

Browsing Music by Usage Context

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DKE Outline

- Motivation
 - Why is usage context interesting?
- Related Work
- Concept
 - How can usage context be defined?
 - Which data could be used as context?
- Prototype context logger
- What can we learn from usage context?
- Facet-browser for context data
- Discussion
 - How much context is too much?

Why is usage context interesting?

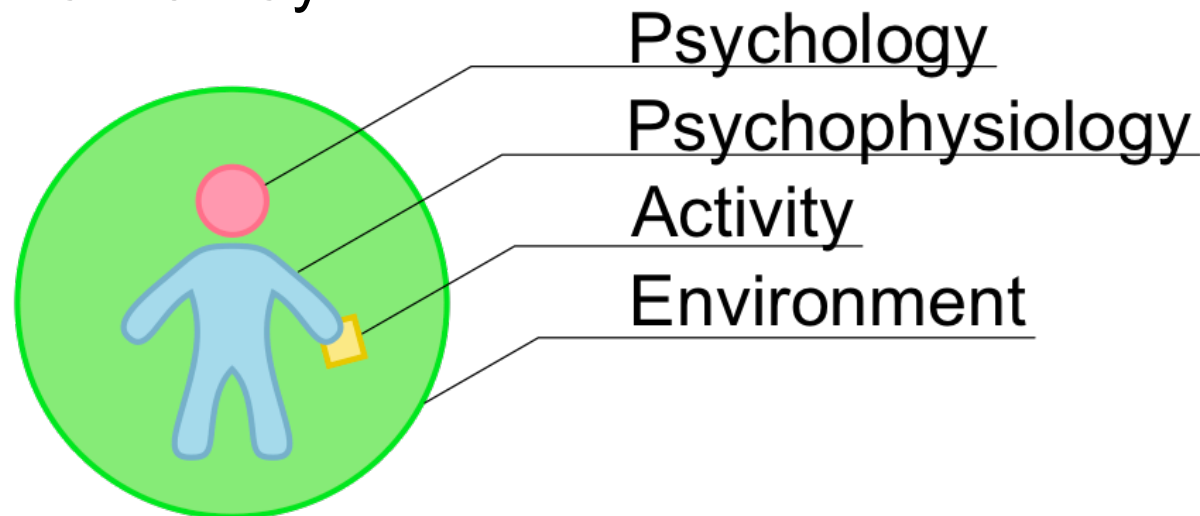
- Jones et al. 2004:
 - One notable way that participants *characterized music* was by intended use - that is, based on the event or occasion at which they intended to listen to a particular set of music.
 - idiosyncratic genres (e.g. “driving music” “work music”)
- Lee & Downie 2004:
 - 41.9% of respondents said they would *search or browse music information* by “Associated usage.” [...] This kind of extra-musical information is not traditionally incorporated in MIR systems.
- Hu et al. 2006:
 - [...] conclude that the recommended usages specified by users *reflect a meaningful source of user-generated metadata*.
- Our goal:
 - exploit usage context for *personalized structuring of music collections* (possibly more meaningful than genre)

- Pachet & Cazaly 2000:
 - Taxonomy of Music Genres
 - *Audience Location [...] describes the typical place where the music is usually listened to.*
 - *Danceability describes what dance type (if any), the music suggest, and can take various values such as “no” / “rock” / “salsa”, etc.*
- Govaerts et al. 2006:
 - Moody Tunes:
 - commercial application to select music for a desired atmosphere in hotels, restaurants and cafes
 - properties need to be assigned manually by experts and if necessary can only be adapted by hand

- Automatic context logging / guessing:
 - last.fm – audioscrobbler plug-in
 - tracks listening habits to build user profile and find users with similar taste
 - Lee & Lee 2006: M³ music recommender system
 - season, month, day of the week, weather and temperature
 - Park et al. 2006: context-aware RS
 - weather (temp., humidity, current weather and forecast), time, ambient noise level, illuminance
 - Guan et al. 2006: RS for the “smart office”
 - location, time of day, people in the room, weather outside and the user’s “stock portfolio” (???)
 - PAPA (Oliver and Kreger-Stickles 2006) and Yamaha BODiBEAT:
 - bio signals (e.g. pulse)

How can usage context be defined?

