LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

LFE Medieninformatik • Christian Köpke

Abschlussvortrag Diplomarbeit

Neighbor Explorer: Visualization of Neighbor Recommendations in Last.fm

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4. Mai 2010

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Outline

- Motivation
- Related work
- Concept Development
- Preliminary test and Online survey
- Neighbor Explorer
- Implementation
- Evaluation
- Conclusion and Future Work

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Motivation(1)

- Online recommender systems
  - Make recommendations bases on users‘ preferences
  - Users normally can‘t influence the recommendation process
- Visualization of recommendation history
  - Improves self-reflection
  - Facilitates discovery of new items
  - Helps to gain additional insights
- Interaction enhances active exploration

Visualization of Neighbor Recommendations in Last.fm

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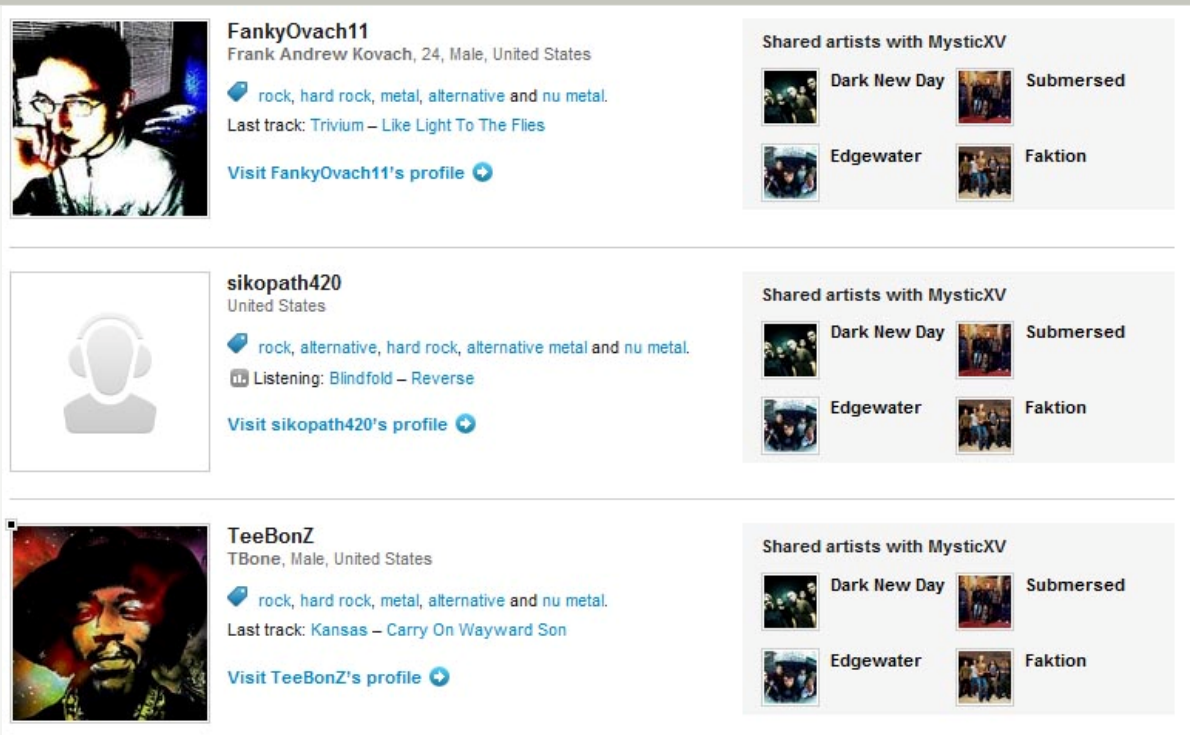
Motivation(2)

In Last.fm:

- List of neighbors calculated weekly
- Short-term musical taste is unstable

  →better to have neighbors with long-term similarity



Neighbor list in Last.fm

Musical compatability („Taste-o-meter“)

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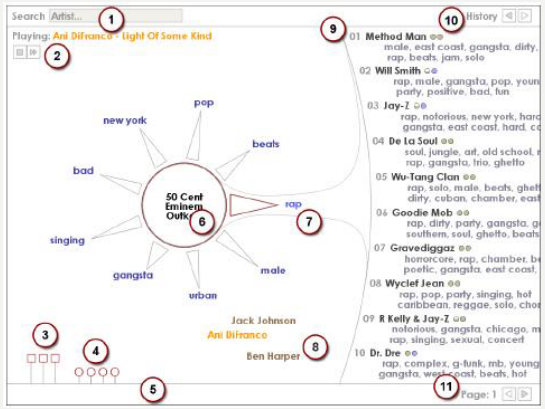
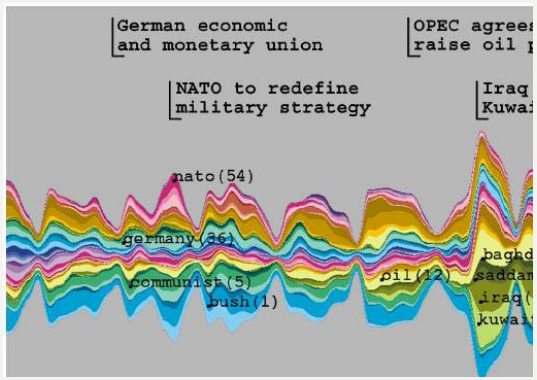
Related work

