



Understanding Lostness

Correlates Of Lostness In Web Navigation



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Introduction

Navigating large, complex, web-based collections of pages places a heavy cognitive burden on users; many users experience difficulty in forming the necessary mental models that will allow them to navigate effectively. As a result users often feel "lost."

Fourteen information seeking sessions were conducted using large and complex websites (e.g. Health Canada). Participants expressed feelings of being lost ("I'm not in the right place"). These areas of "subjective lostness" were compared with quantitative measures such as time to complete task, number of pages visited/re-visited, similarity to an optimal path.

This research seeks to understand how mental models of large, complex websites are formed so that we can develop guidelines on how to improve the design of navigation systems for large websites so as to minimize the cognitive load for users.

Methodology

The Web Navigation Study

Context: Question-driven information seeking on government websites. Each participant was given a starting page (a Government of Canada home page or Health Canada home page. In both cases the home page was in English).

Participants: 14 adults (8 males, 6 females)

User task: Find one web page containing information specified in each of ten questions.

Task constraints: Navigate to the result in the same window, without using a search engine.

Sample questions:

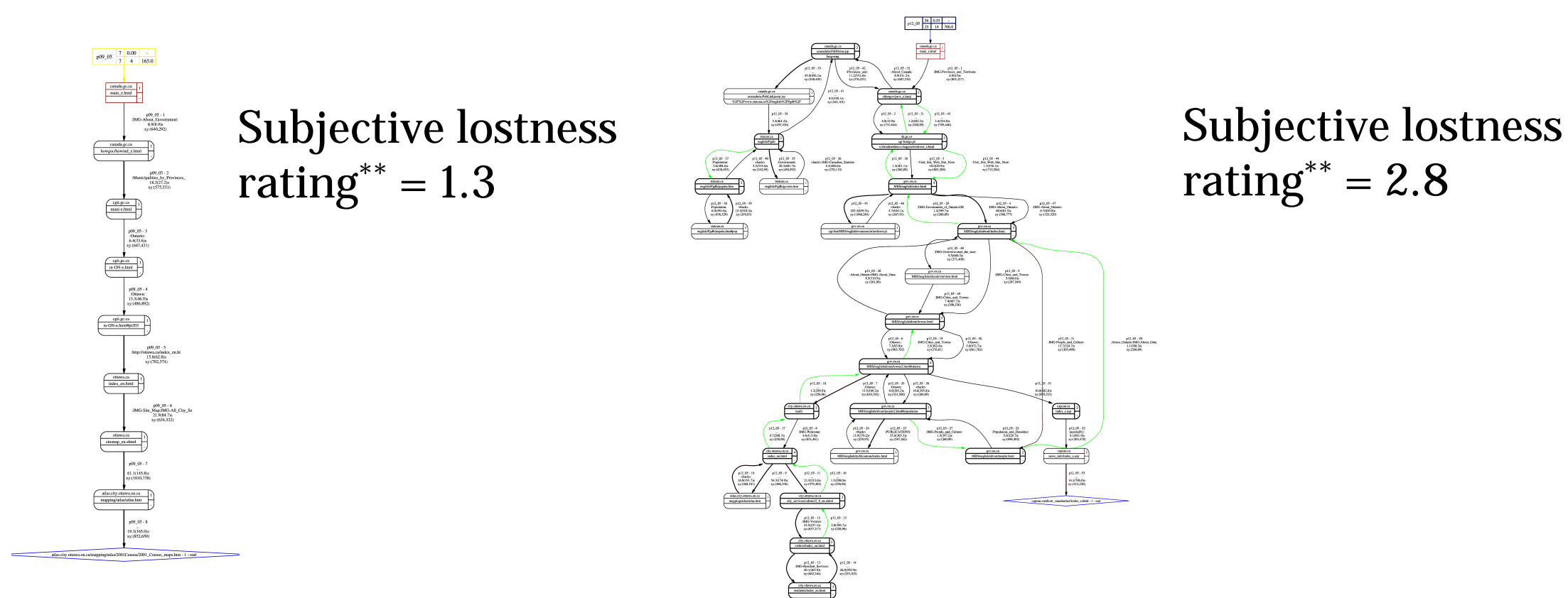
- "Find addresses of passport offices in Ontario"
- "Find a page that describing how to deal with stress for women"

Subjective Evaluation of Lostness

Participants were asked to talk aloud while engaged in the search task—they were asked to report on how well they felt they were doing. Later, a trained human rater watched an audio-video record of the usability session and assessed how lost the participant appeared to be, every 30 seconds. Lostness was rated on a scale: 1-"Definitely Not Lost", 2-"Probably Not Lost", 3-"Probably Lost", 4-"Definitely Lost".

Understanding Lostness

The diagrams below show navigation paths of two users on the same information seeking task. What are the differences between the two paths in terms of user lostness? How is the degree of lostness related to other metrics*?



