LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

LFE Medieninformatik

MusicTrends:

Visualization of User-Generated-Content in last.fm

Project Thesis

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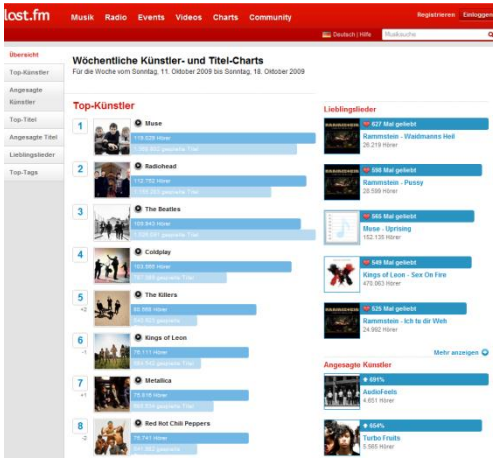
- Introduction
- Application: MusicTrends
- User Study
- Conclusion
- Demonstration

MusicTrends: Visualization of User-Genereated-Content in last.fm

Last.fm provides diverse information, but specialized visualizations



- Listening to last.fm music (audioscrobbler) produces implicit User-Generated-Content
- Available visualizations for particular data (charts, listening histories, national comparison)

➔ MusicTrends was designed to gain insights from aggregated information about **users**, **artists** and **tags**

Sources: www.last.fm; build.last.fm/item/377 ;build.last.fm/item/340

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Separation of data aggregation and visualitazion

