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

TiDi Browser

- 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
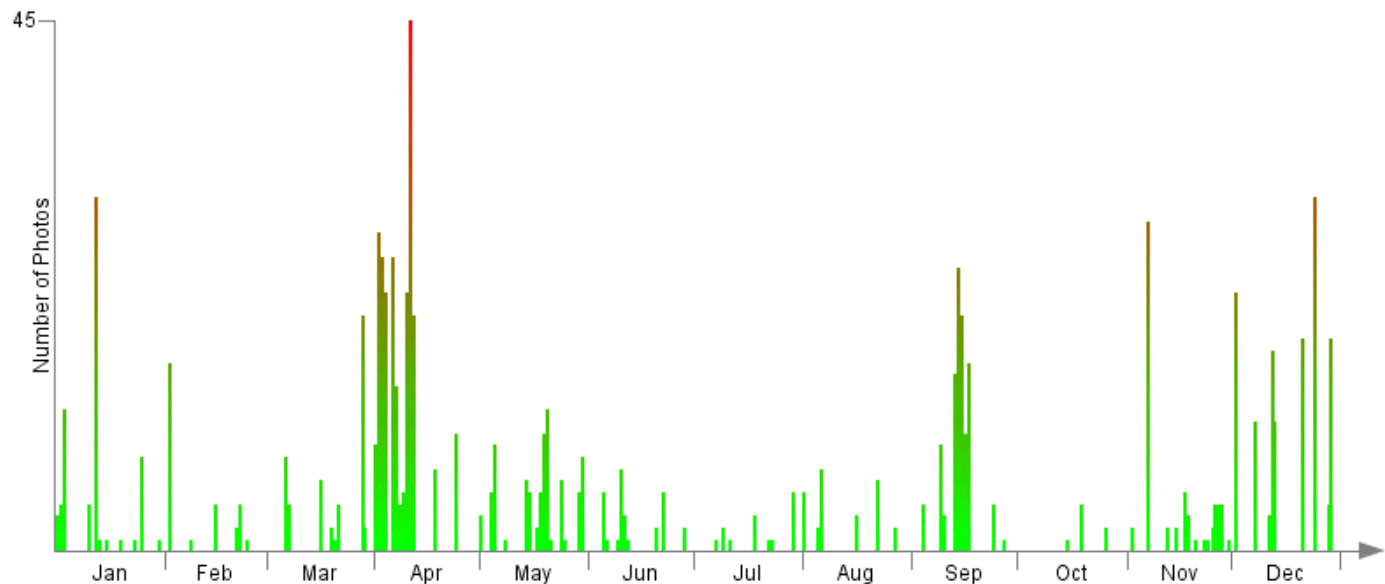
TiDi Browser

- **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
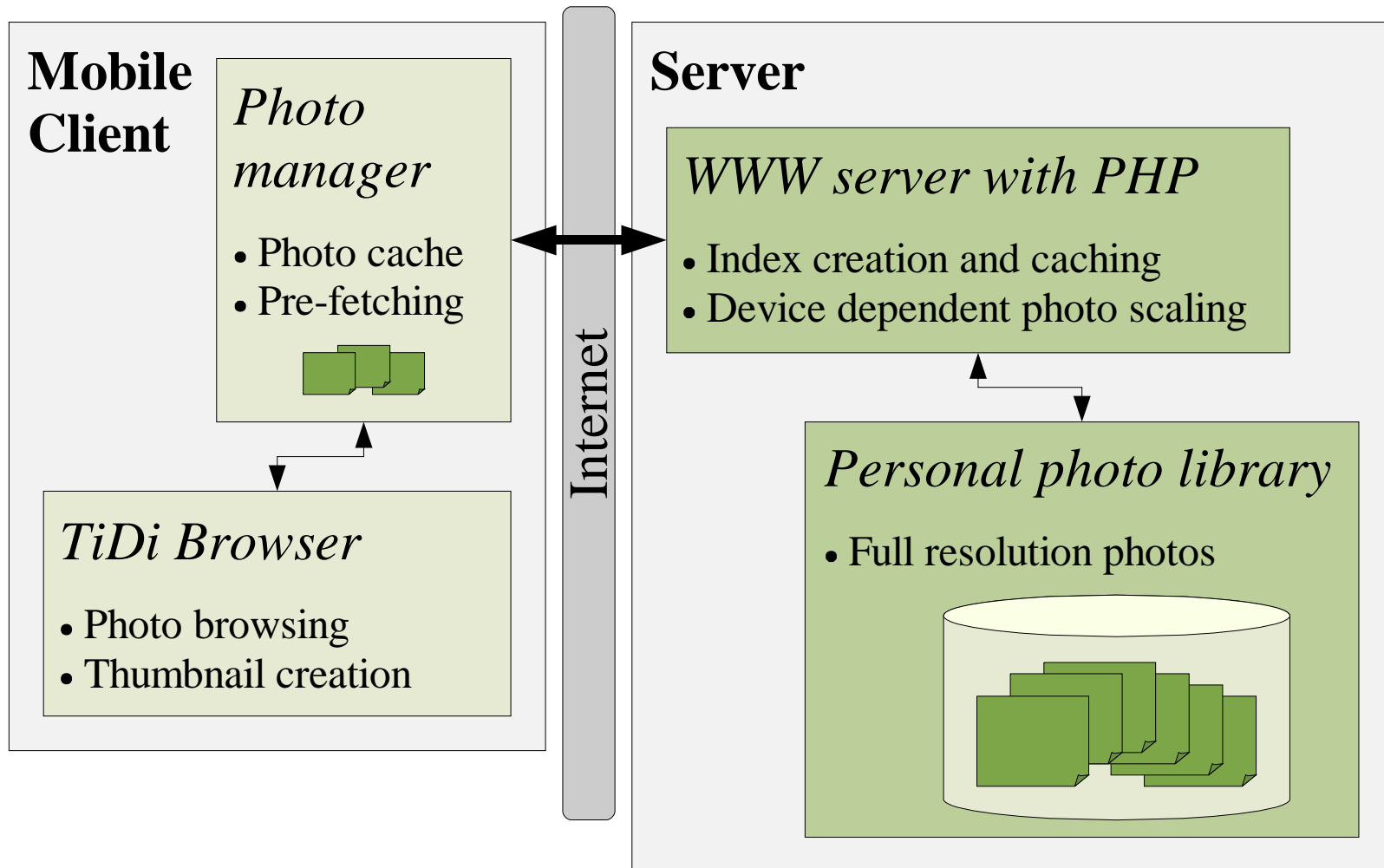- TiDi Browser: Time-Distance-Browser

