

# Privacy-Preserving Truth Discovery in Mobile Crowdsensing: Challenges, Solutions, and Opportunities

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## ABSTRACT

The ubiquity of sensor-rich mobile devices is pushing forward the paradigm of mobile crowdsensing, which facilitates convenient and cost-effective collection of large amounts of sensory data (e.g., traffic monitoring, environment monitoring, and mobile personalized recommendation services [1, 2]). In practice, however, the sensory data collected from different mobile devices are not always reliable, due to various factors like heterogeneous sensor quality, noise, etc. Hence, a realistic problem faced by mobile crowdsensing is how to extract truthful information from the unreliable sensory data, which is also known as truth discovery [3]. Meanwhile, data privacy has long been an acute concern in mobile crowdsensing systems, as sensory data may reveal sensitive information like daily routines, location, personal health, social relations, and more [1]. In light of these observations, there has been an increasing interest to explore and develop sound privacy-preserving truth discovery techniques for mobile crowdsensing in recent years [4, 5].

In this keynote, I will present our research on privacy-preserving truth discovery in mobile crowdsensing. Compared with prior work, our goal is to promise privacy preservation, cost efficiency, and mobile-friendly deployment at the same time for truth discovery in mobile crowdsensing. I will first discuss the research challenges, which mainly lie in the complicated functionality requirements of truth discovery and practical deployment. I will then introduce our solutions on privacy-preserving truth discovery in mobile crowdsensing [6–8], which build on advanced cryptographic techniques (like garbled circuits and homomorphic encryption) and present in-depth customization aimed for practical performance. Finally, I will discuss some future directions for researchers and practitioners to further investigate innovative solutions toward privacy-preserving truth discovery in mobile crowdsensing.

## KEYWORDS

Mobile crowdsensing, truth discovery, privacy, security, cloud

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