Web Montage: A Dynamic, Personalized Start Page

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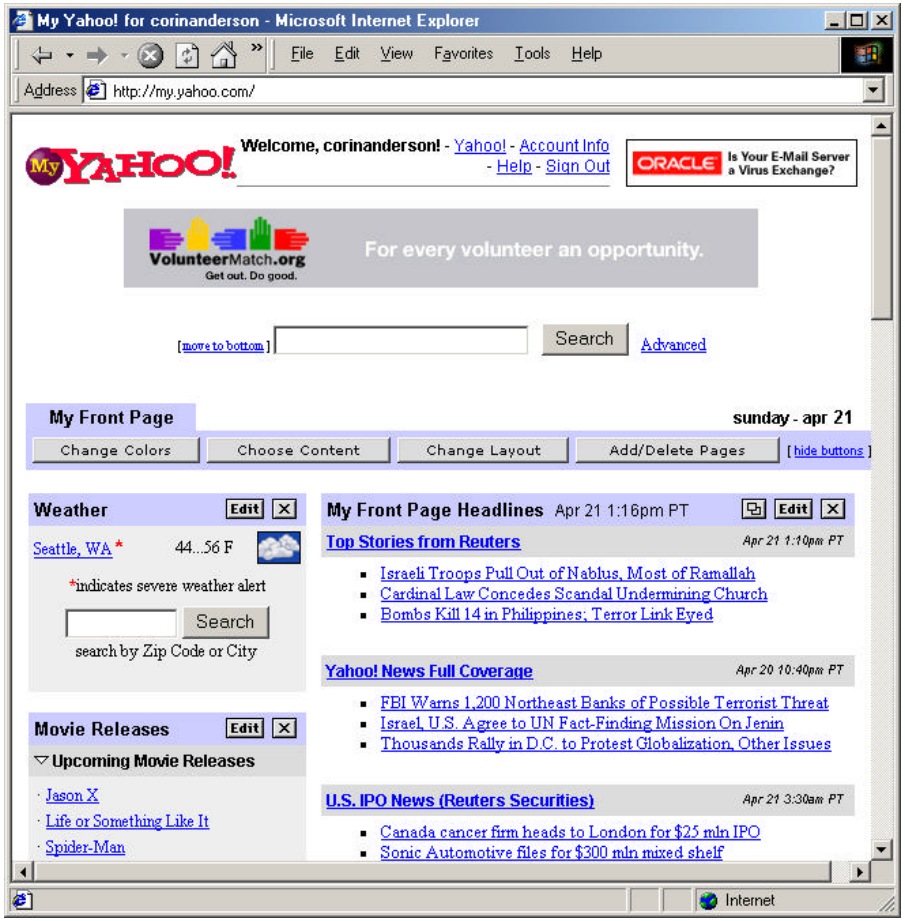
Today's personalized portals

- Make routine tasks easier
- Users configure and maintain
- Content biased by sponsor site
- Display insensitive to browsing context



Our conjectures

1. Users want one-click access to routine destinations

2. Conditioning on browsing context will increase the value of personalization

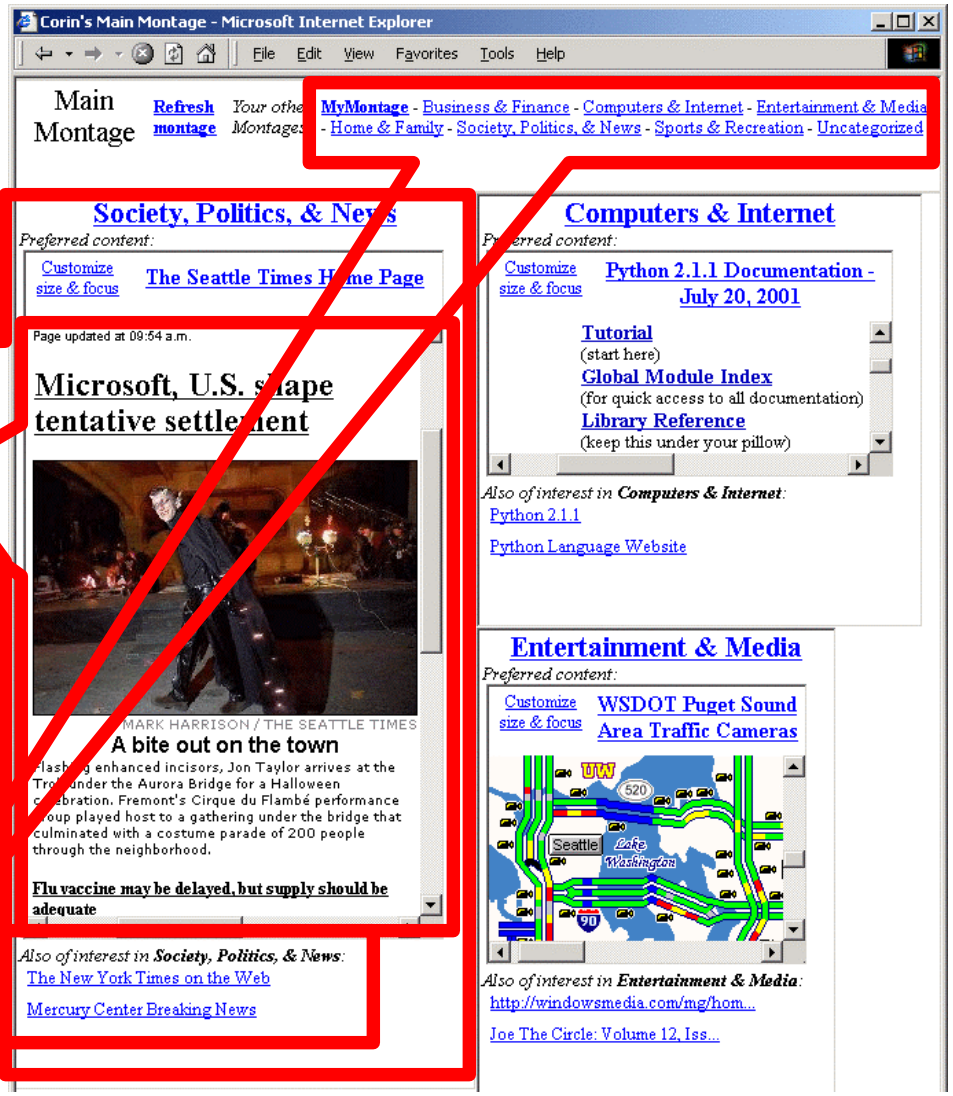
3. Past web access patterns can predict future browsing destinations

