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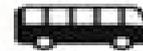
Blockchain technology



**Digital
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Smart transport



Semantic Enhanced Blockchain Technology For Smart Cities

**Saravanan Krishnan,Valentina Emilia
Balas,E. Golden Julie,Harold Robinson
Yesudhas,Raghvendra Kumar**

Semantic Enhanced Blockchain Technology For Smart Cities:

Digital Twin and Blockchain for Sensor Networks in Smart Cities Tuan Anh Nguyen, 2025-02-25 Digital twin blockchain and wireless sensor networks can work together to improve services in the smart city Big data derived from wireless sensor networks can be integrated to accommodate the exchange of real time data between citizens governments and organizations Blockchain can provide high security for large scale communications and transactions between many stakeholders Digital twin uses physical models and historical data to integrate big information under multidiscipline multiphysical quantities multiscale and multiprobability conditions Digital Twin and Blockchain for Sensor Networks in Smart Cities explores how digital twin and blockchain can be optimized to improve services This book is divided into three parts Part 1 focuses on the fundamental concepts of blockchain and digital twin for sensor networks in the smart cities while Part 2 describes their applications for managing the regular operations and services Part 3 deals with their applications for safe cities Describes the fundamentals of blockchain and digital twin Explores how blockchain and digital twin work with smart sensor networks Explains how intelligent sensor networks can be used in the smart and safe cities Discusses how blockchain and digital twin can be used to manage services in smart cities

Smart Cities in the Post-algorithmic Era Nicos Komninos, Christina Kakderi, 2019-12-27 Examining the changing nature of cities in the face of smart technology this book studies key new challenges and capabilities defined by the Internet of Things data science blockchain and artificial intelligence It argues that using algorithmic logic alone for automation and optimisation in modern smart cities is not sufficient and analyses the importance of integrating this with strong participatory governance and digital platforms for community action

Advances in Intelligent Data Analysis and Applications Jeng-Shyang Pan, Valentina Emilia Balas, Chien-Ming Chen, 2021-11-25 This book constitutes the Proceeding of the Sixth International Conference on Intelligent Data Analysis and Applications October 15 18 2019 Arad Romania This edition is technically co sponsored by Aurel Vlaicu University of Arad Romania Southwest Jiaotong University Fujian University of Technology Chang an University Shandong University of Science and Technology Fujian Provincial Key Lab of Big Data Mining and Applications and National Demonstration Center for Experimental Electronic Information and Electrical Technology Education Fujian University of Technology China Romanian Academy and General Association of Engineers in Romania Arad Section The book covers a range of topics Machine Learning Intelligent Control Pattern Recognition Computational Intelligence Signal Analysis Modeling and Visualization Multimedia Sensing and Sensory Systems Signal control Imaging and Processing Information System Security Cryptography and Cryptanalysis Databases and Data Mining Information Hiding Cloud Computing Information Retrieval and Integration Robotics Control Agents Command Control Communication and Computers C4 Swarming Technology Sensor Technology Smart cities The book offers a timely board snapshot of new development including trends and challenges that are yielding recent research directions in different areas of intelligent data analysis and

applications The book provides useful information to professors researchers and graduated students in area of intelligent data analysis and applications *Security in Smart Cities: Models, Applications, and Challenges* About Ella Hassanien, Mohamed Elhoseny, Syed Hassan Ahmed, Amit Kumar Singh, 2018-11-04 This book offers an essential guide to IoT Security Smart Cities IoT Applications etc In addition it presents a structured introduction to the subject of destination marketing and an exhaustive review on the challenges of information security in smart and intelligent applications especially for IoT and big data contexts Highlighting the latest research on security in smart cities it addresses essential models applications and challenges Written in plain and straightforward language the book offers a self contained resource for readers with no prior background in the field Primarily intended for students in Information Security and IoT applications including smart cities systems and data heterogeneity it will also greatly benefit academic researchers IT professionals policymakers and legislators It is well suited as a reference book for both undergraduate and graduate courses on information security approaches the Internet of Things and real world intelligent applications