- Recommender systems [3,5]
  - Metrics: Transparency, Multi-dimensionality, Privacy, User feedback, Efficiency, Recommendation accuracy vs. diversity
- Visualization
  - Music Collections (e.g. MusicSun)
  - Temporal Visualizations (e.g. Theme River)
  - Network Visualizations (e.g. Vizster [2])



MusicSun [4]



ThemeRiver [1]

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Concept development

- Main considerations:
  - Extensibility (finding new neighbors/new music)
  - Social aspect
  - Understandability (does the user understand why neighbors were recommended?)
- Four initial concepts were created

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Preliminary Test

- Discussion with four participants (age between 22 and 27, Students and PhD Students, technical background) about
  - Last.fm experience
  - Evaluation of concepts
- Results
  - Neighbor feature is helpful to find new music
  - Network concepts were highly appreciated
  - Suggestions:
    - User profile for all concepts
    - Display artists

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Online survey

- 56 participants (22 female, 34 male) with different background
- Questionnaire about:
  - Last.fm experience
  - Evaluation of the concepts
- Results
  - Network concept was preferred
  - The results of the preliminary test were confirmed, e.g.
    - Finding new music was most important
    - Overall taste as basis for recommendations

Visualization of Neighbor Recommendations in Last.fm

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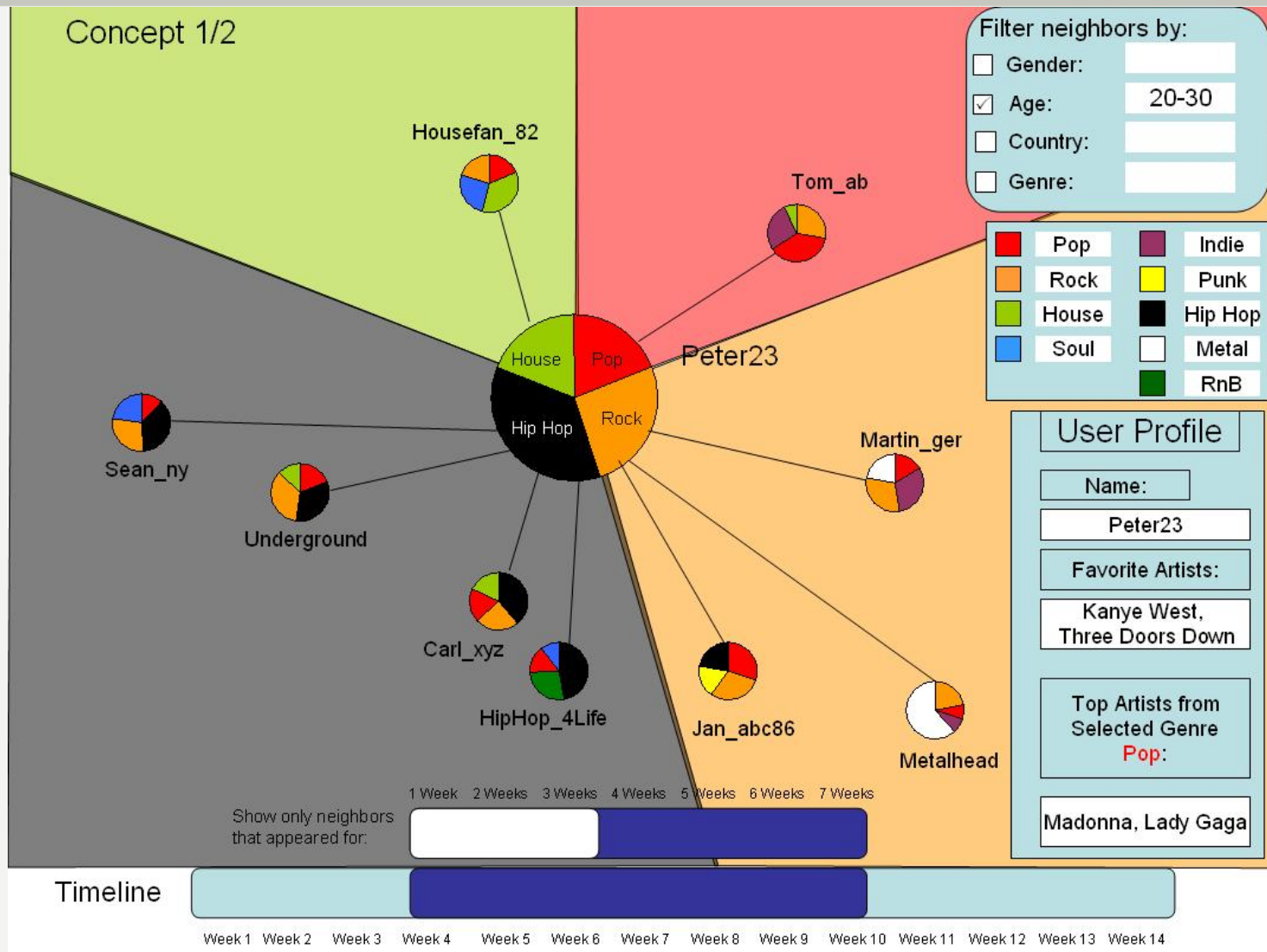
Final concept:

