Flexible Browsing and Searching within Personal Photo Collections

Zwischenbericht Diplomarbeit

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Agenda

1. Task
2. Related Work
3. Concept Development
4. Current State
5. What’s Next?
Task

- A user might always change his mind during searching/browsing. The search goal can be very vague.
  - --> A flexible user interface is necessary.

- Most users do not want to learn how to use a complex interface
  - --> A self-explanatory interface is necessary.

- Many users do not tag their images, but content-based analysis is not mature enough
  - --> Automate as much as possible (e.g. event clustering).
  - --> Let the user tag in a casual way (where it is necessary).

- Almost every available photo browser relies on the same (grid) layout
  - --> Explore different layout and interaction styles.

- Photographs are an emotion-laden subject
  - --> Playful interaction might be suitable.
Related Work

- Non-standard photo browsers:
  - PhotoMesa[1]: ZIB, for browsing collections with several thousand images.
  - Chronological order of photographs is not necessarily retained.
Related Work

- PhotoArcs[2]: create photo narratives to share with others
Related Work

- TimeQuilt[3]: make maximum use of screen real estate while retaining chronological ordering
Related Work

Automatically generating image clusters:

- Based on photo capture times, detect bursts of images and group these into clusters
- Many different algorithms available using:
  - Only capture time [4].
  - Capture time and GPS-data [5].
  - Capture time and visual similarity measures [6].
Concept Development

Initial idea:

- Create a playful interface for browsing personal photo collections.
- Provide suggestions for related images, in order to find “hidden treasures”.
- Create a roadmap, showing the way a user took through his collection.
- Break down the potentially huge photo collection into easily manageable clusters.

Three concepts were developed:

- Photo Bubbles with roadmap view.
- Tree Structure Browser.
- Photo Magnets metaphor.

Conduct a paper prototype evaluation of the concepts.

Refine the concepts based on the findings from the study and test them again.
Concept Development Photo Bubbles

- Lines connect the bubbles, acting as a kind of browsing history.
- Selecting an image shows suggestions for related images.
Concept Development: Tree Structure

Browser

- Similar interaction concept as in Photo Bubbles, but with a more traditional layout.
- Instead of the roadmap view, the browsing history is located in a separate panel.
Concept Development

Photo Bubbles vs Tree Structure Browser

- Photo Bubbles Issues:
  - The layout was considered visually pleasing.
  - Connecting lines were confusing for some users if the connected events were not related logically.
  - About 60% of users preferred to have the browsing history in a separate panel.

- Tree Structure Browser:
  - The layout was considered more structured than in Photo Bubbles.
  - The browsing history view was considered very useful.
  - No serious issues were detected.

- All users liked the idea of showing related images in both concepts.
Concept Development
Refining Photo Bubbles

Based on the findings of the first set of user tests the Photo Bubbles concept was refined.

The roadmap view was discarded. Instead a separate panel was used for the browsing history.

Dragging events from the timeline to the main view was added, in addition to just clicking.

Sub-events can now be collapsed and expanded in order to focus on single events.

Survey Results before refinement (N=8):

<table>
<thead>
<tr>
<th>Ease of use</th>
<th>Like the concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photo Bubbles</td>
<td>3,38</td>
</tr>
<tr>
<td>Tree Structure B</td>
<td>4,38</td>
</tr>
</tbody>
</table>

Survey results after refinement (N=9):

<table>
<thead>
<tr>
<th>Ease of use</th>
<th>Like the concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Photo Bubbles</td>
<td>4,22</td>
</tr>
<tr>
<td>Tree Structure B</td>
<td>4,67</td>
</tr>
</tbody>
</table>
Concept Development

Photo Magnets

- Refining the concept:
  - Magnets can be dragged over the timeline in order to select images from events.
  - Snapshot Browser added.
  - Default magnet layouts are provided, to give the user a starting point.
## Concept Development

### Overall Results

<table>
<thead>
<tr>
<th>Layout Type</th>
<th>Ease of Use</th>
<th>Like the Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circular layout</td>
<td>3.38</td>
<td>2.88</td>
</tr>
<tr>
<td>Hierarchical layout</td>
<td>4.38</td>
<td>3.63</td>
</tr>
<tr>
<td>Magnet metaphor</td>
<td>2.75</td>
<td>3.38</td>
</tr>
</tbody>
</table>

### Results from the first set of the study:

<table>
<thead>
<tr>
<th>Layout Type</th>
<th>Ease of Use</th>
<th>Like the Concept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circular layout</td>
<td>4.22</td>
<td>3.44</td>
</tr>
<tr>
<td>Hierarchical layout</td>
<td>4.67</td>
<td>2.78</td>
</tr>
<tr>
<td>Magnet metaphor</td>
<td>3.89</td>
<td>4.67</td>
</tr>
</tbody>
</table>
General implications from the study

- More than 50% of the users used the Windows Explorer for photo browsing.
  - None of these users missed more sophisticated features.
- Almost 90% of users organize their images in a folder structure by events.
- About 2/3 of users change events during browsing at least sometimes.
- About 40% of users want to have an overview of their complete collection (grid).
- 60% of users think having statistics on their collection might be a nice feature.
Current State

Automatic event clustering and manual refinement of these clusters: finished
Current State

Timeline view: currently being developed
What's next?

- Conduct another paper prototype study with professional photographers to find out if their requirements differ from those of amateur users.
- Implementation.
- Conduct an evaluation of the three concepts in comparison to an existing system.
Literature List

[1] B. B. Bederson, PhotoMesa: A Zoomable Image Browser Using Quantum Treemaps and Bubblemaps


[3] D. Huynh, et. al., TimeQuilt: Scaling Up Zoomable Photo Browsers For Large, Unstructured Photo Collections