The Web Montage system

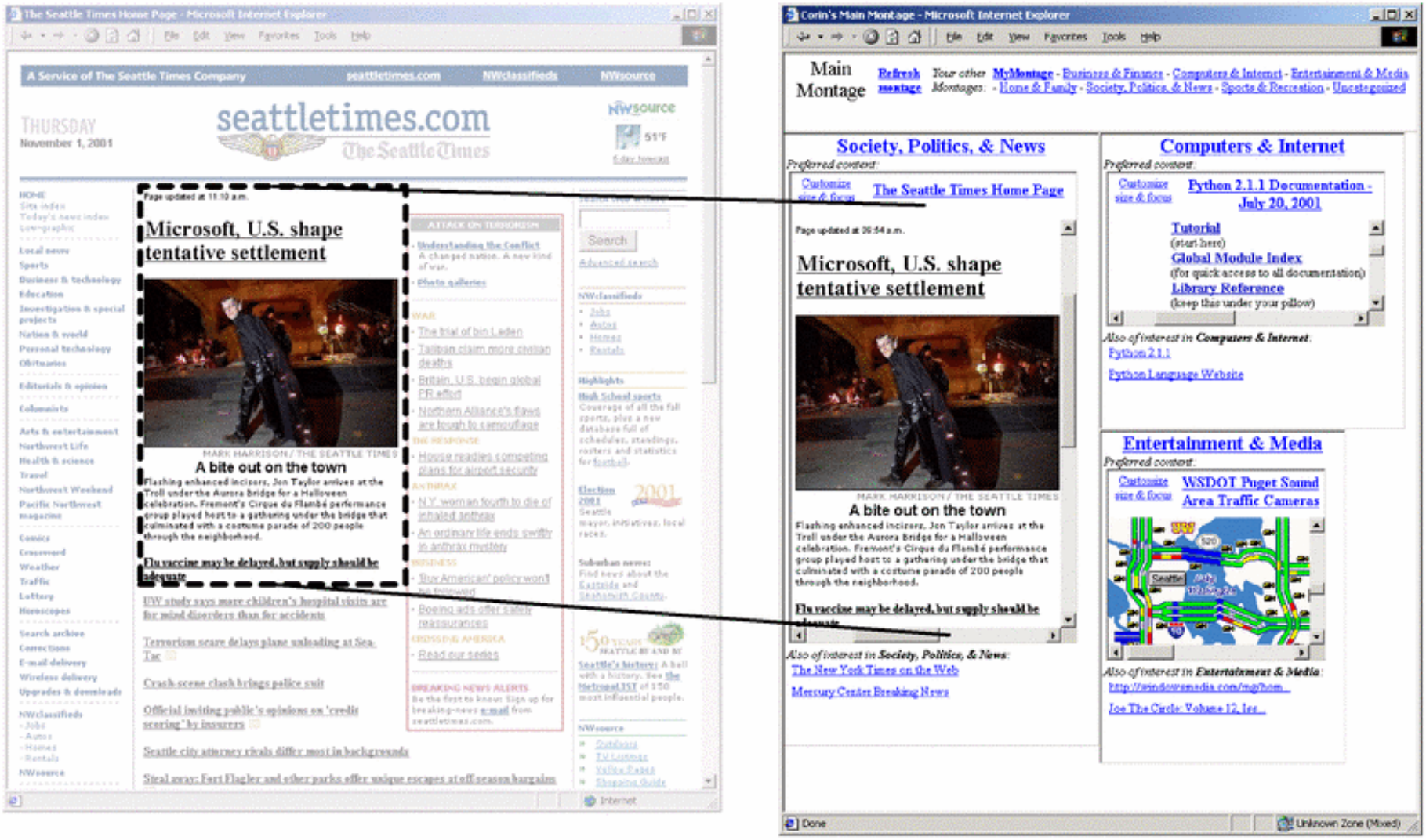
- Builds dynamic, personalized portals
- Embeds and links to content from many sites
  - Builds montages of information
- Montages are dynamic, depend on user's browsing context

