IEEE New Zealand North Section SIGHT Group and

IEEE Vehicular Technology Society (VTS) New Zealand North Chapter

Invited Talk

SmartAuction: A blockchain-based secure implementation of private data queries

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Abstract: A data marketplace provides a platform for data trading by bringing together data owners and data consumers with a data broker. Recent advancements in mechanism design of data marketplaces have introduced a number of private data query mechanisms that facilitate the trading of private data. A critical assumption to ensuring that these mechanisms function as intended in a real-world online platform, which is often overlooked in the mechanism design literature, is that they are implemented in a network infrastructure that guarantees secure and fair trade. Such a network infrastructure should allow data storage, communications and transactions to satisfy confidentiality, data integrity, fair brokerage, and privacy requirements. In this talk, I will introduce the SmartAuction, a blockchain-based secure implementation of a private data query system. SmartAuction utilises a public-key encryption scheme, a digital signature scheme and two smart contracts to facilitate the four tasks of a data trade: data submission, data request, auction and query, and payment and delivery. Using universal composability framework, we verify that SmartAuction satisfies the desirable properties mentioned above. We also conduct experiment to show that SmartAuction can be implemented in real Ethereum platforms and it has a broad applicability.

Biography: Mengxiao (Michelle) Zhang is a Research Associate at the Algorithms and Logic Lab of the University of Electronic Science and Technology of China. Her research interests include algorithmic mechanism design and economics of data security and privacy. She received her Ph.D. in Information Systems from the University of Auckland in 2022. She has published academic papers on top venues, including FGCS, AAMAS, and UAI.

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