Semantic Annotation of Edge/Fog Services With Blockchain Integration Ramírez, J. Reyes Juárez, Le, Dac-Nhuong, Kumar, Abhishek, Batta, Priya, Rathore, Pramod Singh, 2025-12-24 The semantic annotation of edge and fog computing services is increasingly vital for enhancing discovery and automation in decentralized environments As these architectures become more complex and dynamic integrating blockchain technology offers a solution to ensure secure management of service metadata This integration not only enhances trust in service descriptions but also supports decentralized governance and access control By using semantic technologies alongside blockchain this approach creates a more intelligent and resilient ecosystem for edge fog service provisioning Semantic Annotation of Edge Fog Services With Blockchain Integration explores the use of semantic technologies to help annotate edge fog computing This book offers a scalable and secure method for managing heterogeneous edge fog services Covering topics such as semantic annotation blockchain and file storage systems this book is an excellent resource for researchers and practitioners in edge computing semantic web blockchain technology and distributed systems as well as developers building intelligent and secure next generation IoT ecosystems

Digital Twins for Smart Metabolic Circular Cities Simon Elias Bibri, Tan Yigitcanlar, Jeffrey Huang, 2025-05-29 Digital Twins for Smart Metabolic Circular Cities Innovations in Planning and Climate Resilience explores the advanced convergence of smart city technologies digital twin applications smart urban metabolism and circular economy principles This comprehensive resource offers insights into sustainable urban practices and innovative approaches to address the multifaceted challenges posed by rapid urbanization environmental degradation and climate change In a rapidly changing world this book provides a detailed understanding of how digital twin technologies and smart urban metabolism frameworks can be applied to foster sustainable urban development This holistic perspective bridges urban planning environmental sustainability and the transformative potential of digital twins The book equips readers with practical insights and solutions to navigate contemporary urban

development complexities It is an invaluable resource for urban planners environmental scientists policymakers and technology experts interested in sustainable practices Through real world applications foundational theory and forward thinking strategies it empowers readers with the knowledge to address pressing environmental and infrastructural challenges associated with the future of smart cities Utilizes practical insights and case studies to demonstrate the application of digital twins geospatial mapping tools and smart urban metabolism frameworks in real world scenarios Offers a comprehensive understanding of the potential benefits and challenges associated with the integration of digital twin and circular metabolism platforms aiding informed decision making for sustainable policies Focuses on circular economy principles providing actionable strategies for minimizing waste optimizing resource usage and fostering sustainable practices

Urban Innovation and Sustainability Ali Cheshmehzangi,2025-07-01 This book is a collection of context specific ICT based interventions to achieve sustainability from various perspectives or dimensions The book is based on case study examples in the strategic context of Hainan South China Five ICT based pilot studies were conducted surveyed and analysed in 2021 and 2022 The studies explore impacts on four main sustainability dimensions of environmental social economic and institutional Several ICT based interventions are suggested to enhance environmental protection promote health and support in elderly communities augment social media for place promotion create online opportunities for local markets and help boost local tourism industries Urban Innovation and Sustainability is an attempt to highlight the positive side of ICT based interventions in cities and communities We also need to note the negative side of ICTs which are partly covered in the case study examples However this book focuses on case study pilot examples to promote the nexus between innovation and sustainability It is essential to explore opportunities that could later be scaled up transform practices and help develop context specific policies In essence paradigm shifts infrastructural development and human centric development are necessary This book s findings interest scholars researchers practitioners and authorities in various disciplines of urbanism urban human geography urban studies planning innovation and sustainability

Data Mining and Information Security Abhishek Bhattacharya,Soumi Dutta,Sheng-Lung Peng,Xin She Yang,2025-10-01 This book features research papers presented at the International Conference on Data Mining and Information Security ICDMIS 2024 held at Eminent College of Management and Technology ECMT West Bengal India during October 7 8 2024 The book is organized in five volumes and includes high quality research work by academicians and industrial experts in the field of computing and communication including full length papers research in progress papers and case studies related to all the areas of data mining machine learning Internet of Things IoT and information security

