

# Security Analysis of Wireless Sensor Network A Literature Review

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**Abstract**— Security was a prior concern to the researchers since the beginning of wireless sensor network. With the growing technology, the belongings on security are also advancing day by day. Though it was tried to formulate this network completely secured during the time of designing, intruders and attackers always find their way to get inside it and accomplish their disgraceful intention. Different research papers have shown different ways to keep the network secured and trustworthy. This paper presents a significant analysis on the security issues of wireless sensor network. Literature study on various articles are accumulated where both possible security violence and their solutions are focused from most recent research papers which will be very helpful for future work for the researchers. Moreover, some basic implications are also proposed to keep the network away from vulnerability and interception.

**Keywords**—Sensor; Security; Vulnerability; Interception; Trustworthy

## I. INTRODUCTION

In any kind of wireless networks security and confidentiality are essential issues. In wireless sensor network (WSN) the importance of security is more challenging. Wireless sensor network (WSN) and its applications are attacked by intrusions and other attacks to interrupt the characteristics it serves. Wireless sensor network is usually provided to the remote areas. Wireless sensor network is used to determine the different environmental monitoring applications such as temperature, air pressure, humidity finding [16]. Since sensor networks are frequently used in remote areas and in those areas, the operation of the network is left unattended, and unmonitored regularly that help the intruders to make an easy target for substantial attacks, unconstitutional access and tempering. Sensor nodes have to compromise with attacks due to resource tapered activities and operating in insensible surroundings also difficult to differentiate security violations from node failures. Problems are also created in justifying link qualities and overall shut down of the network. These resource limitations need security mechanisms that are designed for WSN applications, so that the limited resources can be used proficiently. This paper presents the different varieties of common attacks which are threatening this network since the beginning

of its operation. Then recent trend in security mechanism improvement has been shown briefly. Most of the security solutions are studied from recently published international journals and conference papers which will be very helpful for future researchers to work onward.

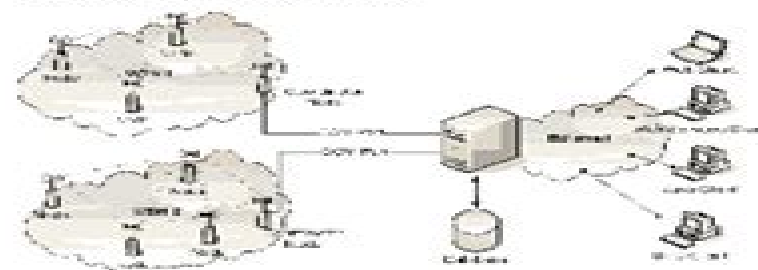


Fig. 1. A simple wireless sensor network [1]

## II. SECURITY FUNDAMENTAL OF WSN NETWORK

To keep the wireless network secured, we have to protect it from unauthorized access or unintended uses. There are three important services for the security mechanisms are Confidentiality, Integrity and Availability are defined by The CIA security model [2]. Confidentiality defines that any unlawful access to the network must be prohibited. Only reliable node of the network can access the resources. Integrity describes that a message must reach from sender to receiver without changing or modification. Sensitive information must not be accessed or changed by unauthorized individual.

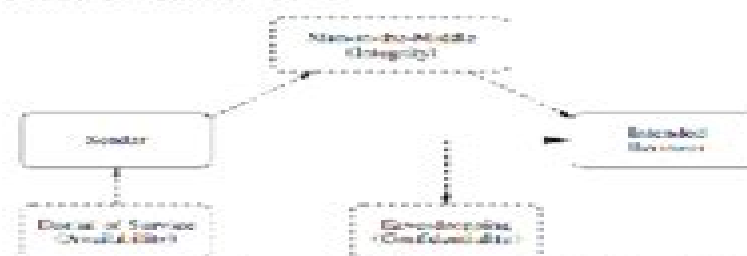


Fig. 2. Different types of attacks in the CIA model [2]

