Title: Contextually Private Mechanisms

Abstract: We introduce a framework for comparing the privacy of different mechanisms. A mechanism designer employs a dynamic protocol to elicit agents' private information. Protocols produce a set of contextual privacy violations—information learned about agents that may be superfluous given the context. A protocol is maximally contextually private if there is no protocol that produces a subset of the violations it produces, while still implementing the choice rule. Contextual privacy violations arise when a choice rule makes some agents collectively, but not individually, pivotal. In auctions, designing for contextual privacy requires choosing an initial question posed to each agent and the order in which agents are queried. We study a particular maximally contextually private protocol for k-item Vickrey auctions—the ascending-join protocol—and show that it achieves maximal contextual privacy by delaying queries to bidders whose privacy it protects.

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