

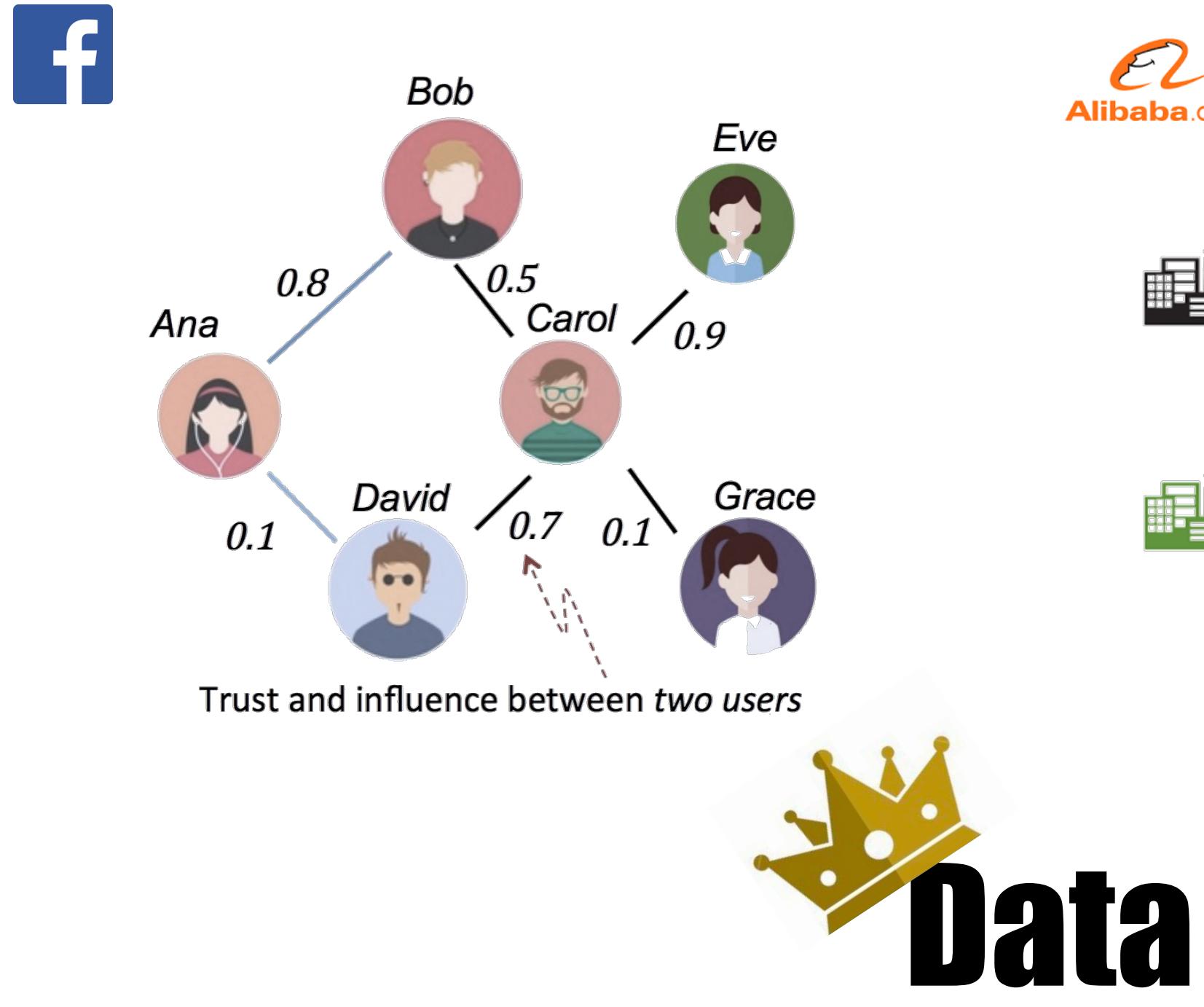
WPI

Sharing Uncertain Graphs Using Syntactic Private Graph Model



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Intension: Sharing Uncertain Graphs



