Away From Prying Eyes: Analyzing Usage and Understanding of Private Browsing

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Introduction

- **Private browsing** is a browser feature in which data from a browsing session is deleted after the session ends.
- To ensure users are not putting their data at risk, it is critical to learn how and why private browsing is used.
- The Security Behavior Observatory (SBO) is a longitudinal study that collects data about privacy and security behaviors from participants’ home computers.

Research Goals

- Leverage SBO browsing data to explore patterns in private browsing usage.
- Investigate the impact that self-reporting bias has on results reported in prior work.
- Provide insights into why people use private browsing for specific use cases.

Private Browsing Use Cases

<table>
<thead>
<tr>
<th>Most Common Use Cases</th>
<th>% of private browsing sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log into service</td>
<td>38%</td>
</tr>
<tr>
<td>General browsing</td>
<td>37%</td>
</tr>
<tr>
<td>General searches</td>
<td>33%</td>
</tr>
<tr>
<td>Access adult content</td>
<td>24%</td>
</tr>
<tr>
<td>Stream audio/video</td>
<td>19%</td>
</tr>
</tbody>
</table>

Approach

Empirical Analysis

- Comparison between normal and private browsing:
  - Domain categories
  - Search engine queries
  - YouTube activity

Survey

- Exploration of user rationales and technical understanding of private browsing mode.
  - 227 SBO + 305 Mechanical Turk participants.

User Perceptions of Private Browsing

Motivations

- **Practical**
  - Avoid price discrimination
  - Prevent unwanted video recommendations
- **Security Related**
  - Keep passwords and personal information safe
  - Protect themselves from malicious activity
- **Privacy Threats**
  - Other users of their device
  - Web tracking
  - Targeted advertising

Misconceptions

- 75% thought private browsing prevents cookies from being sent to websites.
- 48% thought private browsing encrypts web traffic.
- 41% thought private browsing hides their IP address.

A larger proportion of search engine queries in private browsing were for sensitive topics, such as adult and health content.

"[private browsing] lets me think I am seeing ‘real’ prices for tickets/items instead of prices generated for me..."

1. Activities that did not fall under any other use case were categorized as “general” browsing or searches.