.5 Conclusion -- References -- Chapter 2 Swappable Battery Pack System for Electric Two-Wheelers: Design, Infrastructure, and Implementation -- 2.1 Introduction -- 2.2 Swappable Battery Technology -- 2.3 Battery Swapping Infrastructure and Optimization -- 2.4 Battery Management System -- 2.5 Business Models and Economic Implications -- 2.6 Conclusion -- References -- Chapter 3 Implementation of High Gain Bidirectional Interleaved DC/DC Converter for Electric Vehicles with Supercapacitors -- 3.1 Introduction -- 3.2 Proposed Converter -- 3.3 Operating Principle of the HGBID Converter -- 3.4 Design Considerations -- 3.5 Characteristics of SC -- 3.6 Simulation Results -- 3.7 Conclusion -- References -- Chapter 4 Fault Over-Ride and Minimization of Losses in a PV Integrated Transmission Network Using STATCOM -- 4.1 Introduction -- 4.2 Problem Statement -- 4.3

Contingency Analysis and Contingency Selection -- 4.4 Test System, Software and Components Used -- 4.4.1 Test System and Software -- 4.4.2 PV Generators Integration -- 4.4.3 Static Synchronous Compensator (STATCOM) -- 4.5 Results and Analysis -- 4.5.1 Bus Network Integrated with Solar Photo-Voltaic Generators -- 4.5.2 Test Bus Network with One STATCOM Installed at Bus 6 -- 4.6 IEEE 14 Bus Network with Two STATCOMs Installed at Bus 2 and Bus 6 -- 4.7 Conclusion -- 4.8 Future Scope -- References -- Chapter 5 Oscillating Water Column as Clean Energy Source for Sustainable Power Generation -- 5.1 Introduction to Technology -- 5.2 Hardware Implementation.
5.3 Three-Dimensional Design of Hardware Components in Solid Edge Software -- 5.4 Hardware Implementation Results and Performance Analysis of Oscillating Water Column (OWC) -- 5.5 Conclusion -- 5.6 Future Scope -- References -- Chapter 6 Cloud-Based Big Data Architecture and Infrastructure -- 6.1 Introduction -- 6.1.1 Overview of the Difficulties Caused by the Quantity, Speed and Diversity of Big Data -- 6.1.2 The Significance of Adaptable and Scalable Approaches to the Storage, Processing and Analysis of Huge Datasets -- 6.2 Big Data Architecture for the Cloud Fundamentals -- 6.3 Overview of Methods for Ingesting Data, Including Batch Operations and Live Streaming -- 6.3.1 A Description of Distributed Computing Architectures and How They Support Large-Scale Cloud Data Processing -- 6.4 Technologies for Big Data on the Cloud -- 6.4.1 Examining Virtualization and Containerization Technologies and How They Affect the Use of Large Data -- 6.5 Overview of Server Less Computing and Its Benefits for Cost Optimization and Scaling -- 6.5.1 An Examination of Cloud-Native Technologies and How Big Data Platforms Integrate with Them -- 6.6 Big Data Architectural Models for the Cloud -- 6.6.1 Detailed Description of Data Lakes and How They Function How They Process and Store Large Amounts of Heterogeneous Data -- 6.6.2 A Description of Real-Time Streaming Systems and How They are Used to Process High-Speed Data Streams -- 6.7 Integration of Cloud Services and Big Data -- 6.7.1 How to Combine Big Data Platforms with Cloud Services Including Analytics, Compute and Storage -- 6.8 Examining Data Integration and ETL (Extract, Transform, Load) Methods Based on the Cloud -- 6.9 Overview of Cloud-Based Big Data Environments' Data Governance and Metadata Management -- 6.10 Analysis of Cloud-Based Big Data Architectures' Scalability Issues.
6.11 Examining Vertical and Horizontal Scaling Methods to Succeed in Processing Demands and Growing Data Volumes -- 6.11.1 Horizontal Scaling -- 6.11.2 Vertical Scaling -- 6.12 Introduction to Cloud-Based Big Data Architectures' Performance Optimization Strategies -- 6.12.1 Data Partitioning -- 6.12.2 Caching -- 6.12.3 Parallel Processing -- 6.13 Big Data Based on the Cloud is Secure and Private -- 6.13.1 Discussion of the Security Issues and Factors in Cloud-Based Big Data Environments -- 6.14 A Description of the Mechanisms for Data Encryption, Access Regulation and Identity Administration -- 6.14.1 Data Encryption -- 6.14.2 Access Control -- 6.14.3 Identity Management -- 6.15 Examination of Privacy Issues and Data Protection Laws Compliance -- 6.15.1 Data Privacy Principles -- 6.15.2 Compliance with Data Protection Laws -- 6.15.3 Data Governance and Documentation -- 6.15.4 Security Measures -- 6.16 Case Studies and Real-World Applications -- 6.16.1 Case Study 1 -- 6.16.2 Case Study 2 -- 6.16.3 Case Study 3 -- 6.16.4 Case Study 4 -- 6.17 Future Directions and Trends -- 6.17.1 Examining New Trends and Technologies in the Architecture and Infrastructure for Big Data on the Cloud -- 6.17.2 Discussion on the Potential of AI, Edge Computing and Machine Learning to Enhance Cloud-Based Big Data Systems -- 6.18

