Towards Privacy in the RFID Ecosystem

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rfid privacy threats

System Security

- Outside attacker gains access to DB
- Inside attacker with RFID hardware

Malicious Peers

- Other users query to track me
- My data could be mined
- Peers collude to learn even more

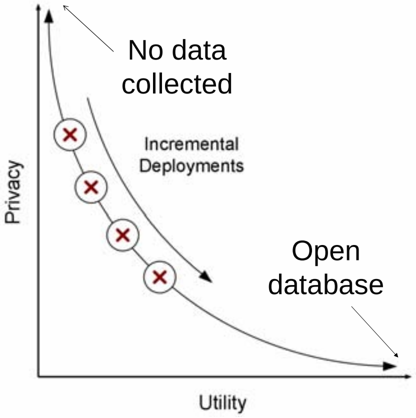
Institutional Surveillance

- System owner tracks users
- Other institutions can gain access
- User is unaware of what is being stored and for how long

research questions

- How much can be inferred from the data?
- Can we achieve provable privacy?
- How to balance privacy and utility?
- What are the users' privacy concerns?

privacy vs. utility



data perturbation

- Perturb returned data (sanitization interface)
- Add noise to database
- Sub-linear queries for a provable privacy guarantee?

data anonymization

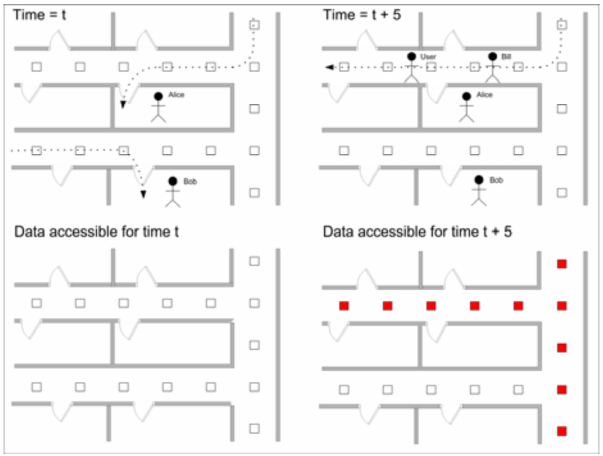
- Use k-anonymization in spatio-temporal responses

- "There are 10 people in the ubicomp lab"
- "Evan is in the building" vs. "in his office"
- "Evan was here today" vs. "here right now"

access control

- Explicit access controls on data sharing between users
- Fine-grained access control (tuple level) for authorization views

initial model: ecosystem provides perfect memory



- Each user carries a "person ID" tag
- Ecosystem acts as personal recorder
- Records RFID events the user *could have seen in person*
- Each user is presented only with this view of the DB
- Fine-grained access control provides this DB view

future work

- Add a set of administrator-defined system-wide database queries
- Study explicit user privacy controls
- Investigate provable database privacy techniques
- Can an economic model for "pricing" queries based on privacy be created?
- Study privacy models in-situ with real applications and users