Robots Still Outnumber Humans in Web Archives in 2019, But Less Than in 2012

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INTRODUCTION

- Comparison of robots vs. humans in web archive access logs [1].
- Identified user sessions as human or robot based on browsing behavior.
- Examined user access patterns and temporal preferences.
- Extension of AlNoamany et al. [2]

BOT IDENTIFICATION

Known bots: A compiled list of User-Agents that are known to be used by bots.

Number of UA per IP: The IPs that update their User-Agent (UA) more than 20 times.

robots.txt: A session that requested for the robots.txt file.

Image-to-HTML Ratio (IH): A session that requested less than one image file for every 10 HTML files.

Browsing Speed (BS): A session with a browsing speed faster than one HTML request every two seconds (BS >= 0.5 requests/sec).

RESULTS

The bot identification results based on the total number of sessions and the total number of requests for each dataset (the header for each column displays the total number of sessions and requests).

<table>
<thead>
<tr>
<th>Heuristics</th>
<th>IA2012</th>
<th>IA2015</th>
<th>IA2019</th>
<th>PT2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sessions</td>
<td>Requests</td>
<td>Sessions</td>
<td>Requests</td>
<td>Sessions</td>
</tr>
<tr>
<td>Known Bots</td>
<td>21,423</td>
<td>(1.40%)</td>
<td>19,441</td>
<td>(1.43%)</td>
</tr>
<tr>
<td>Bots</td>
<td>2,992</td>
<td>(0.22%)</td>
<td>11,061</td>
<td>(0.49%)</td>
</tr>
<tr>
<td>#UA per IP</td>
<td>19,893</td>
<td>(86.94%)</td>
<td>22,308</td>
<td>(81.35%)</td>
</tr>
<tr>
<td>robots.txt</td>
<td>1,340</td>
<td>(87.76%)</td>
<td>10,818</td>
<td>(79.97%)</td>
</tr>
<tr>
<td>IH Ratio</td>
<td>1,340</td>
<td>(87.76%)</td>
<td>10,818</td>
<td>(79.97%)</td>
</tr>
<tr>
<td>Browsing Speed</td>
<td>237,271</td>
<td>(15.53%)</td>
<td>239,120</td>
<td>(17.64%)</td>
</tr>
<tr>
<td>Total Robots</td>
<td>1,340</td>
<td>(87.76%)</td>
<td>10,818</td>
<td>(79.97%)</td>
</tr>
</tbody>
</table>

The heuristics are not mutually exclusive.

CONCLUSION

- Percentage of robots requests in IA decreased over time (2012 – 91%, 2015 – 88%, 2019 – 70%)
- Robots account for 98% of requests in PT2019.
- Robots are almost entirely limited to Dip and Skim access patterns in IA 2012 and 2015, but exhibit all the patterns and their combinations in IA 2019.
- Both humans and robots show a preference for web pages archived in the near past.

ACCESS PATTERNS

- The basic access patterns for users of web archives proposed in 2012.
- The access patterns of robots and humans in our datasets. The color of the stacked bar distinguishes between requests for mementos and TimeMaps.

REFERENCES


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