The Threat
• What is the threat?
  • Users declare location and co-location information on online social networks (OSNs)
    ➔ Social benefits for the user and their friends
    ➔ Privacy loss for the user and their friends w.r.t. different adversaries
  • Co-locations introduce interdependencies between users
    • Privacy risks are complex to evaluate by users
    • Control is limited (e.g., with respect to the SP)
  • Users’ preferences about sharing and privacy are unknown
    ➔ Users’ lack of awareness about the risks
    ➔ Users’ interactions and interests are complex to understand and predict

• Who is concerned? Any active user of OSNs

• What are the implications?
  • (Location) privacy of users is at risk
  • Conflicts of interests arise and decisions are complicated

Theoretical Contribution
• Formalization: a game theoretical framework for analyzing and predicting the strategic behaviors of two users

\[ u_i(t, s_i(-), s_j(-)) = (1 - \alpha_i) B_i(t, s_i(t), s_j(t)) + \alpha_i P_i(t, s_i(-), s_j(-)) \]

• Survey: 250 active Facebook users
  • Evaluation of users’ awareness and concerns
  • Quantify users’ preference factors using conjoint analysis
    • The preference for sharing vs. viewing information \( f_{sv} \)
    • The preference for location vs. co-location information \( f_{lc} \)
    • The preference for privacy vs. social benefits of sharing \( f_{pb} \)

• Results:
  • Users’ preferences are very diverse
  • Individual preferences have a strong effect on the decisions of other users

Experimental Evaluation
• Experiments:
  • Data driven numerical simulations of the users’ decisions
    • On the canonical meeting scenario
    • Using real users’ preferences as quantified in our survey

• Conclusions:
  • Some factors have a strong influence on users’ decisions
    • The considered adversary
    • The preference for privacy vs. social benefits \( f_{pb} \)
  • Users can strongly influence their friends’ decisions
    • Vicious circle effect: I only share because I know my friend likes to share
  • Equilibria decisions are not always satisfying for the users

A.-M. Olteanu, K. Huguenin, M. Humbert, J.-P. Hubaux. The Sharing Game: Benefits and Privacy Implications of (Co)-Location Sharing with Interdependences. In submission