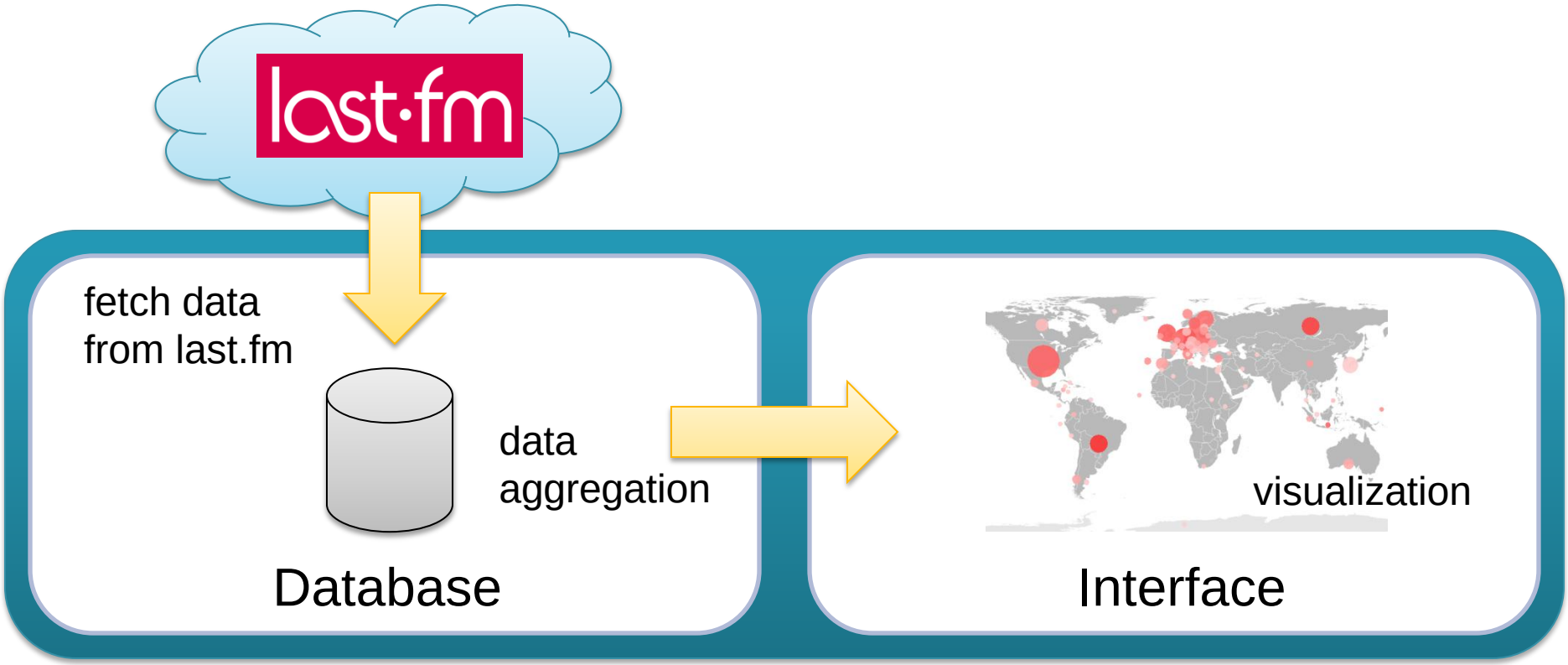

Fig. 5.1: Basic design of MusicTrends

Use of a database provides flexibility for complex data

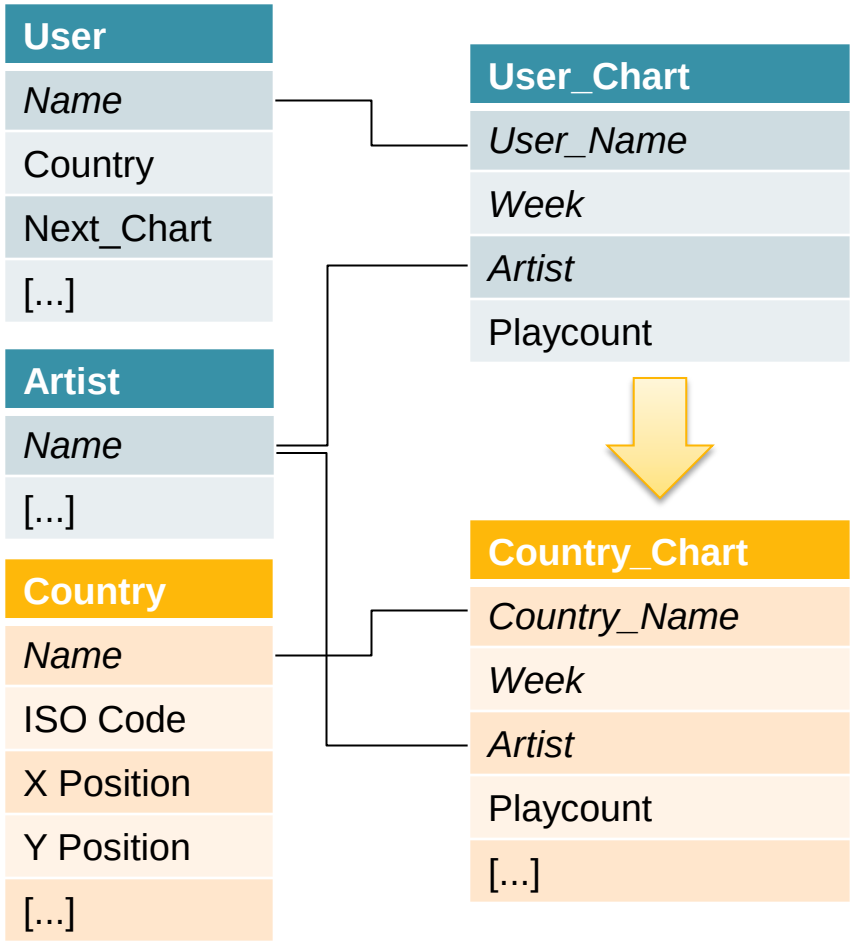

Fig. 6.1: Part of the data model

Collecting data from different sources

- last.fm web services/java bindings
- ISO 1366 country information
- World map coordinates

Data Aggregation

Aggregated data is drived, based on the basic data

Example

Country similarity is calculated based on

- Number of artists contained in both lists
- Ranks of common artists in both lists

$$\sum_{i=0}^{n-1} \frac{1}{|p_i - q_i| + 1}$$

n = number of artists in common
p = artist rank in user list
q = artist rank in country list

