

EAGER: Collaborative Research: Towards Understanding Smartphone User Privacy: Implication, Derivation, and Protection

Project Highlights

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Major Goals of the Project

- Protecting multi-lateral localization privacy in pervasive environments
- Locating rogue access point using fine-grained channel information
- Understanding the leakage of social relationships and demographics from surrounding APs

Significant Results

- Compared the computation and communication overhead of the proposed protocols with prior results based on numerical examples.
- Observed that the proposed protocols are much more computationally efficient than homomorphic encryption (HE) and oblivious transfer (OT), and the communication cost and the execution time are all much smaller than that of HE and OT.
- Found that in general an anchor can achieve a 30-meter estimation error by colluding with only 6 to 7 other anchors, which is sufficient to leak privacy of the target.
- Found that it may be unnecessary for an anchor to collude with many others in order to glimpse into the target's privacy—a small-size collusion, which is relatively easy to form, could be enough.

Significant Results – cont'd

- Showed that the proposed direction determination method using CSI is highly effective and robust to both indoor and outdoor environments.
- Evaluated the overall performance of the Direction Determination component and the Position Estimation component in both indoor and outdoor environments.
- Extensive experiments conducted with 21 participants in their daily lives over a 6-month period confirms the possibility of using surrounding APs to infer people's social relationships and demographics.

Publications and Presentations

- Guang Yang, Jerry Cheng and Minge Xie: “gmeta: meta-analysis using confidence distribution framework”.
<https://cran.r-project.org/web/packages/gmeta/index.html>.
- Jerry Cheng, Regina Liu and Minge Xie (2016) “Fusion Learning”, to appear in Wiley:StatRefOnline.
- Jerry Cheng, Tianhao Luo, and Minge Xie “Joint Frailty Model for Recurrent Event Data Analysis”, presented in 3rd International Workshop on Longitudinal Data Analysis, June 2016.
- Jerry Cheng, Minge Xie and John B. Kostis. Ffusion learning with confidence distribution combining” presented in 72 Deming conference, December 2016.

Thank you very much for
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