

WildThumb: A Web Browser Supporting Efficient Task Management on Wide Displays

^{1,2}Shenwei Liu, ¹Keishi Tajima

¹Kyoto University, ²Cornell University

NOTICE: This pdf includes pdf animations that are visible only in full-screen mode of Acrobat Reader.

Background

- Multi-task on Web browsers
 - Web as a universal access of information
 - Web as a platform
 - Web as a social space
- Prevalence of wide displays



Page Switching Problems

- Page identification
- Linear scan of page lists
- Page pointing
 - Fixed position
 - Small size
- Lack of page organization
 - Frequent interruption [Czerwinski, CHI04]



Ineffective Use of Screen Space

- Most Web pages have white margins on wide displays



Our Approach

- Augmented thumbnails
 - Pointing problem
 - Identification problem
- Relevant thumbnails emphasis
 - Linear scan problem
 - Page organization problem



Related Work

- Rooms [Henderson, TOG86]
- Visual Snippets [Teevan, CHI09]
- Scalable Fabric [Robertson, AVI04]
- GroupBar [Smith, OZCHI03]
- Content-Aware Layout [Ishak, CHI07]
- RelAltTab [Oliver, IUI08]
- SWISH [Oliver, IUI06]
- TaskTracer [Dragunov, IUI05]
- Clipping Lists [Matthews, CHI06]
- Web page “caricatures” [Wynblatt, ICMCS98]

Ordinary Thumbnail

- Pros
 - Easy to recognize
 - Easy to point at
- Cons
 - Ineffective for pages fraught with text
 - Less recognizable if pages are scrolled to less distinctive parts



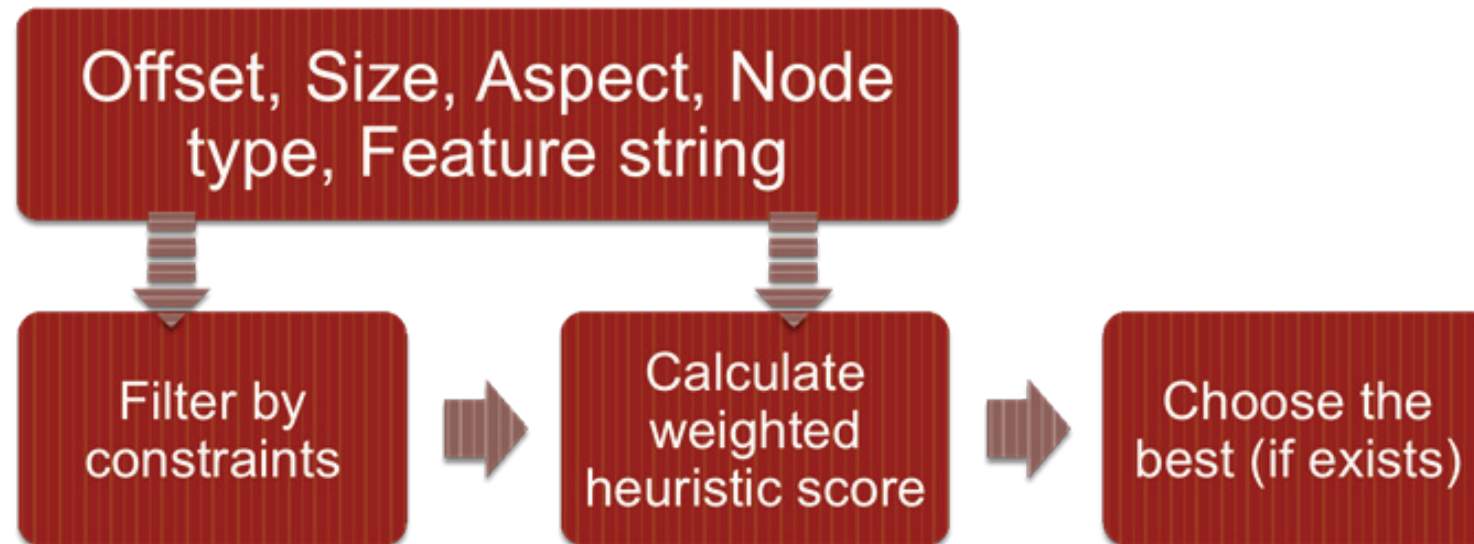
Augmented Thumbnail

- Overlay logos and featured images
- Advantageous situations:
 - Logo: same subject, different websites
 - Featured image: different subjects, same website



Heuristic Extraction

- Method
 - Utilize both static HTML attributes and rendered attributes



- Results

	Logo	Featured Image
Total	62	62
Accuracy	83%	76%

(Note: we used top 100 traffic-based ranking from Alexa.com as test sample.)

