

Preface

The book titled “Advances in Computing, Communication and Security” is a collection of high quality peer reviewed contributions from the academicians, researchers, practitioners, and industry professionals, accepted in the 2nd International Conference on Advances in Computing, Communication and Security (I3CS2023) organized by the Department of Electronics and Communication Engineering in collaboration with the Department of Computer Engineering, National Institute of Technology, Kurukshetra, India during 01- 03 June 2023.

Data engineering is the practice of designing and building systems for collecting, storing, and analysing data at scale. It works in a variety of settings to build systems that collect, manage, and convert raw data into usable information for data scientists and business analysts to interpret. Their ultimate goal is to make data accessible so that organizations can use it to evaluate and optimize their performance. Data computing plays a very important role in almost every aspect of our lives like App-based cab services generate and uses a huge amount of data regarding drivers, their vehicles, locations, every trip from every vehicle, etc. All this data is analysed and then used to predict supply, demand, location of drivers, and fares. Also, marketing and advertising, education, healthcare, travel, transport, and logistics have important role of data computing. Data computing forms the cornerstone of modern society, enabling us to harness the vast amounts of information generated daily. From cutting-edge algorithms to cloud computing, data mining to artificial intelligence, this book encompasses a broad spectrum of topics that showcase the remarkable advancements in data processing and analysis. It delves into the intricacies of machine learning, natural language processing, and predictive analytics, exploring how these techniques are reshaping industries, transforming decision-making processes, and revolutionizing the way we live, work, and interact.

The data science domain is very wide, enveloping everything from analysing data to building predictive models. At this point of time, it is almost impossible to think of any industry, which has not been revolutionized by data science. The next generation data engineering is moving towards complete transmutation as the recent developments in data computing are greatly impacted by Machine Learning (ML), Artificial Intelligence and Internet of Things (IoT). The role of data engineer will evolve towards a more ops-oriented role. The next generation of data engineers will focus on improving data reliability across the company. To keep pace with this transformation, there is a need to develop and design new protocols and methods for data technologies. Therefore, one part of this book focuses especially on the recent developments, open challenges and future scope in the area of data science that persuade to industrial merchandise, businesses and standardization.

Next-generation wireless (NextG) involves the concept that the next generation of wireless communications will be a major move toward ubiquitous wireless communications systems and seamless high-quality wireless services, high throughput, and highly efficient in both radio frequency spectrum utilization and greater energy effectiveness. This includes dynamic and adaptive technologies that provide a new standard for radio spectrum accessibility, dynamic and fast adaptive multilayer schemes, smart radio, and adaptive networking i.e. Software defined Radio (SDR), Cognitive Radio Networks (CRN). The future Generation wireless communication technologies i.e. IoT, SDR, CRN, Non-orthogonal multiple access (NOMA),

device to device communication and machine to machine communication (M2M), visible light network and terahertz wireless network, artificial intelligence-based wireless networking tactile, are expected to operate in very complex, uncertain, dynamic and diverse environment. Such an operating environment along with hardware intricacies and pragmatic challenges limit the performance of the end-to-end communication. Also, the computing functionality of these systems is highly distributed and decentralized in nature. Designing and developing these systems ensuring consistent performance in complex and uncertain environment is indeed a very challenging task. Recently the accessibility of data irrespective of the time and place, is an essential characteristic for NextG communication technology. However, security and privacy are of prime concern when applied to the end user applications. Improper and unethical practices such as hacking, industrial espionage, pirating, online fraud and malicious destruction are some but few of the problems experienced by mobile computing. Another big problem plaguing mobile computing is credential verification. There are several wireless network security threats i.e. Piggybacking, Cracking attack, Evil twin attack, Wireless sniffing and Unauthorized computer access. A recent report of National Sanitation Foundation (NSF) has revealed that 78% and 63% of large organization and of small business, respectively, are attacked annually, and it is expected that these figures will continue to rise in future making the security distress across the world. Therefore, security and privacy are of primary concern for future technological advances.

The proposed book aims at providing an encyclopaedic and insightful understanding of the critical review, recent developments, open technical challenges and future directions in the areas of Data Computing Communication Technologies and Security.

Salient features of the book:

- The critical review of the literature and recent advancement in the area of data engineering and secure communication technologies.
- Analysis of the inspiring developments and future technical challenges for researchers, practitioners.
- Futuristic research methodologies and their applications in data science, communication and Security.
- Through censorious research promises a useful approach to bridging the gap between research and practice and thus promoting evidence-informed education.
- The book aims to apprise the readers including academicians, researchers, scientist, practitioners, and industry professionals with the recent advancement in the designing and establishing secure and scalable data infrastructures and communication systems.

The aim of this book is to serves as a comprehensive resource, facilitating knowledge exchange, interdisciplinary collaboration, and cross-pollination of ideas. It is our hope that this compilation will inspire future research endeavours, spark new innovations, and contribute to the advancement of data computing, communication, and security.

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