Several views for different characteristics of data

Visualization

- 3 different **categories**
  user/artist/tag
- 2 different **views**
  map-view and abstract-view

Interaction

- Navigation within inter-connected views
- Timeslider
- Detailed information/settings in sub-windows

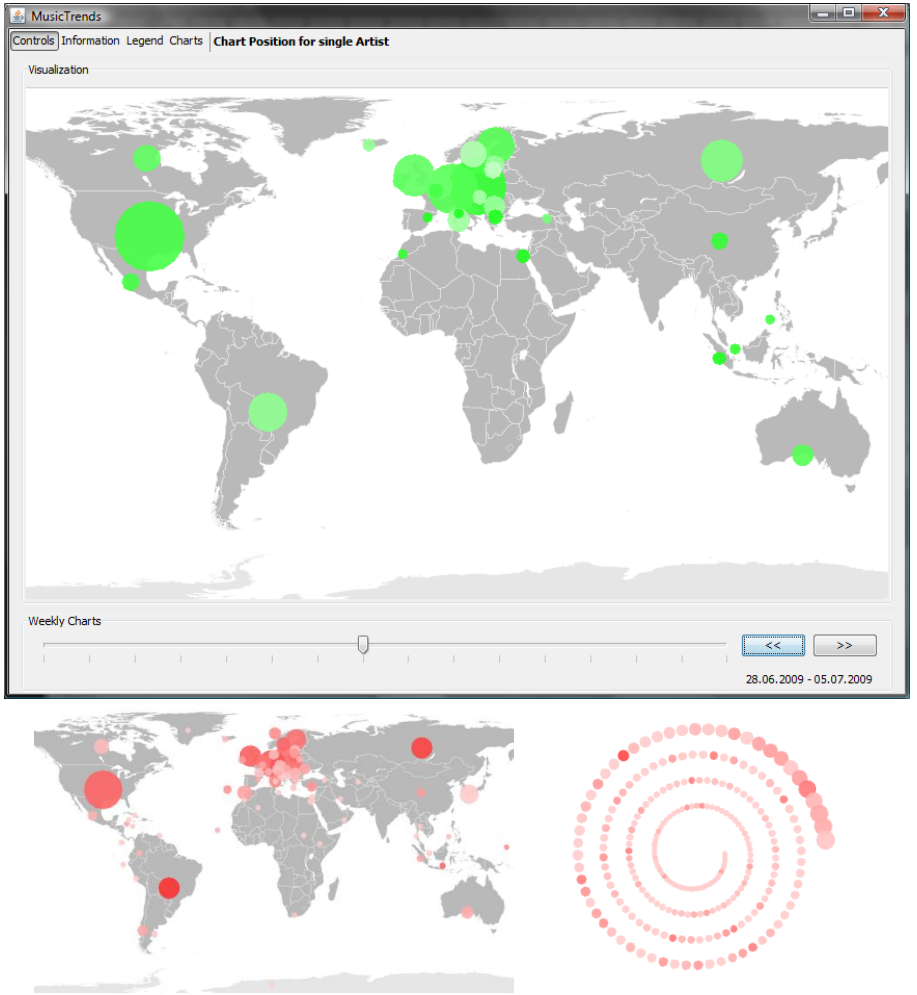

Fig. 7.1: Examples for map-view and abstract-view

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User study designed to gain information about insights and usability

- Questions
  I. Is the application helpful to gain new insights?
  II. What kind of insights can be found?