# Ieee Papers On Wireless Network Of Security

**Prabhat Mishra,Subodha Charles**



## **Ieee Papers On Wireless Network Of Security:**

**Wireless Network Security** Yang Xiao,Xuemin Shen,Ding-Zhu Du,2007-12-29 This book identifies vulnerabilities in the physical layer the MAC layer the IP layer the transport layer and the application layer of wireless networks and discusses ways to strengthen security mechanisms and services Topics covered include intrusion detection secure PHY MAC routing protocols attacks and prevention immunization key management secure group communications and multicast secure location services monitoring and surveillance anonymity privacy trust establishment management redundancy and security and dependable wireless networking *Security and Routing in Wireless Networks* Yang Xiao,Jie Li,Yi Pan,2005 With the advance of wireless networks building reliable and secured network connections is becoming extremely important On the other hand ad hoc networks become especially important and have many useful applications The primary focus of this book is to present these two hot and rapidly evolving areas in wireless networks Security and scheduling routing in wireless networks remain challenging research problems due to the complexity involved How to develop more efficient and reliable wireless networks remains a hot research area It is this realisation that has motivated the editing of this book The goal of the book is to serve as a reference for both security in wireless networks and channel access scheduling and routing in ad hoc networks In this book the authors review important developments and new strategies for these topics Important features and limitations of methods and models are identified Consequently this book can serve as a useful reference for researchers educators graduate students and practitioners in the field of wireless networks This book contains 14 invited chapters from prominent researchers working in this area around the world All of the cha *5G Wireless Network Security and Privacy* DongFeng Fang,Yi Qian,Rose Qingyang Hu,2023-12-26 An expert presentation of 5G security privacy and network performance In *5G Wireless Network Security and Privacy* a team of veteran engineers delivers a robust and accessible discussion of 5G security solutions including physical layer security authentication and mobility management In the book the distinguished authors expertly cover the requirements of 5G wireless network security and privacy with explorations of existing solutions and vulnerabilities from security architecture and mechanism perspectives Readers will learn to enhance the security and network performance of 5G wireless networks in contexts like vehicle to vehicle and vehicle to infrastructure communications industrial automation health services smart cities and smart homes They will develop a comprehensive understanding of 5G wireless network security as they move through the book s 11 insightful chapters developing in depth knowledge on the current state of 5G security and coming developments in the field Readers will also find A thorough introduction to legacy cellular network security including network performance development from 1G to 4G In depth treatments of 5G network security including the motivation and objectives of 5G wireless network security Comprehensive explorations of wireless security solutions including cryptographic approaches and physical layer security Fulsome discussions of the security architecture of cellular networks including 3G and 4G security Perfect for researchers and

professionals working in the field of cybersecurity and 5G wireless networks 5G Wireless Network Security and Privacy will also earn a place in the libraries of engineers computer scientists and graduate students studying 5G network security and privacy

*Network Security* Christos Douligeris,Dimitrios N. Serpanos,2007-06-02 A unique overview of network security issues solutions and methodologies at an architectural and research level Network Security provides the latest research and addresses likely future developments in network security protocols architectures policy and implementations It covers a wide range of topics dealing with network security including secure routing designing firewalls mobile agent security Bluetooth security wireless sensor networks securing digital content and much more Leading authorities in the field provide reliable information on the current state of security protocols architectures implementations and policies Contributors analyze research activities proposals trends and state of the art aspects of security and provide expert insights into the future of the industry Complete with strategies for implementing security mechanisms and techniques Network Security features State of the art technologies not covered in other books such as Denial of Service DoS and Distributed Denial of Service DDoS attacks and countermeasures Problems and solutions for a wide range of network technologies from fixed point to mobile Methodologies for real time and non real time applications and protocols

Next Generation Wireless Systems and Networks Hsiao-Hwa Chen,Mohsen Guizani,2006-05-01 Next Generation Wireless Systems and Networks offers an expert view of cutting edge Beyond 3rd Generation B3G wireless applications This self contained reference combines the basics of wireless communications such as 3G wireless standards spread spectrum and CDMA systems with a more advanced level research oriented approach to B3G communications eliminating the need to refer to other material This book will provide readers with the most up to date technological developments in wireless communication systems networks and introduces the major 3G standards such as W CDMA CDMA2000 and TD SCDMA It also includes a focus on cognitive radio technology and 3GPP E UTRA technology areas which have not been well covered elsewhere Covers many hot topics in the area of next generation wireless from the authors own research including Bluetooth all IP wireless networking power efficient and bandwidth efficient air link technologies and multi user signal processing in B3G wireless Clear step by step progression throughout the book will provide the reader with a thorough grounding in the basic topics before moving on to more advanced material Addresses various important topics on wireless communication systems and networks that have emerged only very recently such as Super 3G technology 4G wireless UWB OFDMA and MIMO Includes a wealth of explanatory tables and illustrations This essential reference will prove invaluable to senior undergraduate and postgraduate students academics and researchers It will also be of interest to telecommunications engineers wishing to further their knowledge in this field

