

Title: A Formal Approach to Preserving Privacy in Social Networks

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Abstract:

Social Network Services (SNSs) have changed the way people communicate, bringing many benefits but also the possibility of new threats. Privacy is one of them. Over the past decade, the use of the social networks like Facebook and Twitter, just to mention two of the most popular ones, has increased at the point of becoming ubiquitous. In this talk I will introduce a framework to write privacy policies for SNSs and to reason about such policies in the presence of events making the network to evolve. The framework includes a model of SNSs, a logic to specify properties and reasoning about the knowledge of the users (agents) of the SNS, and a formal language to write privacy policies. Agents are enhanced with a reasoning engine allowing to infer knowledge from previously acquired one. To describe the way SNSs may evolve, we provide operational semantics rules which are classified into four categories: epistemic, topological, policy, and hybrid, depending on whether the events under consideration change the knowledge of the SNS' users, the structure of the social graph, the privacy policies, or a combination of the above, respectively. We provided specific rules for describing Twitter's behaviour, and proved that it is privacy-preserving (i.e., that privacy is preserved under any possible event of the system). We also show how Twitter and Facebook are not privacy-preserving in the presence of additional natural privacy policies. Finally, I will show a prototype implementation of our framework in the open-source social network Diaspora*, where we implemented an enforcement mechanism for some of the privacy policies which can be written in our framework.