A web montage

- Groups by topic
- Embeds content from many sites in content lenses
- Links to other content
- Links to topic-specific montages



Content lenses



Links-only montage

- Display only links
  - No content lenses
- Only one montage
  - No topic-specific pages
- Loads quickly
- Displays more links

The Montage system

- Two-step approach
  - Step 1: model the user
  - Step 2: assemble the montage

- Condition the personalized portal on the *context* of web browsing
  - Time/date of session
  - Topic of recent browsing

Step 1: model the user

- User directs browsing through a proxy
- Montage collects context of each request
  - Topics are drawn from Open Directory
    - Computers & Internet ; Sports & Recreation ; etc.
  - Topics are assigned using content classifier

- Learns 5 aspects about the user…

User model: candidate pages

1. Candidate pages to include on montage
   - Can't consider all pages on web
   - Can't consider all pages ever viewed

   - Consider pages that have been revisited

User model: interest

2. User interest in page
   - Would the user want to return to this page?
   - We use:
     - Links followed from page
     - Time spent in sessions starting w/ page
3. User interest in topic
   - Which topics to display in Main Montage?
   - Sum of interest in pages belonging to topic

User model: navigation savings

4. Probability of revisiting page

$$\Pr(p) = \frac{\text{\# sessions containing } p}{\text{\# sessions total}}$$

5. Savings possible
   - How many steps would a link on the montage save?

Step 2: assembling the montage

- Collect the context of the current session
- Estimate expected utility of pages & topics

$$E[U(p)] = Pr(p \mid C)\ (I(p) \times S(p))$$

- Pack content and links into window
  - Fill exactly one browser window – no scrolling
  - Knapsack packing problem

A Montage user study

- Tested for two variables
  - Model: Complex vs. simple
    - Simple model: suggest most frequented links
  - View: Links-only vs. embedded-content
- Three study groups of 6 people each
- Each group saw complex/embedded and
  - Simple / links-only
  - Complex / links-only
  - Simple / embedded-content

Study procedure

- Users directed all browsing through proxy
- Users set montage as their start page
  - Users rate opinion of montage each visit

- First 7 days: collect data exclusively
- Next 4 days: we present first view
- Next 4 days: we present second view
  - Models rebuilt nightly; montages hourly

Scores for Montage styles

Model	Score
Simple	2.64
Complex	3.79

View	Score
Links-only	4.40
Embedded-content	2.98

1 = Not pleased
7 = Very pleased

- Complex model best
  - Context-sensitive & expected utility
- Links-only is preferred view

Lessons learned (1 of 3)

- *Users want one-click info access*
  - Users appreciated automatic display of links
  - But links-only (two clicks) preferred over embedded-content (one click)
- Montage load time important
  - Portal/home page must load quickly
- Variety in displayed content better
  - More links displayed on links-only montage

Lessons learned (2 of 3)

- *Context enhances personalization*
  - Complex model preferred over simple

- What context is best?
  - Time/date & topic of recent browsing
  - Other applications running on computer
  - User demographics

Lessons learned (3 of 3)

- *Past accesses predict future browsing*
  - Montage often displayed appropriate content
- Longer-lived history would help
  - Many revisited pages too infrequent in study
- Collaborative filtering would, too
  - Montage could display content other, similar users have viewed recently

Related work

- Personalized portals
  - MyOwnWeb [Anupam, et. al., 1999]
  - Web Object-Oriented Desktop [Chan, 2001]
- Automated bookmark systems
  - PowerBookmarks [Li, et. al., 1999]
  - Bookmark Organizer [Maarek & Ben-Shaul, 1996]

Summary

- Montage improves routine web browsing
- Montage follows two-step approach
  - Learns context-based user model
  - Builds dynamic, personalized web portals
- Study results show Montage strengths & suggest future research

Future work

- More user control over utility evaluation
  - User sets trade-offs in utility model
- Dynamic topic leveling
  - More detail only in topics of interest
- Mixed-initiative montage
  - User can directly add & delete candidates
  - Montage automatically selects best candidates and formats page