Emphasizing Relevant Thumbnails

- Benefits of multiple virtual workspace
 - Page organization
 - Resumption of tasks
- Automatic page organization
 - Eliminate manual management overhead
 - One-to-many relationship for pages and tasks



Estimation of Inter-Page Relevance

- Apply Markov model to switching history
- Apply sliding window to history
- Bonus score
 - Referrer page and linked page
 - Recent two or three switched pages

Two Modes for Emphasis

- Dynamic-size mode
- Dynamic-opacity mode

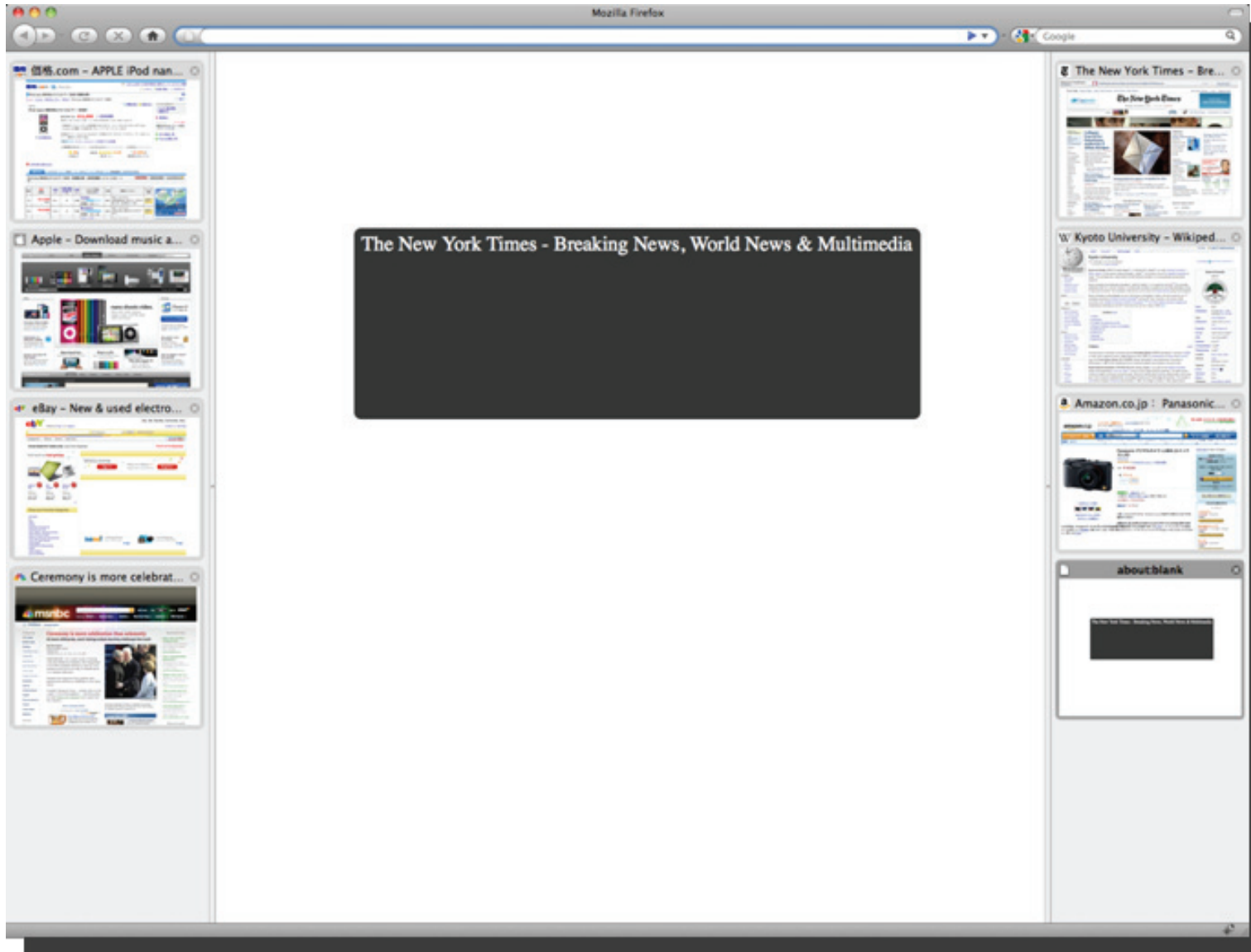
=> Relieve linear scan problem



User Study

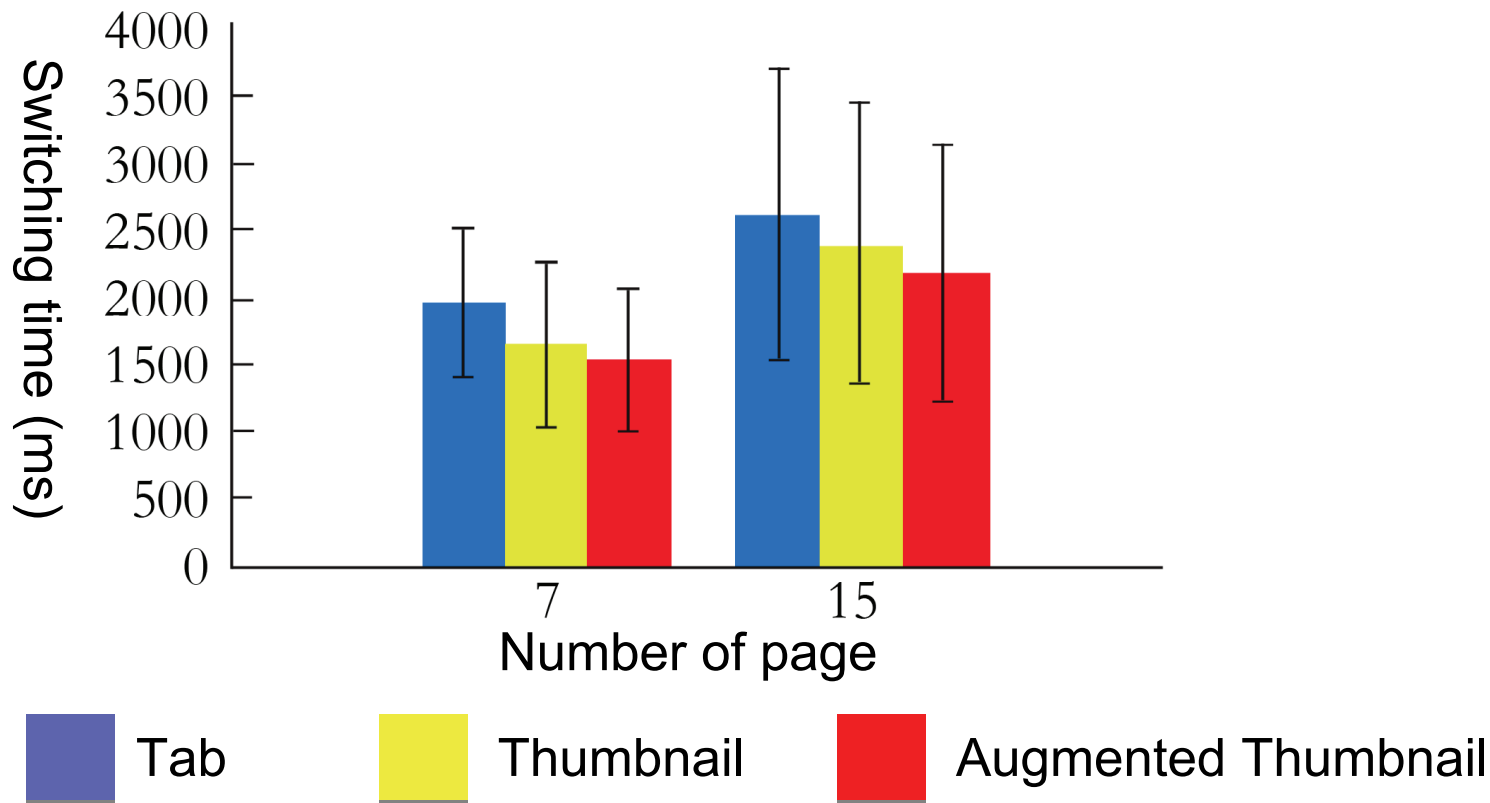
- Task
 - Switch to randomly presented pages
- Test conditions
 - Tab, thumbnail, augmented thumbnail
 - 7 pages & 15 pages
 - For 7 pages, we expect users to remember positions of all thumbnails
- Measurement
 - Page switching time
- Participants
 - Eight males, one female

User Study (Continued)



User Study Results

- Switching time
 - Augmented Thumbnail < Thumbnail < Tab
- Further discussion
 - Augmented thumbnail are the most efficient even when participants remember all thumbnail positions



Semi-structured Interview

- Usage scenario
 - Multi-task with interruption
- Results
 - (+) Augmented thumbnails were favored
 - (-) Problems with dynamic-opacity mode
 - (-) Position changes in dynamic-size mode disfavored
- Going deeper
 - Importance of spatial memory

Future Work

- Improve extraction with machine learning
- Hybrid relevance estimation
 - Content-based relevance
 - History-based relevance
- New emphasis interface
 - Leverage spatial memory

Contributions

- Augmented Thumbnail
- Automatic task management by emphasis
 - Two emphasis modes
- Effectiveness confirmed by user study

Thank you!

- Question?
- Acknowledgement
 - Anonymous reviewers and participants
- Contact info:
 - Name: Shenwei Liu
 - Email: sl2277@cornell.edu