Digital Twin and Blockchain for Smart Cities Amit Kumar Tyagi,2024-09-11 The book uniquely explores the fundamentals of blockchain and digital twin technologies and their uses in smart cities In the previous decade many governments explored artificial intelligence digital twin and blockchain and their roles in smart cities This book discusses the convergence of two transformative technologies digital twin and blockchain to address urban challenges and

propel the development of smarter more sustainable cities This convergence empowers cities to create real time replicas of urban environments digital twins and secure transparent data management blockchain to improve city planning management and civic services In this application the concept of a digital twin involves creating a virtual data driven replica of a city or specific urban systems such as transportation energy or infrastructure This digital twin mirrors the real world gathering data from various sensors IoT devices and other sources to provide a holistic view of the city s operations Furthermore blockchain technology offers a decentralized and tamper resistant ledger for securely storing and managing data In the context of smart cities blockchain can ensure data integrity privacy and transparency enabling trust and collaboration among various stakeholders This book covers many important topics including real time city modeling data security and the trustworthy storage of sensitive urban data transparent governance to facilitate accountable governance and decision making processes in smart cities improved city services disaster resilience by providing insights into vulnerabilities and efficient resource allocation during crises sustainable urban planning that optimizes resource allocation reduces energy consumption and minimizes environmental impact which fosters sustainable development citizen engagement and much more This book will not only provide information about more efficient resilient and sustainable urban environments but it also empowers citizens to be active participants in shaping the future of their cities By converging these technologies cities can overcome existing challenges encourage innovation and create more livable connected and responsive urban spaces Audience This book has a wide audience in computer science artificial intelligence and information technology as well as engineers in a variety of industrial manufacturing industries It will also appeal to economists and government city policymakers working on smart cities the circular economy clean tech investors urban decision makers and environmental professionals

Blockchain-Based Solutions for Accessibility in Smart Cities Abhishek, Kumar,Chakraborty, Chinmay,2024-08-29 In the evolving landscape of smart cities the integration of technology and real time data management presents a dual edged challenge and opportunity for urban accessibility The web of devices from smartphones and connected cars to homes and citizens forms the backbone of a smart city s infrastructure As cities strive to become technologically enhanced hubs the need for seamless accessibility becomes paramount However this ambitious transformation encounters hurdles such as traffic congestion inefficient energy distribution and concerns about air quality Enter **Blockchain Based Solutions for Accessibility in Smart Cities** a groundbreaking exploration that addresses the issues hindering the optimal realization of smart city accessibility This book delves into the emergence of blockchain technologies within smart city infrastructures and offers a compelling narrative on how blockchain based solutions can be the catalyst for overcoming these challenges This innovative book is crafted with a specific audience in mind researchers faculty and students committed to shaping a secure ecosystem for smart city infrastructure By merging concepts of security smart city infrastructure and blockchain this multidisciplinary approach ensures that readers gain a nuanced understanding of the challenges at hand Whether immersed

in academia or eager to contribute to the evolution of smart cities Blockchain Based Solutions for Accessibility in Smart Cities is a valuable resource that empowers readers to navigate the complexities and unlock the full potential of blockchain in urban accessibility

Green Blockchain Technology for Sustainable Smart Cities Saravanan Krishnan,Valentina Emilia Balas,Raghvendra Kumar,2023-05-05 Green Blockchain Technology for Sustainable Smart Cities presents a detailed exploration of the adaptation and implementation of green blockchain technology for sustainable and eco friendly smart city applications This book covers all aspects of the topic and explores smart cities ecosystem applications of blockchain technology Novel architectural and business blockchain use case solutions in smart city implementations are at the core of this book which will be beneficial for all researchers engineers graduate students smart city practitioners and city administrators who are engaged in green blockchain and smart cities related technologies Covers a wide variety of topics Offers readers multiple perspectives from a variety of disciplines Written by an internationally diverse group of experts in their respective fields Includes a section on use cases as well as current challenges and future directions

Blockchain Enabled Secure Big Data Computing for Smart Cities Using Internet of Things L. Ashok Kumar,2024-01-15 Smart cities are one of the focus areas of many governments across the globe Many countries have created strategies for transforming their cities into smart cities in order to fully utilise the potential opportunities arising from urbanisation Smart cities enable operational efficiencies maximise environmental sustainability efforts and create new citizen services Over the last few years the growing big data and blockchain technology has made it feasible to associate complex things with the internet It has led to a digital disturbance by alternating the way the technology is being utilized With the extensive utilization of IoT technology new security and privacy mechanisms must be addressed The government defined the features of a smart city many of which can potentially be implemented on a blockchain for enhanced security immutability resilience and transparency This book focuses on providing a broad understanding of the current urban challenges being tackled through smart cities The proliferation of big data and the rapid growth of the Internet of Things IoT have significantly contributed to the emergence and feasibility of numerous smart city initiatives This book provides the fundamental framework research insights and empirical evidence in the efficacy of these new technologies employing practical and academic approaches to help professionals and academics reach innovative solutions and grow competitive strengths

