TiDi Browser: A Novel Photo Browsing Technique for Mobile Devices

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Outline

- Motivation
- Related Work
- TiDi Browser
- Prototype Architecture
- Conclusion
Motivation

- **New technologies:**
  - Digital photo technology: large personal photo libraries
  - Photos tagged with temporal information
  - Photos tagged with spatial information (GPS devices mounted or integrated into photo devices, geolocation tagging via maps)

- **Mobile devices:**
  - Take photos any time and any place!!!
  - UMTS, WLAN, etc. provide access any time and any place!!!
  - *Browse photos any time and any place???
Related Work

- Support for organizing personal photo libraries:
  - Google’s Picasa
  - ACDSee
  - Many more…

- Support for browsing photos:
  - PhotoFinder
  - PhotoMesa
  - Many more…
Related Work

- Photo browsing software focuses on desktop machines
- Mobile devices provide only standard software to view photos
- Recent mobile devices though have capabilities to serve as mobile photo browsers
- Take care of restrictions in mobile scenarios
Basic idea: Utilize meta information stored in digital photos to drive photo browsing on mobile devices

Literature and available desktop applications advise us to use time as basis for image browsing

Visualize spatial and temporal information to support mental map of personal photo library
TiDi Browser

- Considering photo taking behavior is the key to efficient photo browsing
- Time is important, visual patterns support mental map
- Many photos indicate personal events
TiDi Browser

- Components
  - Detail view
  - Info view
  - Thumbnail view
  - Photo distance plot
  - Photo frequency plot
TiDi Browser Components

- **Detail view**
  - Photo in detail
  - Can be expanded to display size

- **Thumbnail view**
  - Provides preview of temporal context
  - Control component to navigate in time
  - Animation when traveling in time

- **Info view**
  - Textual output of meta information
  - Intended to use for annotation and tagging of photo
TiDi Browser Components

Time plots visualize meta information over time

- Photo frequency view
  - Number of photos taken per day
  - Events can be easily found

- Photo distance view
  - Average distance (from home base or current location) of photos taken per day
    (2D or 3D spatial information difficult to show on small display; Idea: Reduce 2D information to 1D distance information)
  - Larger distances indicate events like vacation or business trip

- Both views serve as control components to allow for direct navigation in time to first photo of selected day

- TiDi Browser: Time-Distance-Browser
TiDi Browser

- Interaction:
  - Navigation in time
  - Zooming in time
  - Expansion of detail view
  - Dragging / tapping thumbnail view
Architecture

- Only small number of photos on mobile device → TiDi Browser as stand-alone application arguable
- Large number of photos in personal photo library → Client-server-architecture for mobile photo browsing
- Architecture must consider limitations of mobile devices
Architecture

**Mobile Client**

- *Photo manager*
  - Photo cache
  - Pre-fetching

- *TiDi Browser*
  - Photo browsing
  - Thumbnail creation

**Server**

- *WWW server with PHP*
  - Index creation and caching
  - Device dependent photo scaling

- *Personal photo library*
  - Full resolution photos
Technical Details

- TiDi Browser:
  - .Net Compact Framework 2.0

- Server:
  - Apache Web Server 2.2
  - PHP 5.2

- Hardware:
  - Pocket Loox 720
  - 520 MHz, 128 MB RAM
  - 480x640x16bit display
  - Bluetooth, WLAN
Summary

- Novel photo browsing brought to mobile devices
- Visualization of spatial and temporal meta information supports detection of personal events and helps in developing and maintaining mental map of photo library
- Photo browsing any time and any place!!!
Future Work

- Integration of advanced presentation techniques for large photos (detail view)
  - Overview+detail
  - Focus+context (Fisheye view)
- Annotation and tagging of photos
  - Facilitate remote organization of photo library
  - Requires extension of TiDi Browser and client-server architecture