Network Architectures in Internet of Vehicles (IoV): Review, Protocols Analysis, Challenges and Issues.

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Abstract. Since some decades ago, the evolution of the internet continues to revolutionize many aspects of human life. It started by connecting computers, then smartphones before it becomes generalized to connecting everything which gives birth to the Internet of Things (IoT) paradigm. Thanks to the telecommunications and technologies' advancements, vehicles are now able to have internet access and communications capabilities, thus, making communications networks called Vehicular Ad hoc Networks (VANETs). The Internet of Vehicles is, therefore, an evolution of VANETs where IoT is applied and in which the main component is the vehicle. Besides the many opportunities that IoV presents, there are still many challenges and issues that must be considered with great attention such as efficient and reliable network architectures that should provide an efficient IoV deployment. This is why, in this paper, we have made our contribution by establishing a review of existing novel IoV architecture solutions and we further propose a protocol stack analysis of these architectures.

Keywords: IOV - VANETs - D2D - Network Architectures - C-ITS.

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Arthur James Wells

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Internet of Things Applications - From Research and Innovation to Market Deployment Ovidiu Vermesan,Peter Friess,2022-09-01 The book aims to provide a broad overview of various topics of Internet of Things from the research innovation and development priorities to enabling technologies nanoelectronics cyber physical systems architecture interoperability and industrial applications It is intended to be a standalone book in a series that covers the Internet of Things activities of the IERC Internet of Things European Research Cluster from technology to international cooperation and the global state of play The book builds on the ideas put forward by the European research Cluster on the Internet of Things Strategic Research Agenda and presents global views and state of the art results **Artificial Intelligence Technologies for Smart and Sustainable Urban Transportation** Pethuru Raj,Sudesh Yadav,Manas Kumar Mishra,Satya Prakash Yadav,Victor Hugo C. de Albuquerque,2025-12-23 Explores the future of transportation and provides a comprehensive guide to leveraging cutting edge digital technologies and AI powered platforms for creating smart energy efficient and sustainable urban transportation systems As urbanization accelerates globally transportation has become a major contributor to environmental degradation and climate change Rising greenhouse gas GHG emissions including carbon dioxide CO_2 methane ozone nitrous oxide and chlorofluorocarbons pose a serious threat to air quality and environmental sustainability To counteract these challenges nations advocate smart eco friendly urban mobility solutions This book presents the latest advancements and transformative trends in urban transportation emphasizing emerging digital technologies that foster sustainability The integration of artificial intelligence 5G and 6G cybersecurity the Internet of Things blockchain edge computing and cloud native infrastructures enhances intelligent and energy efficient transportation systems Experts and environmental advocates champion innovative software platforms and solutions essential for modernizing mobility This book examines the foundational technologies driving this transformation and explores AI powered platforms and management solutions shaping the future of urban transportation making it an essential resource for beginners and seasoned professionals alike Uncovers the innovative features of artificial intelligence in urban transportation illustrating how integrated platforms enhance operational efficiency and sustainability at both macro and micro levels Delves into the most common AI techniques and algorithms used in modern urban mobility systems Focuses on how the evolution of AI paradigms supports real time decision making transforming urban transportation planning and management Examines the integration of trust management and advanced cybersecurity measures within AI powered transportation systems Provides a collection of case studies and detailed analyses of AI based integrated platforms offering theoretical perspectives and practical examples of technological advancements and their challenges <u>Building the Hyperconnected Society- Internet of Things Research and Innovation Value Chains, Ecosystems and Markets</u> Ovidiu Vermesan,Peter Friess,2022-09-01 This book aims to provide a broad overview of various topics of Internet of Things IoT ranging from research innovation and development priorities to

enabling technologies nanoelectronics cyber physical systems architecture interoperability and industrial applications All this is happening in a global context building towards intelligent interconnected decision making as an essential driver for new growth and co competition across a wider set of markets It is intended to be a standalone book in a series that covers the Internet of Things activities of the IERC Internet of Things European Research Cluster from research to technological innovation validation and deployment The book builds on the ideas put forward by the European Research Cluster on the Internet of Things Strategic Research and Innovation Agenda and presents global views and state of the art results on the challenges facing the research innovation development and deployment of IoT in future years The concept of IoT could disrupt consumer and industrial product markets generating new revenues and serving as a growth driver for semiconductor networking equipment and service provider end markets globally This will create new application and product end markets change the value chain of companies that creates the IoT technology and deploy it in various end sectors while impacting the business models of semiconductor software device communication and service provider stakeholders The proliferation of intelligent devices at the edge of the network with the introduction of embedded software and app driven hardware into manufactured devices and the ability through embedded software hardware developments to monetize those device functions and features by offering novel solutions could generate completely new types of revenue streams Intelligent and IoT devices leverage software software licensing entitlement management and Internet connectivity in ways that address many of the societal challenges that we will face in the next decade **Vehicular Communications for Smart Cars** Niaz Chowdhury,Lewis Mackenzie,2021-12-30 This book covers a wide range of topics from the smart transportation domain It discusses protocols applications and security concerns in various vehicular networks using examples and easy to understand figures The first four chapters focus on vehicular network protocols and applications while the remaining four chapters incorporate security trust and privacy issues with examples from real life cases The book concludes with a vision of what to expect in the near future and will be an invaluable resource for anybody interested in this nascent technology and its variegated applications Dr Niaz Chowdhury is a postdoctoral research associate at the Knowledge Media Institute the Open University in England Dr Lewis M Mackenzie is a senior lecturer in computing science at the University of Glasgow *5G Multimedia Communication* Zoran S. Bojkovic,Dragorad A. Milovanovic,Tulsi Pawan Fowdur,2020-10-27 In bringing to the readers the book 5G Multimedia Communication Technology Multiservices and Deployment the aim is to present current work and direction on the challenging subject of multimedia communications with theoretical and practical roots The past two decades have witnessed an extremely fast evolution of mobile cellular network technology The fifth generation of mobile wireless systems has achieved the first milestone toward finalization and deployment by 2020 This is vital to the development of future multimedia communications Also it is necessary to consider 5G technology from the performance point of view by analyzing network capabilities to the operator and to the end user in terms of data rate capacity coverage energy efficiency

