Energy Consumption Characterization of Privacy Preserving Algorithms for Participatory Sensing Systems

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Abstract

• Participatory sensing is a new sensing paradigm where a group of users voluntarily gather, analyze, share and report data of interest utilizing their mobile devices.
• One of the most important problems in participatory sensing systems is that of the privacy, i.e., users will not be willing to participate, if the system does not include privacy-preserving mechanisms.
• This project investigates the energy consumption associated with the most important privacy-preserving mechanisms available in the literature and the tradeoff between user privacy and energy consumption.
• These algorithms were classified in three categories, anonymization, obfuscation and encryption-based.

Motivation

• In order to motivate mobile phone users to participate of these systems, privacy should be guaranteed.
• But, the privacy-preserving mechanisms should not deplete the phone’s resources.

System Architecture

System Implementation

Obfuscation Based on Points of Interest
Obfuscation Based on Random Perturbation
Double Encryption
User Anonymization

Results

Conclusion

• Comparing all mechanisms, the results present that the encryption-based algorithms consume significantly more energy, followed by anonymization-based algorithms and obfuscation-based algorithms.
• The obfuscation-based algorithms represent the best alternative as a privacy-preserving mechanism.

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