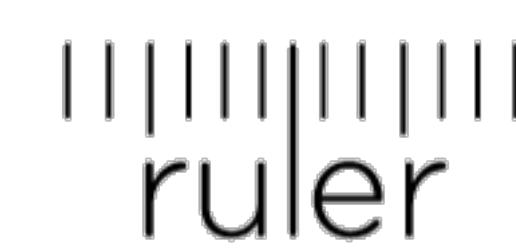
Data

Challenges

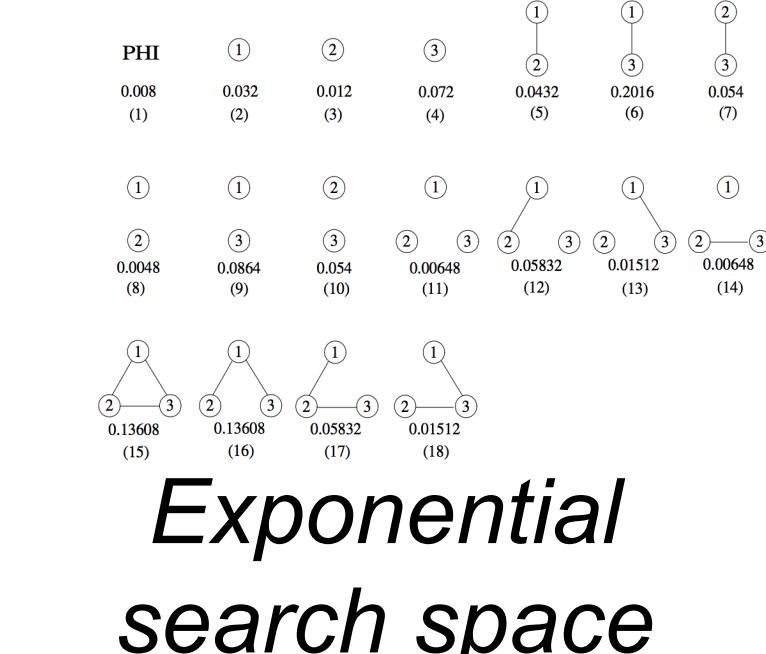
- **Stochastic Privacy Attack**
- **Stochastic Utility Loss**
- **Intractable Search Space**