connectivity and latency The book is divided into three major parts with each part containing four to seven chapters Critical enabling technology Multiservices network Deployment scenarios The first part discusses enabling technologies such as green communication channel modeling massive and distributed MIMO and ML based networks In the second part different methodologies and standards for multiservices have been discussed Exclusive chapters have been dedicated to each of the open research challenges such as multimedia operating in 5G environment network slicing optimization mobile edge computing mobile video multicast broadcast integrated satellite and drone communication The third part paved the way to deployment scenarios for different innovative services including integration of a multienergy system in smart cities intelligent transportation systems 5G connectivity in the transport sector healthcare services 5G edge based video surveillance and challenges of connectivity for massive IoT in 5G and beyond systems The book is written by experts in the field who introduced scientific and engineering concepts covering the 5G multimedia communication areas The book can be read cover to cover or selectively in the areas of interest for the readers Generally the book is intended for novel readers who could benefit from understanding general concepts practitioners who seek guidance into the field and senior level as well as graduate level engineering students in understanding the process of today s wireless multimedia communications   *Smart Cities Policies and Financing* John R. Vacca,2022-01-19 Smart Cities Policies and Financing Approaches and Solutions is the definitive professional reference for harnessing the full potential of policy making and financial planning in smart cities It covers the effective tools for capturing the dynamic relations between people policies financing and environments and where they are most often useful and effective for all relevant stakeholders The book examines the key role of science technology and innovation STI especially in information and communications technologies in the design development and management of smart cities policies and financing It identifies the problems and offers practical solutions in implementation of smart infrastructure policies and financing Smart Cities Policies and Financing is also about how the implementation of smart infrastructure projects related to the challenges of the lack of financing and the application of suitable policies underlines the key roles of science technology and innovation STI communities in addressing these challenges and provides key policies and financing that will help guide the design and development of smart cities Brings together experts from academia government and industry to offer state of the art solutions for improving the lives of billions of people in cities around the globe Creates awareness among governments of the various policy tools available such as output based contracting public private partnerships procurement policies long term contracting and targeted research funds in order to promote smart infrastructure implementation and encouraging the use of such tools to shape markets for smart infrastructure and correct market failures Ensures the insclusiveness of smart city projects by adequately addressing the special needs of marginalized sections of society including the elderly persons with disabilities and inhabitants of informal settlements and informal sectors Ensures gender considerations in the design of smart cities and infrastructure through the use of data generated by smart

systems to make cities safer and more responsive to the needs of women Demonstrate practical implementation through real life case studies Enhances reader comprehension using learning aids such as hands on exercises checklists chapter summaries review questions and an extensive appendix of additional resources **Marine Technology Society Journal** Marine Technology Society,2004 *Cooperating Embedded Systems and Wireless Sensor Networks* Michel Banatre,2008-04-04 A number of different system concepts have become apparent in the broader context of embedded systems over the past few years Whilst there are some differences between these this book argues that in fact there is much they share in common particularly the important notions of control heterogenity wireless communication dynamics ad hoc nature and cost The first part of the book covers cooperating object applications and the currently available application scenarios such as control and automation healthcare and security and surveillance The second part discusses paradigms for algorithms and interactions The third part covers various types of vertical system functions including data aggregation resource management and time synchronization The fourth part outlines system architecture and programming models outlining all currently available architectural models and middleware approaches that can be used to abstract the complexity of cooperating object technology Finally the book concludes with a discussion of the trends guiding current research and gives suggestions as to possible future developments and how various shortcomings in the technology can be overcome Proceedings of the ... International Conference on Embedded Networked Sensor Systems ,2006 **Serials in the British Library** ,2007 *Handbook of Research on User Interface Design and Evaluation for Mobile Technology* ,2008 This book provides students researchers educators and practitioners with a compendium of research on the key issues surrounding the design and evaluation of mobile user interfaces such as the physical environment and social context in which a device is being used and the impact of multitasking behavior typically exhibited by mobile device users Provided by publisher **The British National Bibliography** Arthur James Wells,2009 **Human Computer Interaction** Panayiotis Zaphiris,2008-10-01 This reference book penetrates the human computer interaction HCI field a wide variety of comprehensive research papers aimed at expanding the knowledge of HCI Provided by publisher **Information Communication Technologies** Craig Van Slyke,2008 Information Communication Technologies Concepts Methodologies Tools and Applications is the essential compilation of breaking research in the pivotal areas of social adaptation to information technology This all inclusive reference source examines through case studies empirical analysis and conceptual models the successes and consequences associated with the growth of information communication technologies in the world today Workshop Proceedings Production Process of 3D Computer Graphics Ralf Dörner,2002 *OECD Information Technology Outlook 2006* OECD,2006-10-16 Describes recent market dynamics and trends in industries supplying IT goods and services and offers an overview of the globalisation of the information and communication technology ICT sector and the rise of ICT enabled international sourcing **Gale Directory of Databases** ,2001 **Enabling Technologies**

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