Deep Learning and Blockchain Technology for Smart and Sustainable Cities Subramaniaswamy V,G Revathy,Logesh Ravi,N. Thillaiarasu,Naresh Kshetri,2025-05-22 In this digital era a smart city can become an intelligent society by using advances in emerging technologies Specifically the rapid adoption of deep learning DL in fusion with blockchain technology has led to a new digital smart city ecosystem A broad spectrum of DL and blockchain applications promises solutions for problems in areas ranging from risk management and financial services to cryptocurrency to public and social services Furthermore the convergence of artificial intelligence and blockchain technology is revolutionizing the smart city network architecture to

build sustainable ecosystems However these advances in technology bring both opportunities and challenges in creating sustainable smart cities To help planners and developers to meet these challenges and exploit these opportunities Deep Learning and Blockchain Technology for Smart and Sustainable Cities takes a deep dive into the technologies and applications that enable smart and sustainable cities It provides a comprehensive literature review of the security issues and problems that impact the deployment of blockchain systems in smart cities It presents a detailed discussion of key factors in the convergence of blockchain and DL technologies that help form sustainable smart societies This book also discusses blockchain security enhancement solutions and summarizes main key points necessary for developing various blockchain and DL based intelligent transportation systems This book concludes with a discussion of open issues and future research direction These include new security suggestions and guidelines for a sustainable smart city ecosystem Also discussed is 6G enabled DL and blockchain in real time applications

Blockchain Technologies for Sustainable Development in Smart Cities Swarnalatha, P.,Prabu, S.,2022-02-18 Blockchain technology has great potential to radically change our socio economic systems by guaranteeing secure transactions between untrusted entities reducing costs and simplifying many processes However employing blockchain techniques in sustainable applications development for smart cities still has some technical challenges and limitations Blockchain Technologies for Sustainable Development in Smart Cities investigates blockchain enabled technology for smart city developments and big data applications This book provides relevant theoretical frameworks and the latest empirical research findings in the area Covering topics such as digital finance smart city technology and data processing architecture this book is an essential reference for electricians policymakers local governments city committees computer scientists IT professionals professors and students of higher education researchers and academicians

Smart Cities Jianbin Gao,Qi Xia,Kwame Omono Asamoah,Bonsu Adjei-Arthur,2022-10-18 Smart Cities Blockchain Based Systems Networks and Data examines the various components that make up a smart city It focuses on infrastructure processes and services and outlines approaches for services such as health transport energy and more With an underlying emphasis on blockchain networks the authors examine ways to provide the management of resources and activities by creating a more secure and trustless operating systems where resources are more effectively allocated and managed Features Novel approaches toward the provision of smart city services Detailed explanations of how a blockchain based smart city network operates Novel design and architecture for cutting edge technologies such as energy systems and vehicular devices interacting with blockchain across smart cities Monitoring of data flow and the movement of several data types across different components of a smart city Comprehensive analysis of issues affecting entities across a smart city and the effects of blockchain based solutions This book is a practical and detailed demonstration for researchers and industry professionals who would use blockchain technology for effective city management

Smart City Infrastructure Vishal Kumar,Vishal Jain,Bharti Sharma,Jyotir Moy Chatterjee,Rakesh Shrestha,2022-02-17 SMART CITY INFRASTRUCTURE The

wide range of topics presented in this book have been chosen to provide the reader with a better understanding of smart cities integrated with AI and blockchain and related security issues. The goal of this book is to provide detailed in-depth information on the state of the art architecture and infrastructure used to develop smart cities using the Internet of Things (IoT), artificial intelligence (AI), and blockchain security, the key technologies of the fourth industrial revolution. The book outlines the theoretical concepts, experimental studies, and various smart city applications that create value for inhabitants of urban areas. Several issues that have arisen with the advent of smart cities and novel solutions to resolve these issues are presented. The IoT, along with the integration of blockchain and AI, provides efficient, safe, secure, and transparent ways to solve different types of social, governmental, and demographic issues in the dynamic urban environment. A top-down strategy is adopted to introduce the architecture, infrastructure, features, and security. Audience: The core audience is researchers in artificial intelligence, information technology, electronic and electrical engineering, systems engineering, industrial engineering, as well as government and city planners.

