ΟΜΙΛΙΑ

"Balancing Privacy and Utility in Statistical Databases: A Mathematical Perspective"

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ΠΕΡΙΛΗΨΗ – ABSTRACT

Modern research and strategic decision-making across industry, government, and academia often rely on extensive datasets containing personal information. There is a fundamental assumption that only aggregate statistics and patterns, and not individual records, will be accessible to users.

There are two primary strategies to safeguard individual privacy: adding noise to data and restricting permissible queries. However, even with these safeguards, sophisticated attackers may still "compromise" the database by inferring individual values through carefully crafted combinations of aggregate queries.

This talk explores the critical trade-off between database utility and individual privacy protection, examining the mathematical and algorithmic foundations underlying database security. For example, we reveal unexpected connections between secure database design and graph theory, demonstrating how compromise-free query collections correspond to graphs with the least eigenvalue -2, and we establish the relationship between maximal compromise-free query collections and maximum antichains in finite sets, revealing how abstract mathematical structures inform practical privacy protection mechanisms.

Short Bio:

Professor Ljiljana Brankovic *is a computer scientist and educator at the University of New England's School of Science and Technology, with over 30 years of experience in academia. She holds a PhD in Computer Science from the University of Newcastle (1998), where her doctoral thesis focused on the usability of secure statistical databases, a topic that would define much of her research career.*

Her research spans privacy-preserving data mining, statistical database security, and graph theory and combinatorics. A significant portion of her work explores combinatorial algorithms and the development of parameterised approximation algorithms that bridge the gap between constant-factor approximation and fixed-parameter tractable approaches.
Throughout her career, Professor Brankovic has fostered international research collaborations, including serving as a Mercator Fellow with the German Research Foundation. She has supervised numerous PhD students, contributing to the development of the next generation of researchers in privacy, security, machine learning, and combinatorics.

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