- context (Dey 2001):
 - any information that can be used to characterize the situation of a person, place or object of consideration
- four types of primary context (Dey & Abowd 2000):
 - location, identity, time and activity
- alternative way:

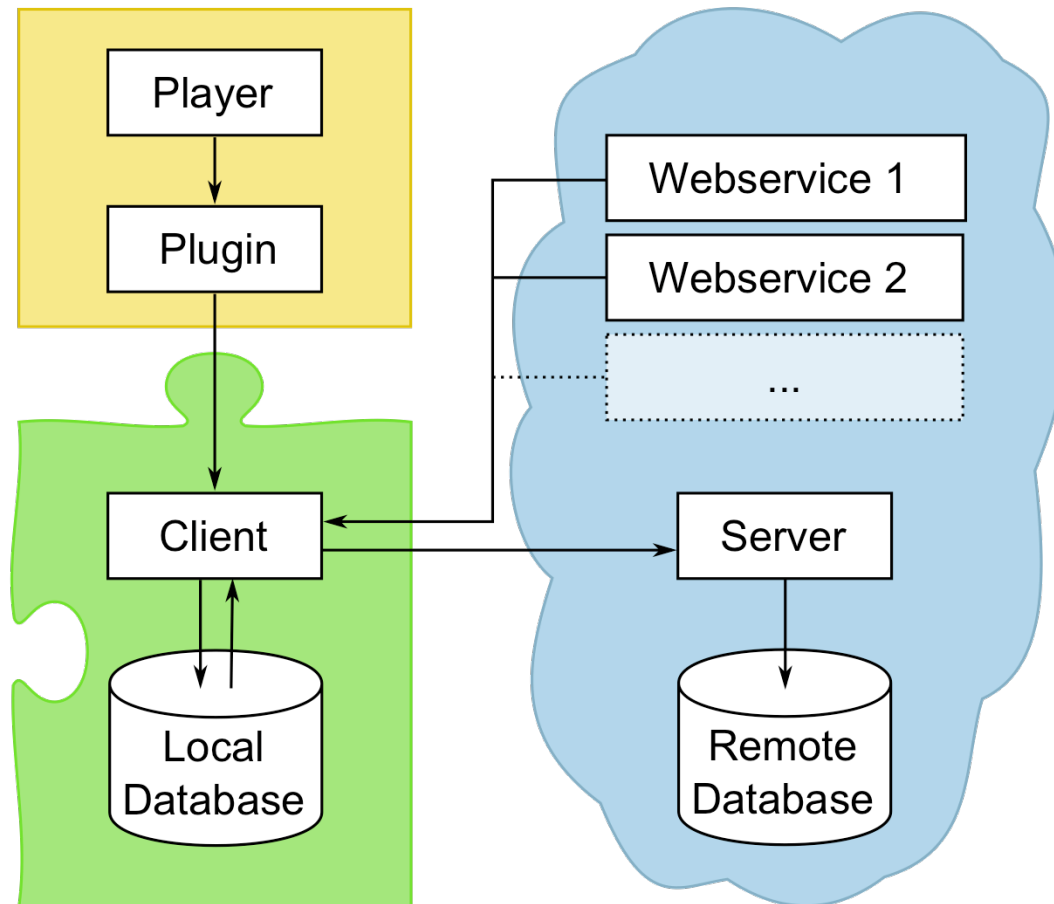


Which data could be used as context?