**Recent Trends in Network Security and Applications** Natarajan Meghanathan,Selma Boumerdassi,Nabendu Chaki,Dhinaharan Nagamalai,2010-07-07 The Third International Conference on Network Security and Applications CNSA 2010 focused on all technical and practical aspects of security and its applications for wired and wireless networks The goal

of this conference is to bring together researchers and practitioners from academia and industry to focus on understanding modern security threats and countermeasures and establishing new collaborations in these areas Authors are invited to contribute to the conference by submitting articles that illustrate research results projects survey work and industrial experiences describing significant advances in the areas of security and its applications including Network and Wireless Network Security Mobile Ad Hoc and Sensor Network Security Peer to Peer Network Security Database and System Security Intrusion Detection and Prevention Internet Security and Applications Security and Network Management E mail Security Spam Phishing E mail Fraud Virus Worms Trojan Protection Security Threats and Countermeasures DDoS MiM Session Hijacking Replay attack etc Ubiquitous Computing Security Web 2.0 Security Cryptographic Protocols Performance Evaluations of Protocols and Security Application There were 182 submissions to the conference and the Program Committee selected 63 papers for publication The book is organized as a collection of papers from the First International Workshop on Trust Management in P2P Systems IWTMP2PS 2010 the First International Workshop on Database Management Systems DMS 2010 and the First International Workshop on Mobile Wireless and Networks Security MWNS 2010 *Handbook of Research on Secure Multimedia Distribution* Lian, Shiguo, Zhang, Yan, 2009-03-31 This handbook is for both secure multimedia distribution researchers and also decision makers in obtaining a greater understanding of the concepts issues problems trends challenges and opportunities related to secure multimedia distribution Provided by publisher *'Advances in Networks, Security and Communications, Vol. 1* Sergey Yurish, 2018-01-17 The 1st volume of new Advances in Networks Security and Communications Reviews Book Series contains 15 chapters submitted by 42 contributors from 13 countries The book is divided into 3 parts Networks Security and Communication The book provides focused coverage of these 3 main technologies Chapters are written by experts in the field and address the immediate and long term challenges in the authors respective areas of expertise Coverage includes wireless sensor network routing improvement connectivity recovery augmentation and routing in wireless Ad Hoc networks advanced modeling and simulation approach for the sensor networks management security aspects for mobile agent and cloud computing various communication aspects and others This book ensures that readers will stay at the cutting edge of the field and get the right and effective start point and road map for the further researches and developments WiMAX/MobileFi Yang Xiao, 2007-12-10 WiMAX is bringing about a worldwide revolution in broadband wireless access including both fixed and mobile handsets The IEEE 802.16 working group standardized most aspects of WiMAX signaling messages However several algorithms were left unspecified opening the door for innovations in protocol engineering for 802.16 802.20 based broadband wirel **Space-Air-Ground Integrated Network Security** Jianwei Liu, Lin Bai, Chunxiao Jiang, Wei Zhang, 2023-06-19 This book focuses on security science and technology data and information security and mobile and network security for space air ground integrated networks SAGINs SAGIN are expected to play an increasingly important role in providing real time flexible and integrated communication and

data transmission services in an efficient manner Today SAGINs have been widely developed for a range of applications in navigation environmental monitoring traffic management counter terrorism etc However security becomes a major concern since the satellites spacecrafts and aircrafts are susceptible to a variety of traditional specific network based attacks including eavesdropping session hijacking and illegal access In this book we review the theoretical foundations of SAGIN security We also address a range of related security threats and provide cutting edge solutions in the aspect of ground network security airborne network security space network security and provide future trends in SAGIN security The book goes from an introduction to the topic s background to a description of the basic theory and then to cutting edge technologies making it suitable for readers at all levels including professional researchers and beginners To gain the most from the book readers should have taken prior courses in information theory cryptography network security etc