- Procedure
  I. Pre-questionnaiere: Demographic data and experience with last.fm
  II. Exploratory Browsing: Users were asked to browse the content in an free manor, while they should think aloud about new insights
  III. Post-Questionnaire: Overall impression about MusicTrends

- Participants

male	5
female	6
age	22-34

Different aspects analysis afford individual forms of evaluation

- Qualitative analysis of participants' overall impression of the system
- Insight evaluation:
  Separate schemes for qantitative evaluation (complexity) and insight clustering (classification)

  ➔ Example: "Brasil has the highest similarity with the worldwide charts over the time"

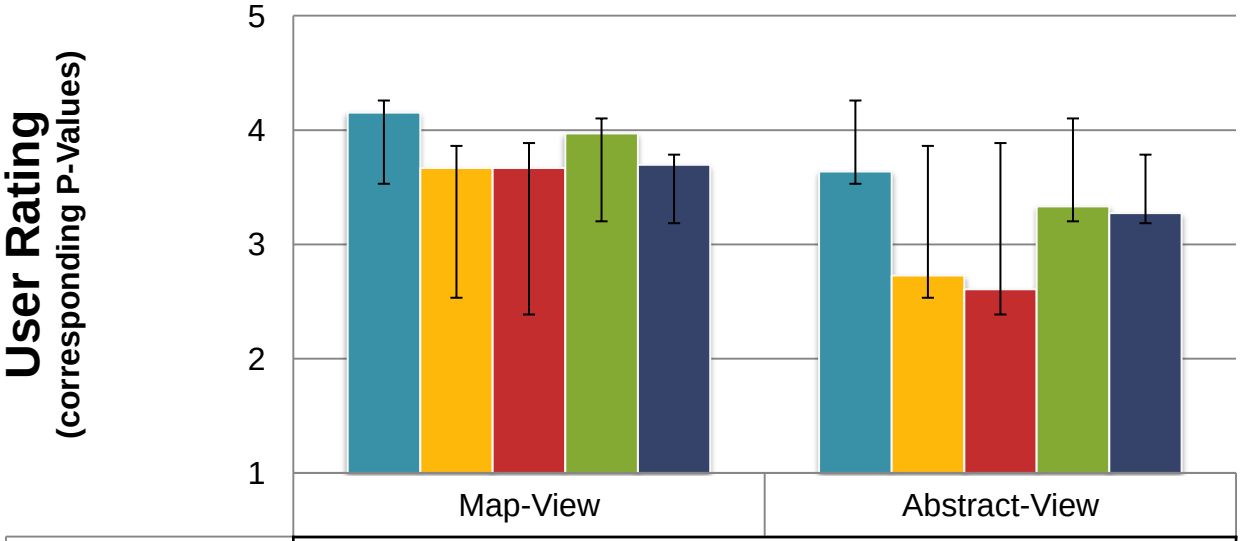
Category (weight 1/3)			Level (weight 1/3)			Information (weight ½)		%
User	Artist	Tag	Overall	Country	Individual	Spatial	Temporal	Complexity
1	0	0	1	0	0	0	1	38,9

Category			Spartial Information		Temporal Information		
User	Artist	Tag	Single Country	Multiple Countries/World	Point in Time	Constancy	Dynamics
1	0	0	1	0	0	1	0

Tab. 10.1: Quantitative insight evaluation scheme/Tab. 10.2: Insight clustering scheme

