Digital Communications and Networks 7 (2021) 245–246

Contents lists available at ScienceDirect

Digital Communications and Networks

journal homepage: www.keaipublishing.com/dcan

Editorial for special issue on ”security and privacy protection in the era of IoT devices”

IoT devices like smartphones have become an important personal assistant and an indispensable part of our daily life and work. As more and more users storing their private data on their mobile phones, it becomes imperative to develop secure mobile operating systems, secure mobile clouds and applications, and secure mobile devices. In recent years, IoT device security, like smartphone security, depends not only on the phones, but also on the mobile device management technology that controls and manages device security. As a result, there is an increasing need for security solutions to protect users' sensitive and private information in the IoT environment. This special issue focuses on security and privacy issues on IoT devices and identifies new schemes and mechanisms for constructing a safe and robust IoT environment.

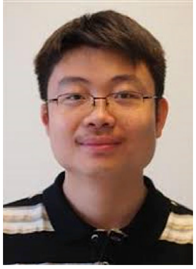
In the first paper entitled “Secure K-Nearest Neighbor Queries in Two-tiered Mobile Wireless Sensor Networks”, Fan et al. focused on the secure KNN query technology in TMWSNs and proposed two secure KNN query algorithms in TMWSNs named BAFSKQ (the basic algorithm of KNN query) and SEKQAM (the KNN query algorithm based on MR-Tree), respectively. They then theoretically analyzed the security of these two KNN query methods, and it is proved that they can effectively ensure the privacy of the information on the storage nodes and have good soundness and integrity. In the evaluation, they found that SEKQAM has a lower communication cost than BAFSKQ in most cases.

In the second paper entitled “Challenge-based Collaborative Intrusion Detection in Software-Defined Networking: An Evaluation”, Li et al. focused on challenge-based Collaborative Intrusion Detection Networks (CIDNs) and evaluated its performance in Software Defined Networking (SDN). For challenge-based CIDNs, since the testing node knows the actual severity in advance, the satisfaction level can be calculated based on the feedback received. The experimental results indicate that such a detection mechanism could work well in SDN by identifying malicious nodes quickly.

In the third paper entitled “User location privacy protection mechanism for location-based services”, He and Chen pointed out that protecting users' location privacy has become an important issue for the current Location-Based Services (LBS). They built a robust authentication mechanism through the critical negotiation phase to ensure the system's overall authentication security. They then designed a user location privacy protection mechanism that is suitable for the LBS based on the privacy proximity test problem. This method guarantees the trust between the users and the service providers under a strong authentication mechanism while ensuring users' privacy.

In the fourth paper titled “Substring-searchable attribute-based encryption and its application for IoT devices”, Sun et al. introduced an Attribute-Based Encryption (ABE) scheme called Sub-String Searchable ABE (SSS-ABE). Compared with the traditional ABE schemes, the SSS-ABE scheme can query the ciphertext, and the data user can know whether the ciphertext contains the desired content before downloading all the ciphertexts. This can reduce the communication overhead.

On the whole, the special issue papers cover a broad range of research on security and privacy issues on IoT devices and discuss various security threats and potential solutions. The team of guest editors would like to thank Editor-in-Chief Jinzhao Lin and Managing Editor Yi Guo for their tremendous support and the paper authors and the reviewers for their contributions.



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https://doi.org/10.1016/j.dcan.2021.04.003

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