Exploring the Cookieverse
A Multi-Perspective Analysis of Web Cookies

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Background

• General Data Protection Regulation (GDPR)
  • EU law
  • May 25, 2018
  • Enhance individuals' control and rights over their personal data

• California Consumer Privacy Act (CCPA)
  • California State law
  • January 1, 2020

• Enterprises and vendors react
  • Cookies banners
Research Questions

• How many websites do show the banners?
  • Does the banner give users the options to explicitly agree or decline?

• Do they respect the users preferences?

• Do websites exhibit different behavior?
  • Geographic location (EU vs. non-EU)
  • User agent (mobile vs. desktop)
Related works

• Not considering users’ characteristics
• Manual or semi-automated inspection
• Hard-to-scale automated tool
• Just “accept” option

Goal: analysis of cookie landscape from different perspectives in a automated way
Methodology
We use cookies to make your interactions with our website more meaningful. They help us better understand how our websites are used, so we can tailor content for you. For more information about the different cookies we are using, read the Privacy Statement. To change your cookie settings and preferences, click the Cookie Consent Manager button.
BannerClick – Detection

Cookies Related Text
BannerClick – Detection

```
div.firstnode {
  position: fixed;
  width: 300px;
  border: 3px
}
```

99% Accuracy
BannerClick – Interaction

Word sets:
acc: ["accept","agree","confirm"]
rej: ["reject","refuse","decline"]
set: ["setting","option","choice"]
Measurement Setup

- **8 vantage points:** Germany, Sweden, US West, US East, India, Brazil, South Africa, Australia
- **Target list:** Tranco Top 10k domains
Banners detected, accepted, rejected

Half of the websites do not show an easy rejection option.
Cookies differences after interaction

Interacting with banners impacts cookie distribution
Cookies – EU vs. non-EU

Fewer cookies in EU compared to non-EU
Mobile vs Desktop

User agent impact the number of cookies.
Consent Management Platform
Discussion

• Banners
  • Straight way to comply with laws
  • Not an optimal solution
  • Annoying, too much effort and attention
  • Dark patterns -> biased decision

• No future in utopia
  • Application layer support
    • Google stops TP for Chrome by 2024
  • One click for opt out all
Conclusion

- Impact of
  - Geographical location of users
  - Interaction with banner

- Check out the paper
  - CCPA impact
  - Landing vs. Inner pages
  - Mobile vs. Desktop
  - Consistency analysis

- Source code available
  - BannerClick
  - Analysis data for reproducibility

[Graphs and diagrams showing data analysis and statistics]

[QR code: bannerclick.github.io]
Backup: Measurement Setup

• Main run
  • TrancoTop10kList domains \( \approx 9020 \) totally reachable
  • 5 iteration for each mode of interaction

• Desktop vs. mobile (and others)
  • Tranco tiered 300 \( \approx \) top-100, 1001–1100, and 9901–10k
  • User Agent
    • Mobile: “Mozilla/5.0 (Android 12; Mobile; rv:68.0) Gecko/68.0 Firefox/93.0”
    • Desktop: “Mozilla/5.0 (X11; Linux x86_64; rv:95.0) Gecko/20100101 Firefox/95.0”
  • Screen size
    • Mobile: 340x695
    • Desktop: 1366x768
Backup: Measurements

Table 1. Overview of different measurement types.

<table>
<thead>
<tr>
<th>Measurement Type</th>
<th>Start Date</th>
<th>Duration</th>
<th>Target</th>
<th>Websites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banner Interaction</td>
<td>Jan 20, 2022</td>
<td>20 days</td>
<td>Tranco Top 10k</td>
<td></td>
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<tr>
<td>Consistency Tests</td>
<td>Feb 9, 2022</td>
<td>10 days</td>
<td>Tranco tiered 300</td>
<td></td>
</tr>
<tr>
<td>Landing vs. Inner</td>
<td>Mar 8, 2022</td>
<td>4 days</td>
<td>Tranco tiered 300</td>
<td></td>
</tr>
<tr>
<td>Desktop vs. Mobile</td>
<td>Feb 27, 2022</td>
<td>10 hours</td>
<td>Tranco tiered 300</td>
<td></td>
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<tr>
<td>Impact of CCPA</td>
<td>Mar 13, 2022</td>
<td>10 hours</td>
<td>Tranco tiered 300</td>
<td></td>
</tr>
</tbody>
</table>
Backup: Words Frequency
Backup: Inner vs Landing
Backup: Cookies – EU vs non-EU

Less cookies in EU compared to non-EU
Backup: Consistency
Backup: Explicit vs. Implicit