**Security of Self-Organizing Networks** Al-Sakib Khan Pathan,2016-04-19 Reflecting recent advancements Security of Self Organizing Networks MANET WSN WMN VANET explores wireless network security from all angles It begins with a review of fundamental security topics and often used terms to set the foundation for the following chapters Examining critical security issues in a range of wireless networks the book *Network Security Attacks and Countermeasures* G., Dileep Kumar,Singh, Manoj Kumar,Jayanthi, M.K.,2016-01-18 Our world is increasingly driven by sophisticated networks of advanced computing technology and the basic operation of everyday society is becoming increasingly vulnerable to those networks shortcomings The implementation and upkeep of a strong network defense is a substantial challenge beset not only by economic disincentives but also by an inherent logistical bias that grants advantage to attackers *Network Security Attacks and Countermeasures* discusses the security and optimization of computer networks for use in a variety of disciplines and fields Touching on such matters as mobile and VPN security IP spoofing and intrusion detection this edited collection emboldens the efforts of researchers academics and network administrators working in both the public and private sectors This edited compilation includes chapters covering topics such as attacks and countermeasures mobile wireless networking intrusion detection systems next generation firewalls and more

**The Wiley 5G REF** Madhusanka Liyanage,2021-07-15 THE WILEY 5G REF Explore cutting edge subjects in 5G privacy and security In *The Wiley 5G REF Security* a team of distinguished researchers delivers an insightful collection of articles selected from the online only *The Wiley 5G Reference* The editors introduce the security landscape of 5G including the significant security and privacy risks associated with 5G networks They also discuss different security solutions for various segments of the 5G network like the radio edge access and core networks The book explores the security threats associated with key network softwarization technologies like SDN NFV NS and MEC as well as those that come with new 5G and IoT services There is also a detailed discussion on the privacy of 5G networks The included articles are written by leading international experts in security and privacy for telecommunication networks They offer learning opportunities for everyone from graduate level students to seasoned engineering professionals The book

also offers A thorough introduction to the 5G mobile network security landscape and the major risks associated with it Comprehensive explorations of SDMN security the complex challenges associated with 5G security and physical layer security for 5G and future networks Practical discussions of security for Handover and D2D communication in 5G HetNets authentication and access control for 5G and G5 Core network security In depth examinations of MEC and cloud security as well as VNF placement and sharing in NFV based cellular networks Perfect for researchers and practitioners in the fields of 5G security and privacy The Wiley 5G REF Security is an indispensable resource for anyone seeking a solid educational foundation in the latest 5G developments

*Communication System Security* Lidong Chen, Guang Gong, 2012-05-29 Helping current and future system designers take a more productive approach in the field Communication System Security shows how to apply security principles to state of the art communication systems The authors use previous design failures and security flaws to explain common pitfalls in security design Divided into four parts the book begins with the necessary background on practical cryptography primitives This part describes pseudorandom sequence generators stream and block ciphers hash functions and public key cryptographic algorithms The second part covers security infrastructure support and the main subroutine designs for establishing protected communications The authors illustrate design principles through network security protocols including transport layer security TLS Internet security protocols IPsec the secure shell SSH and cellular solutions Taking an evolutionary approach to security in today s telecommunication networks the third part discusses general access authentication protocols the protocols used for UMTS LTE the protocols specified in IETF and the wireless specific protection mechanisms for the air link of UMTS LTE and IEEE 802 11 It also covers key establishment and authentication in broadcast and multicast scenarios Moving on to system security the last part introduces the principles and practice of a trusted platform for communication devices The authors detail physical layer security as well as spread spectrum techniques for anti jamming attacks With much of the material used by the authors in their courses and drawn from their industry experiences this book is appropriate for a wide audience from engineering computer science and mathematics students to engineers designers and computer scientists Illustrating security principles with existing protocols the text helps readers understand the principles and practice of security analysis