- time
 - time of day, day of week, season, date
- location
 - device
 - GeolP
 - GPS information (mobile devices)
 - infer speed and way of traveling (e.g. stationary, walking, running, cycling, driving, going by train, ...)
- activity (corr. with location, device, time)
 - access to calendar
 - PC: active applications (e.g. browser, word processor, ...)
 - people around
 - ambient noise (level / classify)
 - illumination
 - acceleration / gyro sensor
 - bio signals

Prototype context logger

- for Foobar, Winamp and iTunes



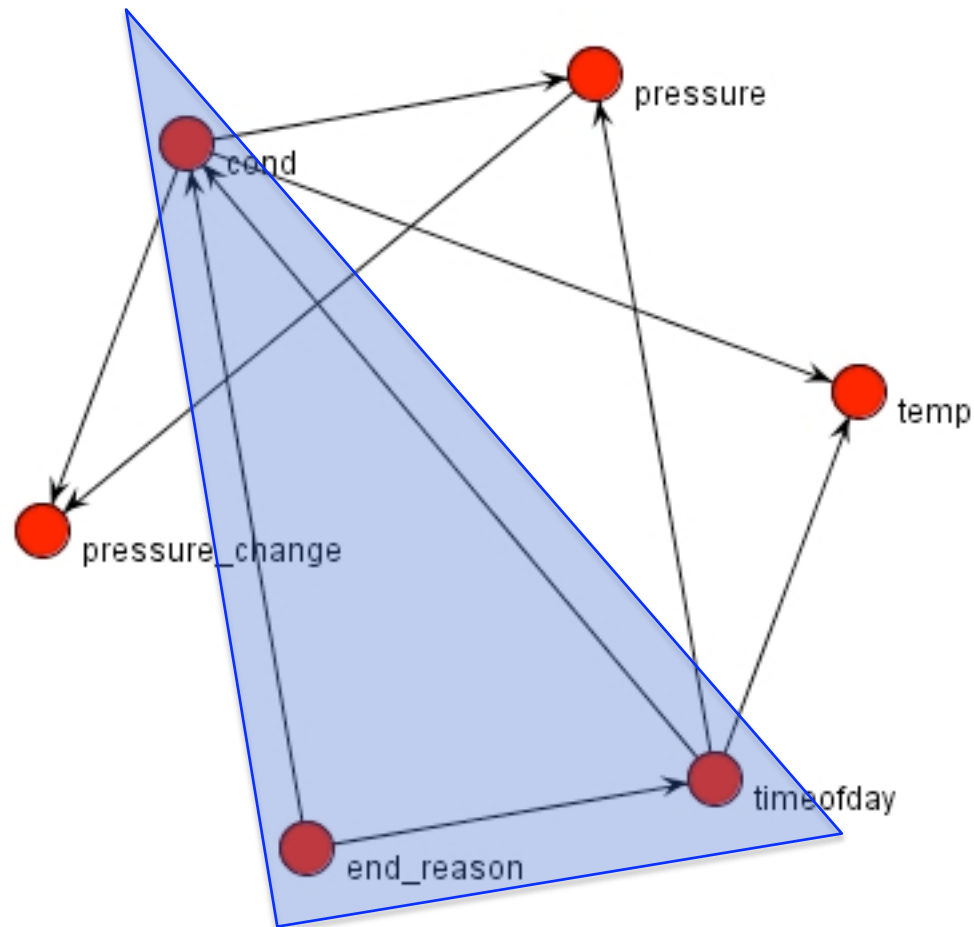


Prototype: collected data

- 8 users
- 15325 played songs
- between February and April 2008
- 14 data dimensions:
 - user id
 - artist, title, album, genre, date (from ID3)
 - end reason (finished, skipped, quit)
 - weekday, time of day
 - weather quality, temperature, humidity, air pressure, pressure change (last 4 hours)
- problems:
 - large number of records incomplete (initial problems with logger)
 - biased towards bad weather (seasonal)
 - about half of the data contributed by a single user



- induced graphical model (Borgelt & Kruse 2002)
generated with K2 metric (Cooper & Herskovits 1992)



198 of 2064 instances

9,59% of all instances

19,8% of instances with end_reason=skipped

[Create Rule](#)