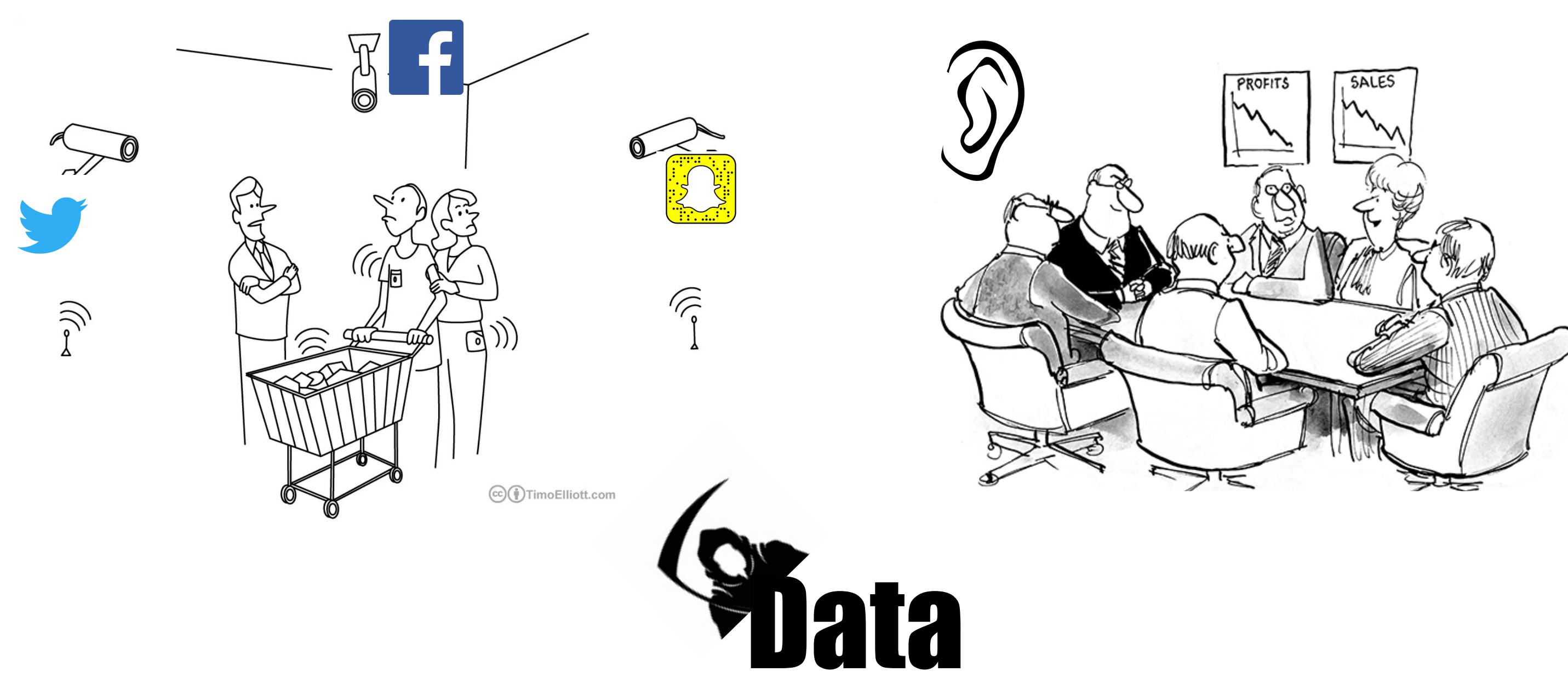
Leak caused by edge uncertainty



Structural difference over uncertain graphs

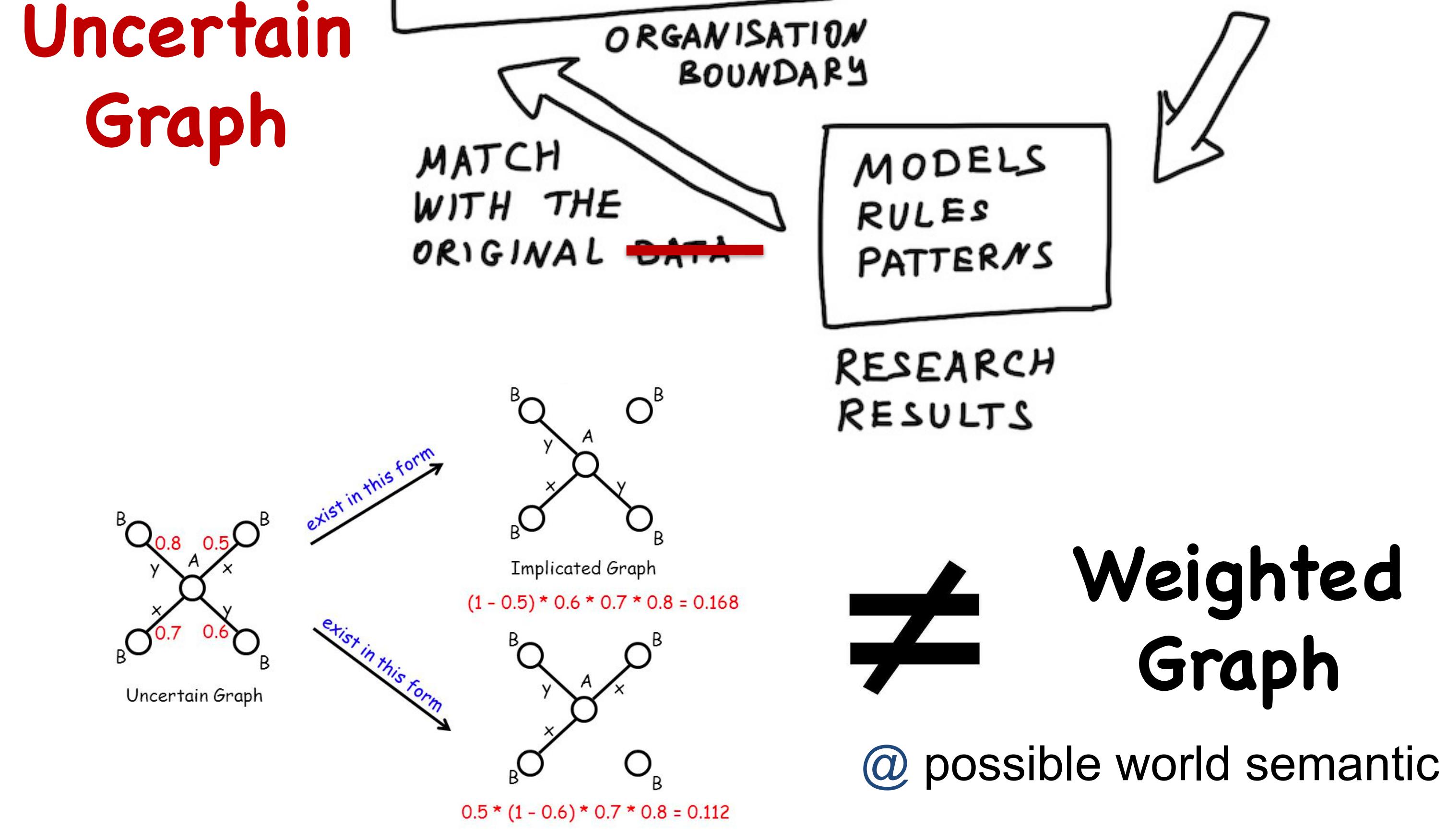


Intension: Privacy Concerns



Data

