Human dynamics revealed through Web analytics

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Outline

- Web surfing, our database
- Population dynamics
- Inter-event statistics
- Preferential linking
- Conclusions
Web Surfing at Emory University
Web surfing

http://www.emory.edu

http://www.physics.emory.edu
Web Surfing

- The database is formed by the weblogs of Emory University from Apr. 1st 2005 to Jan. 17th 2006 (41 weeks).
- Each click in a web of the university is registered at the time resolution of 1 second.

<table>
<thead>
<tr>
<th>Number of IPs</th>
<th>( N_{IP} )</th>
<th>3,179,671</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of URLs</td>
<td>( N_{URL} )</td>
<td>2,562,398</td>
</tr>
<tr>
<td>Total Number of page requests (weight)</td>
<td>( \Omega )</td>
<td>53,582,121</td>
</tr>
<tr>
<td>Average number of IPs introduced per day</td>
<td>( n_{IP} )</td>
<td>10,742</td>
</tr>
<tr>
<td>Average number of URLs introduced per day</td>
<td>( n_{URL} )</td>
<td>8,396</td>
</tr>
<tr>
<td>Average number of edges introduced per day</td>
<td>( e )</td>
<td>77,569</td>
</tr>
<tr>
<td>Average weight increment per day</td>
<td>( \Omega \uparrow )</td>
<td>186,350</td>
</tr>
</tbody>
</table>
Population dynamics
Population dynamics
Population dynamics

![Graph showing population dynamics over different days and hours](image-url)
Inter-event time statistics

\[ P(\tau_v) \sim \tau_v^{-1} \]
Inter-event time statistics

![Graph showing inter-event time statistics](image)

- IP ➔ www.x.emory.edu

- IP ➔ www.x.emory.edu/*
Preferential linking

\[ \langle \Delta x \rangle = ax + b \]
Preferential linking

Users

$P(x) \sim x^{-\gamma(a,b)}$

$C_x = \int_x^{\infty} P(x')dx'$

Webs
Preferential linking
Conclusions

- We have studied a huge empirical database accounting for user-Web interactions.
- These data allow us to consider the activity patterns of the whole community.
- Priority queuing and preferential linking play an important role on how users navigate but so does also aging of the contents.
- Open questions …