- Combining network ideas (overview & detail)
- User profile
- Genre sectors
- Filter



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Neighbor Explorer-demo

- No pie charts in the graph (would take too much space)
- One dynamic slider instead of two
  → A flexible time period can be selected
- Instead of coloured background, neighbors colored according to their most popular genre
- Enhanced user profile with information from Last.fm profiles, genre pie chart and artist list

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Implementation

- Java, Prefuse (prefuse.org)
- 3 Phases:
  - Data collection (neighbors, personal and musical information)
  - Preparing graph-relevant data
  - Implementation of the visualization

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Data collection

- Downloaded using the Last.fm API and a Last.fm Java Plugin:
  - Neighbor lists (every week)
  - Musical charts
  - Personal information (from the Last.fm user profile)
- Stored in XML format for easy access and transformations

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Generation of graph-relevant data

- Neighbor lists were aggregated in a tree format
  →GraphML file for generation of the graph
- Musical charts were used for computation of musical genre distribution and artist lists

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Implementation of the visualization

- Visualization created with Java and the Prefuse framework
- Interaction with the graph and the filters possible
  →Using Prefuse actions
- When dragging the time slider, new colors and positions for the nodes are calculated

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Evaluation

- 8 Last.fm users (2 females, 6 males), age 20-34 years, students with technical background and employees
- Procedure:
  - Questions about
    - Last.fm experience
    - Network visualizations
  - Interview: 8 tasks (each task for main tree and subtree):
    - Find 3 most similar neighbors
    - Find 3 shared artists
    - Does the genre distribution of the neighbors correspond to the distribution of the central node?
    - Time slider: which changes over time?
  - Post-discussion

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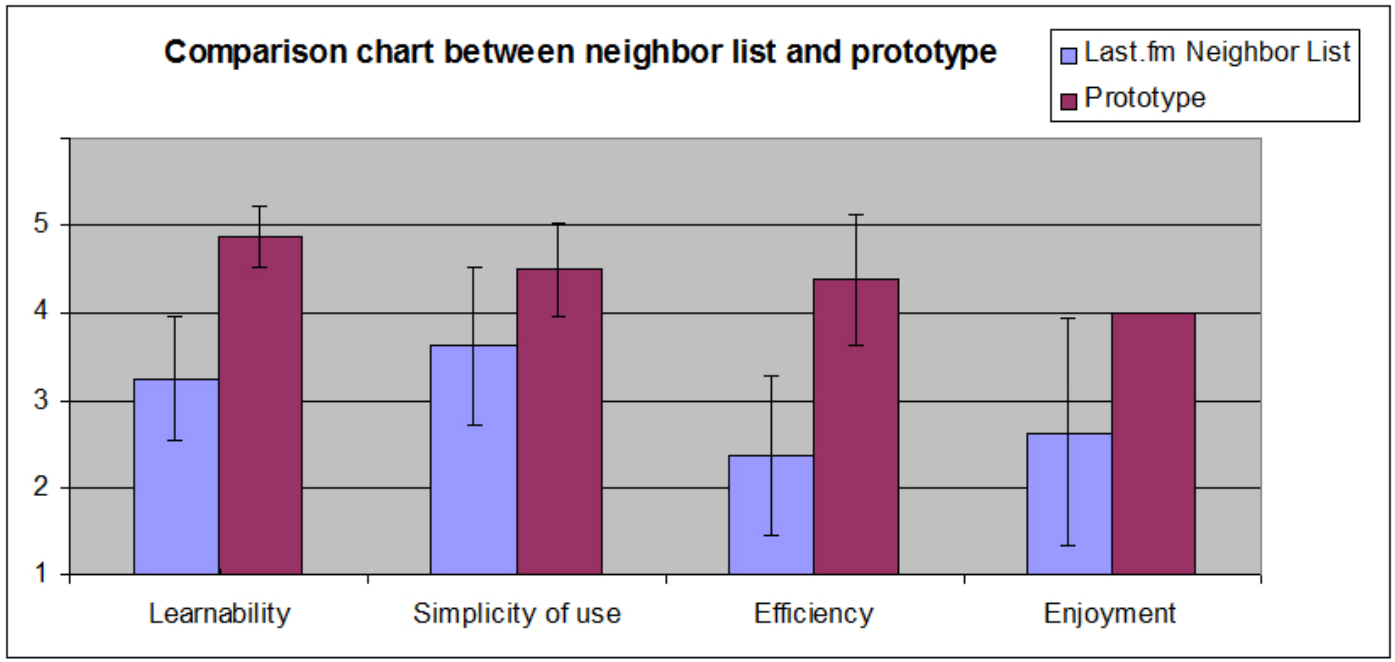
Results (1):