MusicTrends: Visualization of User-Genereated-Content in last.fm

MusicTrends supports people to gain new insights

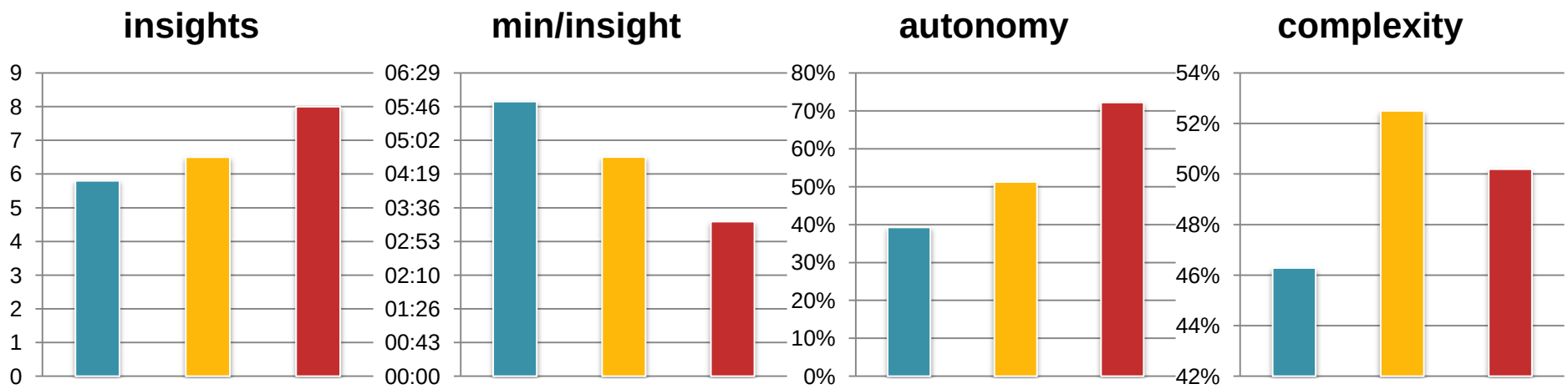


Ease of Use	T(11)=1,35; p=0,104
Enjoyment	T(11)=3,31; p=0,004
Helpfulness	T(11)=2,89; p=0,008
Learnability	T(11)=2,70; P=0,011
Understandability	T(11)=1,42; p=0,093

- Map-view outperformes abstract-view in general, especially in Enjoyment, Helpfulness and Learnability

Fig. 11.1: Diagram of average user rating and corresponding P-Values

Users with last.fm experience tend to show higher performance



- Experienced users gain more insights
- Experienced users acquire insights faster
- Experienced users need less help
- Complexity shows no direct relation to users' experience

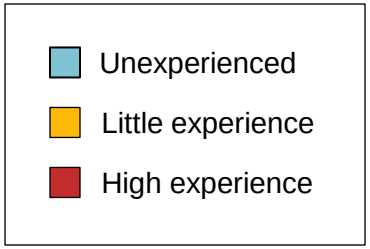
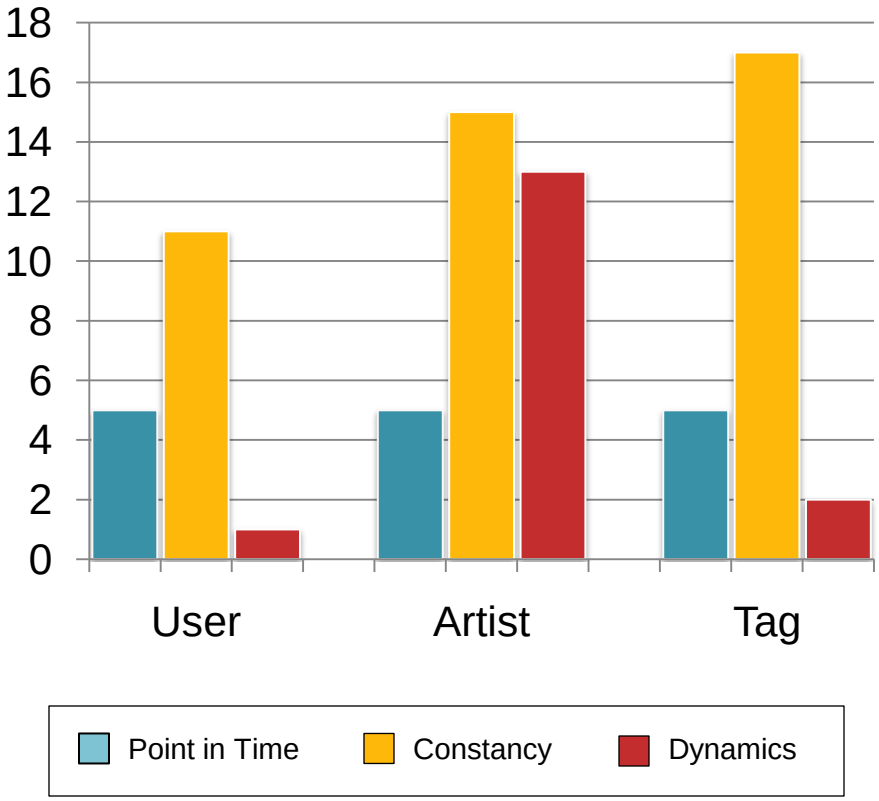