Network Security Technologies: Design and Applications Amine, Abdelmalek, Mohamed, Otmane Ait, Benatallah, Boualem, 2013-11-30 Recent advances in technologies have created a need for solving security problems in a systematic way With this in mind network security technologies have been produced in order to ensure the security of software and communication functionalities at basic enhanced and architectural levels Network Security Technologies Design and Applications presents theoretical frameworks and the latest research findings in network security technologies while analyzing malicious threats which can compromise network integrity This book is an essential tool for researchers and professionals interested in improving their understanding of the strategic role of trust at different levels of information and knowledge society

**Cryptography and Network Security with**

**Machine Learning** Atul Chaturvedi, Sartaj Ul Hasan, Bimal Kumar Roy, Boaz Tsaban, 2024-04-22 The book features original papers from International Conference on Cryptology Network Security with Machine Learning ICCNSML 2023 organized by PSIT Kanpur India during 27-29 October 2023. This conference proceeding provides the understanding of core concepts of Cryptology and Network Security with ML in data communication. The book covers research papers in public key cryptography, elliptic curve cryptography, post quantum cryptography, lattice based cryptography, non commutative ring based cryptography, cryptocurrency authentication, key agreement, Hash functions, block stream ciphers, polynomial based cryptography, code based cryptography, NTRU cryptosystems, security and privacy in machine learning, blockchain, IoT security, wireless security protocols, cryptanalysis, number theory, quantum computing, cryptographic aspects of network security, complexity theory, and cryptography with machine learning. *Advances in Network Security and Applications*

David C. Wyld, Michal Wozniak, Nabendu Chaki, Natarajan Meghanathan, Dhinaharan Nagamalai, 2011-06-30 This book constitutes the proceedings of the 4th International Conference on Network Security and Applications held in Chennai India in July 2011. The 63 revised full papers presented were carefully reviewed and selected from numerous submissions. The papers address all technical and practical aspects of security and its applications for wired and wireless networks and are organized in topical sections on network security and applications, ad hoc sensor and ubiquitous computing, as well as peer to peer networks and trust management. **Network Security and Data Privacy in 6G Communication**

Rajendra Kumar, Vishal Jain, Danish Ather, Vinay Kukreja, Manoj Singhal, 2025-02-13 This book proposes robust solutions for securing a network against intrusions for data privacy and safety. It includes theoretical models, commercialization of validated models, and case studies. Explains the integration of technologies such as artificial intelligence, the Internet of Things, and blockchain for network security in a 6G communication system. Highlights the challenges such as spectrum allocation and management, network architecture, and heterogeneity, energy efficiency, and sustainability, antenna and radio frequency. Discuss theories like quantum safe cryptography, zero trust networking, and blockchain based trust management. Covers emerging technologies including homomorphic encryption, secure multi party computation, post quantum cryptography, and distributed ledger technology for security and privacy in 6G communication systems. Presents light and deep secure algorithms to detect fake incidents in wireless communication. The text is primarily written for senior undergraduates, graduate students, and academic researchers in fields including electrical engineering, electronics and communications engineering, and computer science. **Network-on-Chip Security and Privacy**

Prabhat Mishra, Subodha Charles, 2021-05-03 This book provides comprehensive coverage of Network on Chip NoC security vulnerabilities and state of the art countermeasures with contributions from System on Chip SoC designers, academic researchers, and hardware security experts. Readers will gain a clear understanding of the existing security solutions for on chip communication architectures and how they can be utilized effectively to design secure and trustworthy systems. *Computer and Network Security*

Jaydip Sen, Sidra



Mehtab,2020-06-10 In the era of Internet of Things IoT and with the explosive worldwide growth of electronic data volume and the associated needs of processing analyzing and storing this data several new challenges have emerged Particularly there is a need for novel schemes of secure authentication integrity protection encryption and non repudiation to protect the privacy of sensitive data and to secure systems Lightweight symmetric key cryptography and adaptive network security algorithms are in demand for mitigating these challenges This book presents state of the art research in the fields of cryptography and security in computing and communications It covers a wide range of topics such as machine learning intrusion detection steganography multi factor authentication and more It is a valuable reference for researchers engineers practitioners and graduate and doctoral students working in the fields of cryptography network security IoT and machine learning

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