TiDi Browser

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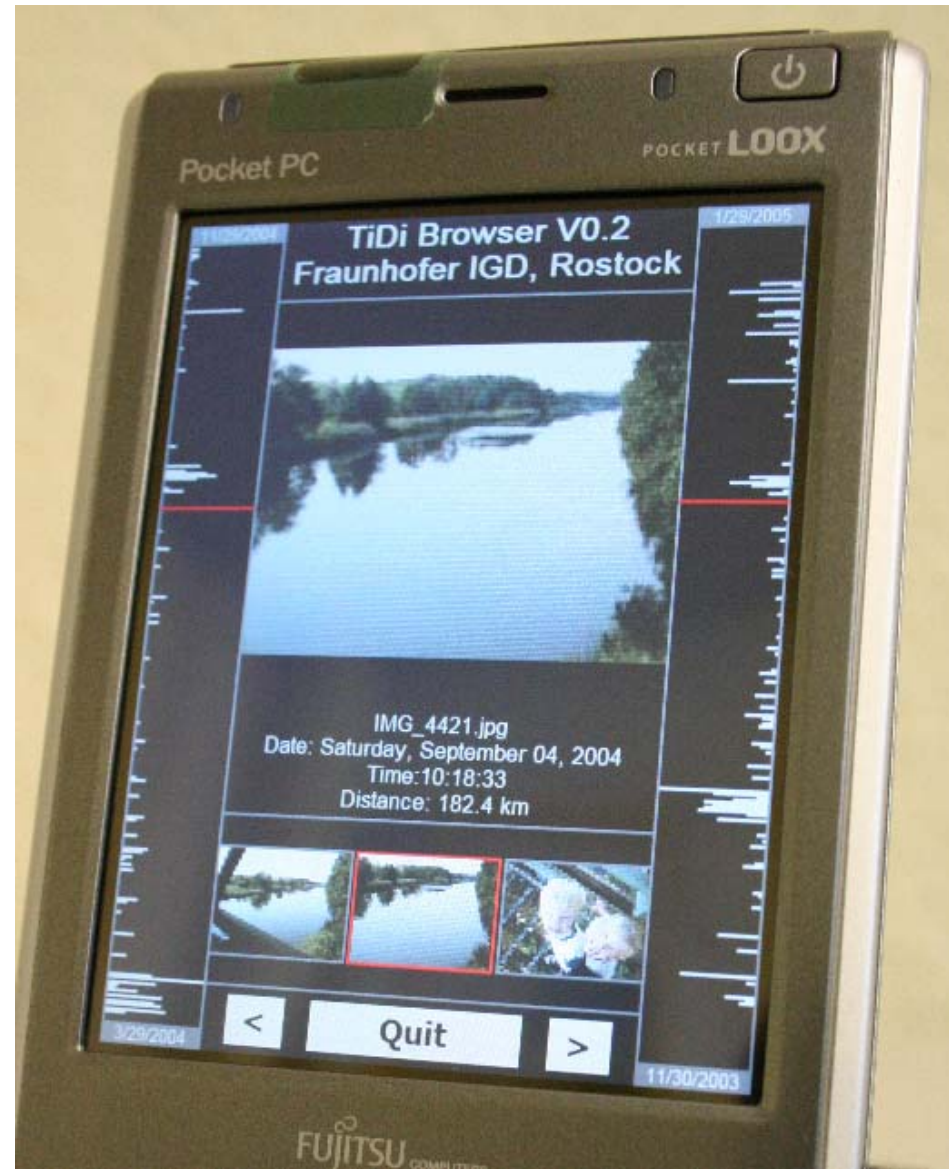
Architecture

- 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

Internet

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