Fig. 12.1: User data diagrams

Insights show constancy in taste and dynamics for artists



- Most findings for Artists/fewest for Users
- Same number for **Point in Time** over all categories
- Most **Development** insights for artists
- Most **Constant State** insights for tags

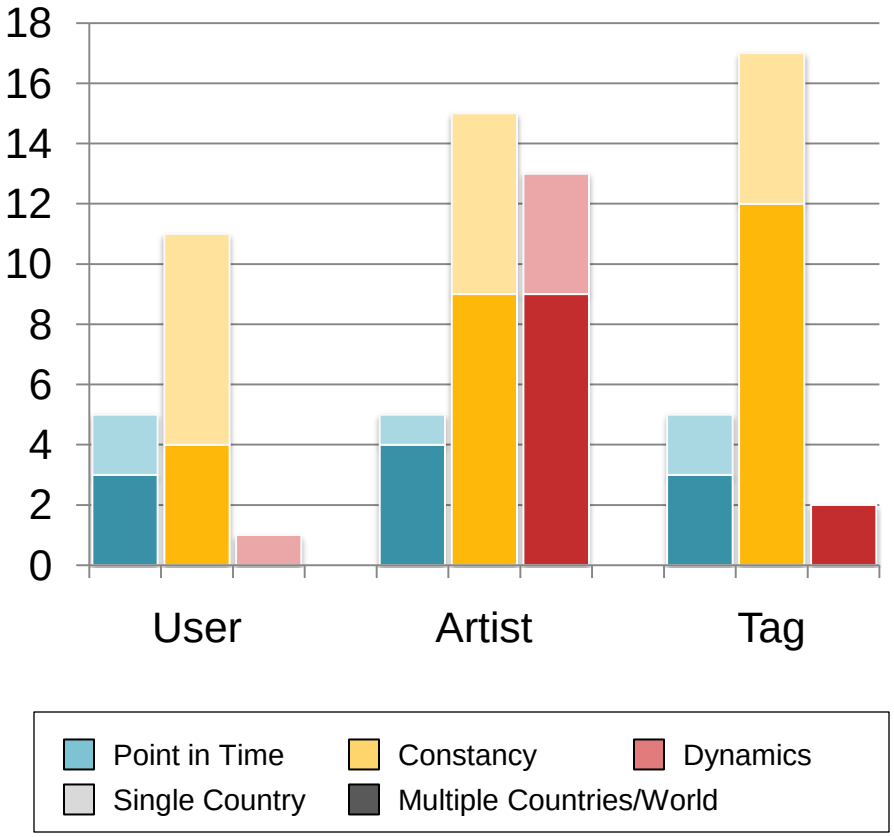
➔ Point in Time statements often depict participants' first assumption

➔ general taste of last.fm users is rather constant over time

➔ popularity of artists is influenced by temporal trends more than music genres

Fig. 13.1: Insights sorted by category and time

Most insights consider temporal information about multiple counties



- No insights for user **Development** on **World** level
- No insights for tag **Development** for **Single Countries**
- Mostly insights about **Multiple Countries**

➔ Uers are dedicated to one country

➔ Assumption: map-view helps to derive worldwide information

Fig. 14.1: Insights sorted by category , time and spatial information

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MusicTrends provides insights into UCG of last.fm

- Application
  - Source data: UGC grouped in 3 categories
  - Visualization: map-view and abstract-view
  - Interaction: timeslider, inter-connected views
- Insight-based Evaluation
  - Positive feedback for map-view
  - Correlation between user experience and user performance
  - Most insights could cover both temporal and spatial information

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