Other metrics characterizing user navigation paths for the two cases above:

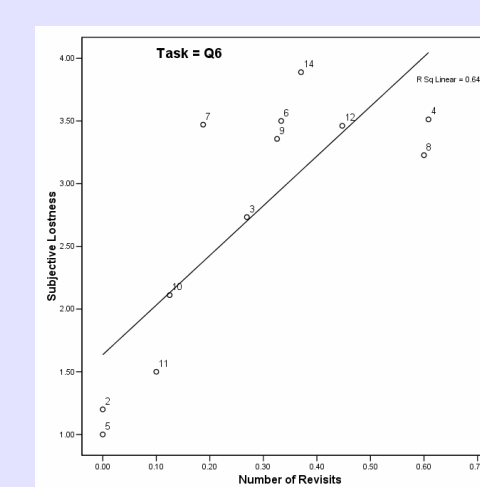
Revisit ratio = 0.00 (none)	Revisit ratio = 0.48
Total time = 165 s	Total time = 706 s
Total nodes = 9; unique nodes = 9	Total nodes = 58; unique nodes = 30
Stratum = 1 (linear graph)	Stratum = 0.18

* For the definitions of the above metrics please see CASCON poster "Quantifying Navigation", Gwizdka et al. 2004
** See description of "Rating Lostness"

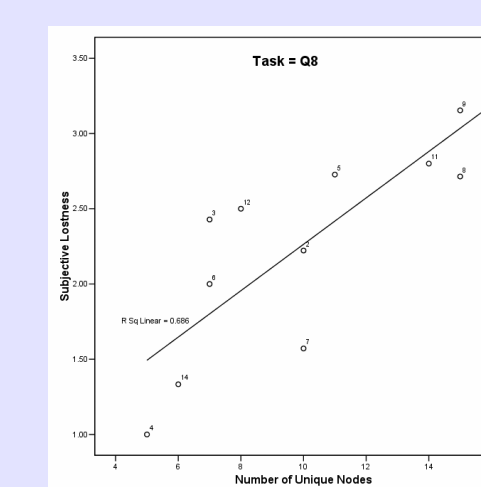
Lostness On Individual Tasks

Predictors of user lostness seem to be task-dependent (the analysis was based on stepwise linear regression). Significant predictors of lostness on seven out of ten tasks were as follows: Q1: Stratum; Q2: Time per click; Q3, Q8: Unique nodes visited; Q6, Q7: Revisits; Q9: Stratum and Total nodes visited.

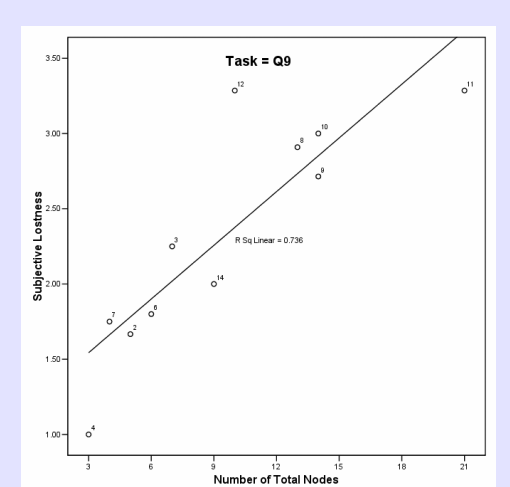
The figures below show three selected relationships between subjective lostness and the measure that predicts it best.



Task Q6: Revisits



Task Q8: Unique nodes visited



Task Q9: Total nodes visited

Summary & Future Work

Summary

Lostness is a multi-dimensional construct that appears to be influenced by, or correlated with, a multitude of factors. This research examined the relationship of lostness to measures based on visited node counts, graph properties (linearity), and similarity to optimal path. Greater lostness was related to a higher number of visited nodes, slow overall performance on a task, longer time per click, higher number of revisits, less linear navigation paths, and lower similarity to the optimal path.

Future Work

The ultimate goal is to find ways of improving website navigation by designing information architectures in a way that will help users find information without feeling lost. Following areas will be further explored:

- Automatically detect when users are lost and provide adaptive interface;
- Examine if individual differences such as level of web familiarity, domain knowledge, gender, verbal ability, etc. influence propensity to feel lost;
- Develop web interfaces that explicitly show the previous navigation paths to support memory since numerous revisits indicate lostness;
- Examine factors that encourage deviation from the optimal or intended path;
- Find similarities between wayfinding tactics and website navigation to tap into large body of existing knowledge in cognitive psychology.

Average Lostness

Average Subjective Lostness (across all tasks) is best predicted (stepwise linear regression) by similarity to the optimal path (as measured by LCS Similarity *).

* see CASCON poster "Quantifying Navigation" Gwizdka et al. 2004

If an existence of an optimal path is not assumed, the subjective lostness is best predicted by the **revisit ratio**.

Correlation with **stratum** and **time**, which appeared as predictors of user lostness in individual task analyses (described in the box above), can also be seen in the aggregate data analysis.

