

# Who Knows I like Jelly Beans?: An investigation into Search Privacy

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## Abstract

Internal site search is an integral part of how users navigate modern sites, from restaurant reservations to house hunting to searching for medical solutions. Search terms on these sites may contain sensitive information such as location, medical information, or sexual preferences; when further coupled with a user's IP address, this information becomes extremely identifying.

In this talk, I will explore the various ways that websites leak search terms to third parties when a user submits a search query. My team and I developed a reliable methodology for identifying and interacting with search components, which we implemented on top of an instrumented headless browser. We used this crawler to visit the one million most popular websites and analyzed search term leakage across three vectors: URL query parameters, payloads, and the Referer HTTP header. We then compared our results to the expected results based on a natural language analysis of the privacy policies of those websites (where available). I will present the analysis of the crawl and natural language analysis during the talk, then discuss potential strategies to possibly improve the situation.

## Bio

Daniel Kats is a Senior Principal Researcher at NortonLifeLock Research Group. His past research touched on enterprise security, privacy on the web, privacy for machine learning models, applying human-in-the-loop learning to security, and tracking disinformation. Daniel is also the lead of the [BotSight](#) project. He obtained his M. Sc. in 2016 from the University of Toronto where he focused on distributed systems, studying under Prof. Eyal de Lara. Daniel has also been a speaker at PyCon, as well as a PC member at the DYNAMICS and DIMVA conferences. His research has been covered by Forbes, VentureBeat, and Bleeping Computer (among others). In his spare time, Daniel does not enjoy staying home but must do so anyway because we live in a dystopian nightmare; he also likes to cook.