Future Developments Prediction and Scalable and Efficient Data Processing Implications -- 6.19 Conclusion -- 6.20 Emphasis on Cloud-Based Big Data Architecture and Infrastructure's Potential for Transformation -- 6.21 Motivating Companies to Adopt Cloud-Based Big Data Technologies -- Chapter 7 RISC-V Processor Hardware Modelling with Custom Instruction Set for SHA-3 Acceleration -- 7.1 Introduction -- 7.2 State of the Art -- 7.3 Keccak Algorithm in SHA-3 -- 7.4 RISC-V Instruction Set Architecture -- 7.4.1 Base Instruction Set Architecture.
7.4.2 Cryptography Extensions -- 7.5 Custom Instructions for SHA-3 Hashing -- 7.5.1 Instruction DMPL -- 7.5.2 Instruction DMPH -- 7.5.3 Instruction ACC -- 7.5.4 Instruction ROT -- 7.6 Proposed Processor Microarchitecture -- 7.6.1 Standard Modules -- 7.6.2 Extension Modules -- 7.6.3 SHA-3 Module -- 7.7 Results and Discussion -- 7.7.1 Functional Verification Results -- 7.7.2 Logical Synthesis Results -- 7.7.3 Physical Synthesis Results -- 7.8 Conclusion -- References -- Chapter 8 SSL Vulnerability Exploitation Analysis Tool to Provide a Secure and Sustainable Network for Smart Cities -- 8.1 Introduction -- 8.2 Related Work -- 8.3 Research Methodology -- 8.4 Experimental Results -- 8.5 Conclusion -- References -- Chapter 9 Service-Oriented Smart City Vigilant Data Hub for Social Innovation -- 9.1 Introduction -- 9.2 Background and Literature Review -- 9.3 App Architecture and Technology Stack -- 9.4 User Registration and Authentication -- 9.4.1 Streamlined User Onboarding -- 9.4.1.1 Simple Registration Process -- 9.4.1.2 Verification and Security -- 9.4.1.3 Efficient Authentication Mechanisms -- 9.5 Features and Functionality -- 9.5.1 Interactive Forum for Smart City Development -- 9.5.1.1 Project Exploration -- 9.5.1.2 User-Friendly Interface -- 9.5.2 Empowering User Engagement -- 9.5.2.1 Upvoting and Downvoting -- 9.5.2.2 Commenting and Collaborative Discussions -- 9.5.3 Personalized User Profiles and Notifications -- 9.5.3.1 User Profiles -- 9.5.3.2 Timely Notifications -- 9.5.4 Efficient Search and Filtering -- 9.5.4.1 Keyword Search -- 9.5.4.2 Category and Tag Filtering -- 9.5.5 Active User Feedback Submission -- 9.5.5.1 New Feedback Submission -- 9.5.5.2 Category and Tag Filtering -- 9.5.6 Empowered Administrative Dashboard -- 9.5.6.1 Moderation and Oversight -- 9.5.6.2 User Activity Insights -- 9.6 User Experience and Interface Design.
9.6.1 Intuitive User Experience (UX) -- 9.6.1.1 Simplicity and Clarity -- 9.6.1.2 Effortless Navigation -- 9.6.1.3 Responsive Design -- 9.6.2 Thoughtful User Interface (UI) -- 9.6.2.1 Visual Consistency -- 9.6.2.2 Engaging Visual Elements -- 9.6.2.3 Strategic Color Palette -- 9.6.2.4 Natural Interaction -- 9.7 Data Privacy and Security -- 9.7.1 Protecting User Data -- 9.7.1.1 Firebase Security Rules -- 9.7.1.2 Secure Authentication -- 9.7.1.3 Encryption -- 9.7.2 Ensuring User Privacy -- 9.7.2.1 Data Minimization -- 9.7.2.2 User Consent -- 9.7.2.3 Opt-Out Options -- 9.7.3 Secured Cloud Operations -- 9.7.3.1 Cloud Storage -- 9.7.3.2 Real-Time Updates -- 9.7.4 Regular Security Audits -- 9.7.4.1 Ongoing Monitoring -- 9.7.4.2 Prompt Updates -- 9.8 Real-Time Updates and Push Notifications from the App -- 9.8.1 Real-Time Updates -- 9.8.2 Push Notifications -- 9.9 Scalability and Performance Optimization -- 9.9.1 Scalability Design -- 9.9.1.1 Distributed Architecture -- 9.9.1.2 Elastic Resources -- 9.9.1.3 Load Balancing -- 9.9.2 Performance Optimization Strategies -- 9.9.2.1 Caching Mechanisms -- 9.9.2.2 Image Compression -- 9.9.2.3 Asynchronous Processing -- 9.9.2.4 Database Indexing -- 9.10 User Engagement Analytics -- 9.11 Impact and User Engagement -- 9.11.1 Impact -- 9.11.1.1 Amplified Citizen Voices -- 9.11.1.2 Inclusive Dialogue -- 9.11.1.3 Fostering Togetherness -- 9.11.1.4 Transparency in Action --