- Participants liked to have recommendations based on their whole listening period
- Most important task of Last.fm neighbor feature: find new music
- Participants not very experienced with network visualizations
- Neighbor Explorer was rated higher in all categories (compared to Last.fm)



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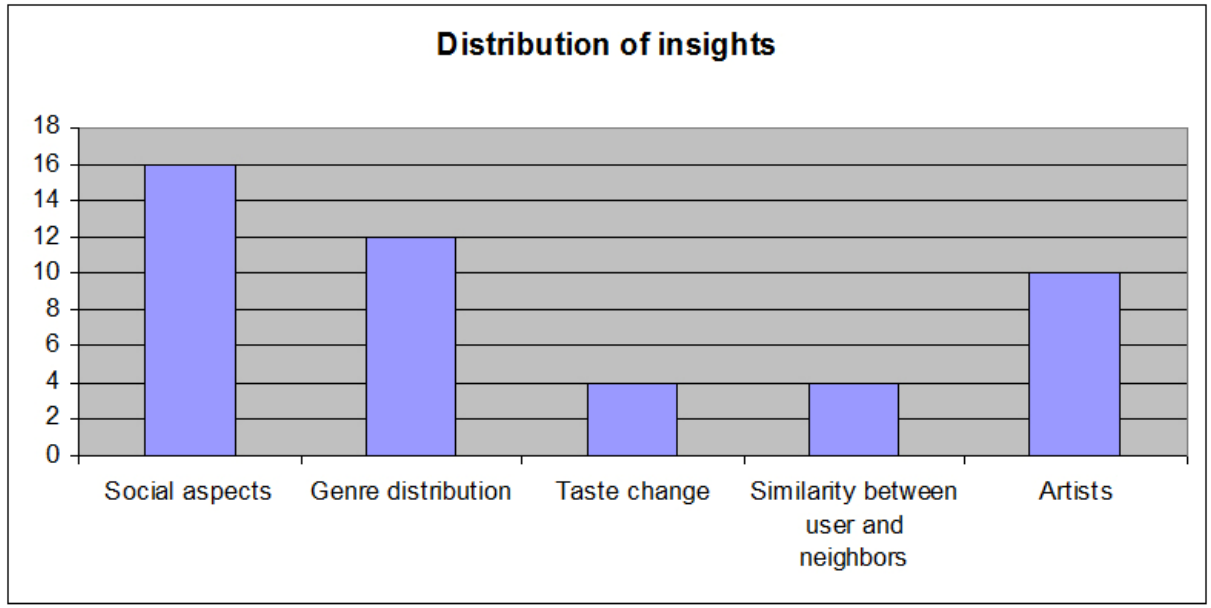
Results (2):

- Most important insights:
  - Social aspects
  - genre distribution
  - artists

→ Users explored social aspects with the help of new functions in the Neighbor Explorer



- Improvement
  - Displaying playcount for neighbors and artists
  - Efficient way to find new music

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Conclusion and Future Work

- The browsing experience can be enhanced with an interactive visualization
- Temporal dimension is valuable
  - changes over time
  - long-term effects
- General problems with network visualizations:
  - Large number of nodes
  - Subgraphs

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References

- [1] Havre et. al.: ThemeRiver: Visualizing Theme Changes over Time (2000)
- [2] Heer, Boyd: Vizster: Visualizing Online Social Networks (2005)
- [3] Herlocker et. al.: Evaluating Collaborative Filtering Recommender Systems (2004)
- [4] Pampalk, Goto: Musicsun: A new approach to artist recommendation (ISMIR 2007)
- [5] Swearingen and Sinha: The Role of Transparency in Recommender Systems (CHI 2002)

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Thank you for your attention!