Blockchain for Smart Cities Saravanan Krishnan, Valentina Emilia Balas, E. Golden Julie, Harold Robinson Yesudhas, Raghvendra Kumar, 2021-08-25. Focusing on different tools, platforms, and techniques, Blockchain and the Smart City Infrastructure and Implementation uses case studies from around the world to examine blockchain deployment in diverse smart city applications. The book begins by examining the fundamental theories and concepts of blockchain. It looks at key smart cities domains such as banking, insurance, healthcare, and supply chain management. It examines, using case studies for each domain, the book looks at payment mechanisms, fog/edge computing, green computing, and algorithms and consensus mechanisms for smart cities implementation. It looks at tools such as Hyperledger, Ethereum, Corda, IBM Blockchain, Hydrachain, as well as policies and regulatory standards, applications, solutions, and methodologies. While exploring future blockchain ecosystems for smart and sustainable city life, the book concludes with the research challenges and opportunities for academics, researchers, and companies in implementing blockchain applications. Independently organized chapters for greater readability, adaptability, and flexibility. Examines numerous issues from multiple perspectives and academic and industry experts. Explores both advances and challenges of cutting-edge technologies. Coverage of security, trust, and privacy issues in smart cities.

Harnessing AI, Blockchain, and Cloud Computing for Enhanced e-Government Services Lytras, Miltiadis Demetrios, Alkhaldi, Afnan N., Ordóñez de Pablos, Patricia, 2024-12-26. The integration of artificial intelligence (AI), blockchain, and cloud computing revolutionizes the way governments deliver services to citizens, creating new opportunities for efficient, transparent, and secure e-government solutions. AI can streamline decision-making and automate processes for personalized services, citizen need prediction, and optimized resource allocation. Blockchain technology offers enhanced security and accountability, while cloud computing provides the scalability and flexibility needed to store and process vast amounts of data. By harnessing the power of these technologies, governments can improve service delivery, reduce operational costs, and foster greater citizen engagement, driving the digital transformation of

public sector functions and contributing to responsive inclusive and efficient governance Further exploration of these technologies integration in government may provide insights into their role in enhancing public service delivery citizen engagement and administrative efficiency

Harnessing AI Blockchain and Cloud Computing for Enhanced e Government Services delves into the transformative potential of modern technologies in reshaping government services It explores how AI blockchain and cloud computing are driving the evolution of e government enabling more efficient transparent and value added services across various public sectors efficiency This book covers topics such as political science cybersecurity and public sectors and is a useful resource for data scientists computer engineers government officials policymakers business owners researchers and academicians

Blockchain Matevž Pustišek, Nataša Živić, Andrej Kos, 2021-11-22 Blockchains are seen as a technology for the future which reduce the cost of trust and revolutionize transactions between individuals companies and governments The sense of using blockchains is to minimize the probability of errors successful frauds and paper intensive processes For these reasons blockchains already have and will have a significant impact to the society and every day s life especially in field of Machine to Machine M2M communications which are one of the basic technologies for Internet of Things IoT Therefore blockchains with their inherent property to provide security privacy and decentralized operation are engine for todays and future reliable autonomous and trusted IoT platforms Specially a disruptive role of ledger technologies in future smart personal mobility systems which combine smart car industry smart energy smart cities will be explained in the book considering its importance for development of new industrial and business models

The Blockchain in Smart Cities. Analysis of Blockchain Use Cases for Smart Mobility Hasan Toraman, 2021-08-31 Seminar paper from the year 2020 in the subject Business economics Information Management grade 1 3 University of Duisburg Essen language English abstract In this paper the author analysed the potential of Blockchain in smart mobility In my research he has focused on four areas of smart mobility being Vehicular Data sharing Mobility as a Service VANET as well as Transport and logistic In order to give the reader basic information firstly he gave a definition of Blockchain and Smart mobility then we moved onto the above mentioned four areas At first we explained the goal and the current status of the system which problems it possesses and how Blockchain can fix these problems In the end of his paper he summarized the main findings and point out the weaknesses of Blockchain and why it can be challenging to implement it in this area Further there is also a proposed possible solution to current lack of information in order to give a final review to the potential of Blockchain in smart mobility

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