9.11.2 Increasing User Engagement -- 9.11.2.1 Gamification and Rewards -- 9.11.2.2 Moderation and Content Quality -- 9.11.2.3 Data Privacy and Security -- 9.11.2.4 Feedback Loop -- 9.11.2.5 User Training and Onboarding -- 9.12 Citizen User Flow and Admin Access User Flow -- 9.13 Conclusion -- 9.14 Future Potential -- 9.14.1 Increased Citizen Engagement -- 9.14.1.1 Number of Registered Users -- 9.14.1.2 Frequency and Quality of Feedback Submissions. 9.14.1.3 Active Participation in Discussions and Collaborations.

Sommario/riassunto

Discover how to empower your community with sustainable energy solutions with Resilient Community Microgrids, a comprehensive guide that explores the integration of innovative technologies and distributed energy resources to enhance local energy independence and resilience. Resilient Community Microgrids emphasizes opportunities to incorporate distributed energy resources and communication networks to build a cyber-physical community microgrid system by modelling photovoltaics, energy storage units, micro-turbines, and wind energy. The microgrid proves itself as a sustainable archetype to improve the resilience and reliability of power distribution networks. High-distributed energy resources penetrate communities, unlocking the potential to build the resilience of microgrids. Neighborhoods, villages, towns, and cities can meet their local energy needs by utilizing community microgrids. Community microgrids are being considered as a possibility even in locations where a bigger grid already exists, primarily as a means of boosting local energy independence and resilience. The fundamentals of community microgrids are covered in this book, along with an outline of how to join one and the factors contributing to their rising popularity. Novel technologies arrive with the potential to integrate with the physical microgrid to realize the next generation in cyber-physical microgrid systems, which can be used as a prototype to demonstrate and promote the development of next-generation microgrids. Resilient Community Microgrids will clarify the ways to enhance a cyber-physical system's resilience that significantly contributes to realizing innovative and sustainable development in the energy sector.