Option: Anonymization



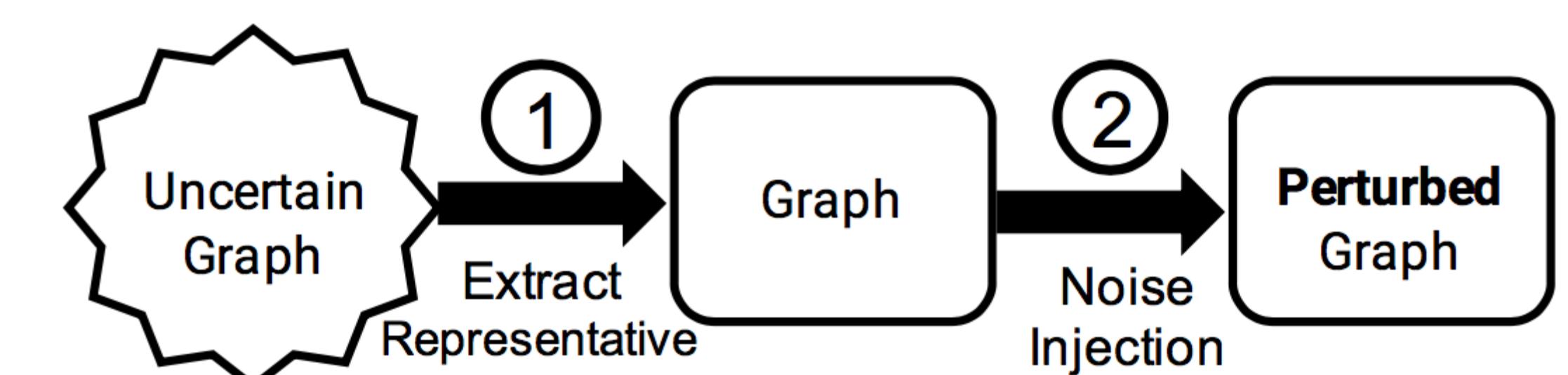
The simplest case: edge independent

Current graph anonymization works only target on deterministic graphs and overlook the uncertain scenario.

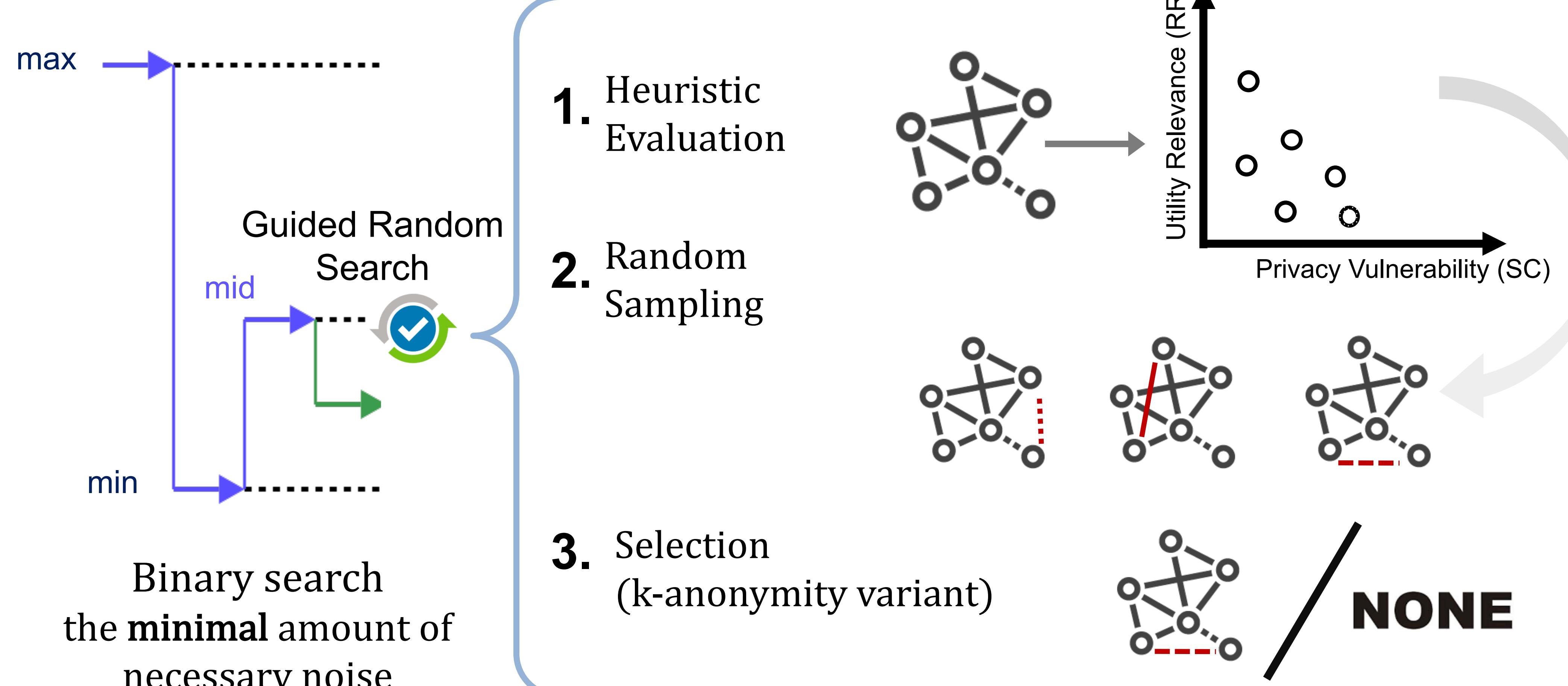
Uncertain Graph Anonymization Solutions

Benchmark: Rep-An

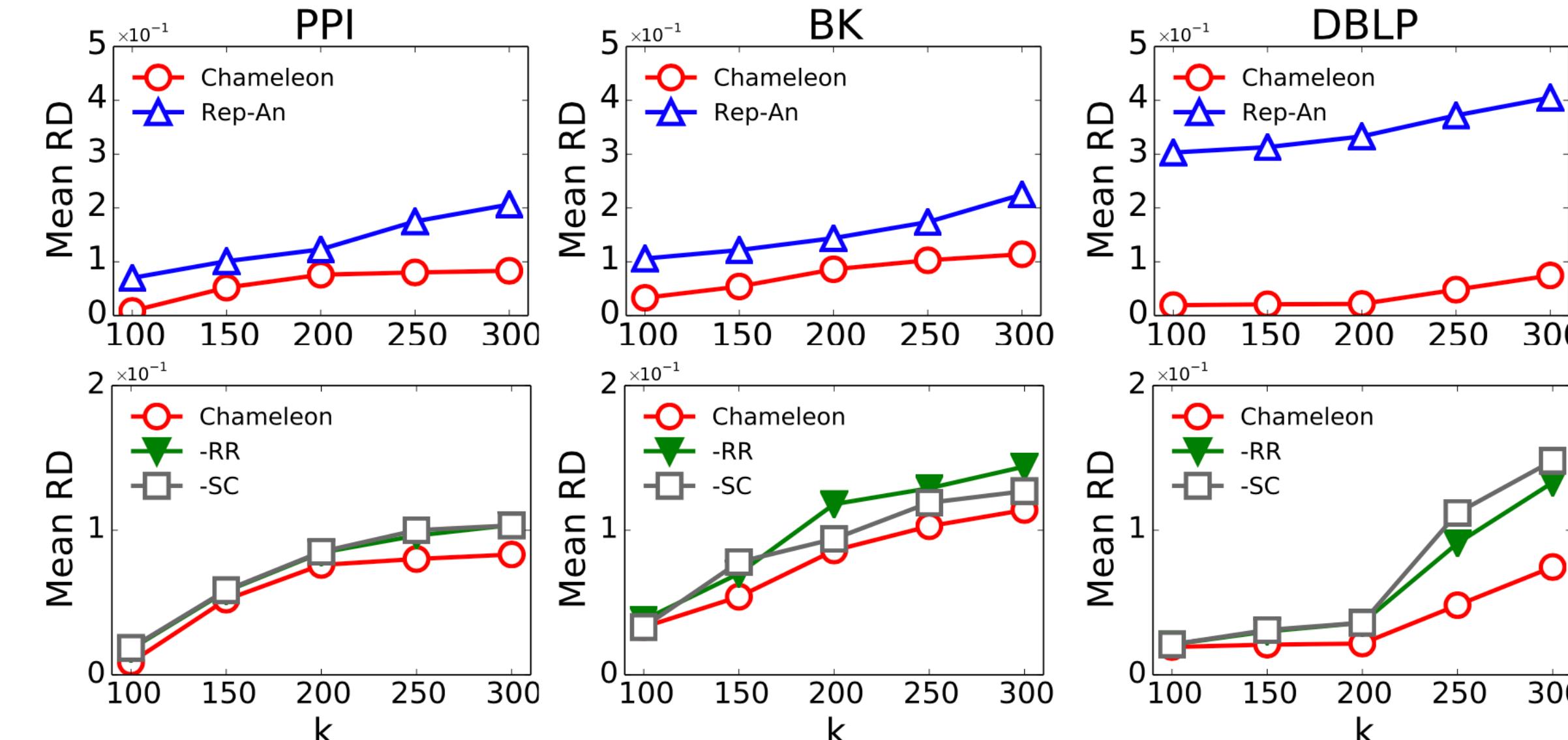
- ✓ Combines isolated techniques
- ✓ Suffers from huge utility loss



- ✓ With the possible world semantics
- ✓ Enables a fine-grained control of injected noise



Empirical Evaluation



The generated anonymized uncertain graphs that closely match the original ones w.r.t probabilistic connectivity.

Reference

1. Parchas, Gullo, Papadias, and Bonchi. The pursuit of a good possible world: extracting representative instances of uncertain graphs. *SIGMOD*, 2014.
2. P. Boldi, F. Bonchi, A. Gionis, and T. Tassa. Injecting uncertainty in graphs for identity obfuscation. *VLDB*, 2012.
3. W.-Y. Day, N. Li, and M. Lyu. Publishing graph degree distribution with node differential privacy. *SIGMOD*, 2016.