Attribute	Value
end_reason	skipped
cond	Light Rain
timeofday	afternoon

Heuristics Values

LHS Support: 0,101

Confidence: 0,952

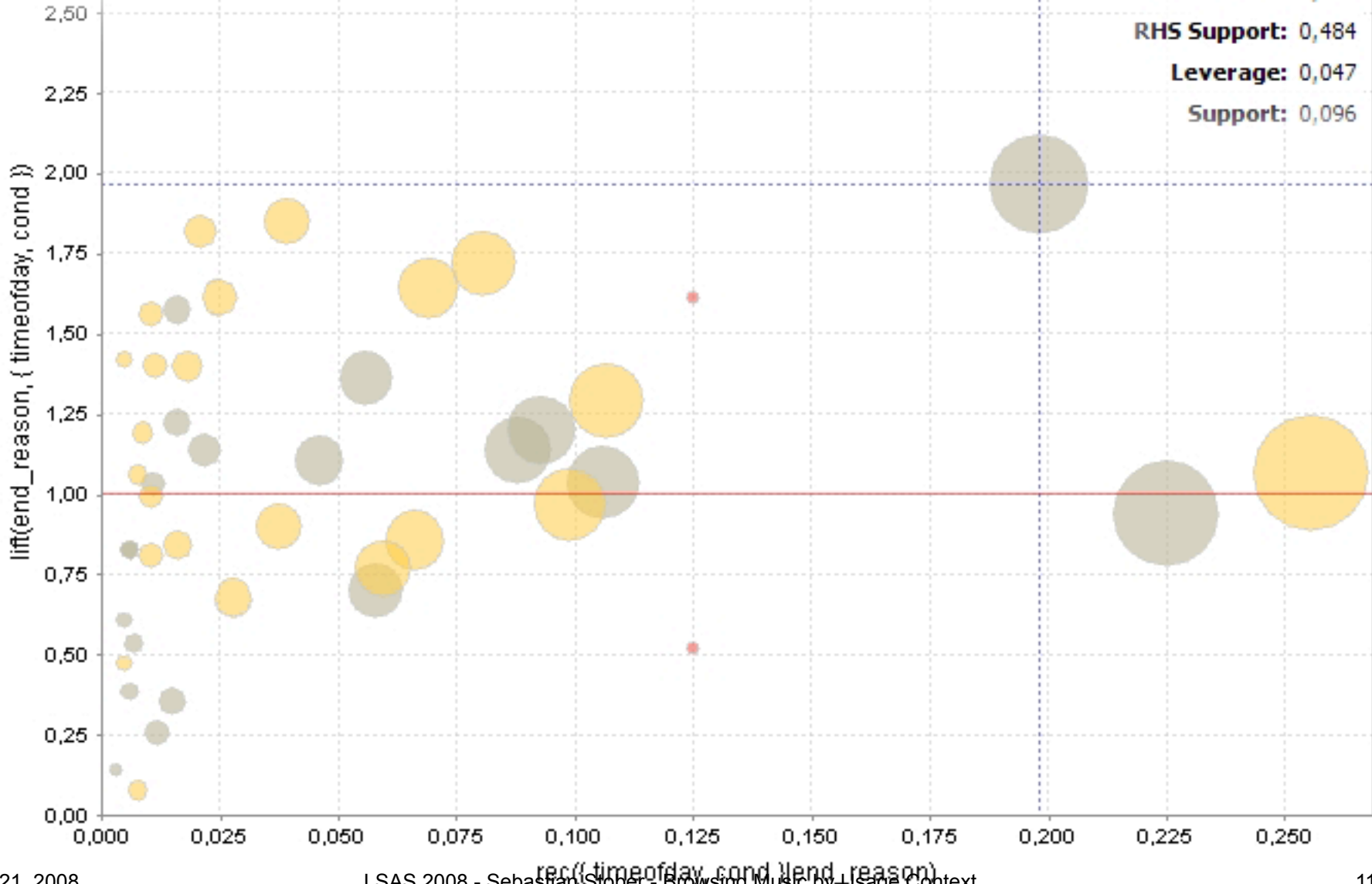
Recall: 0,198

Lift: 1,965

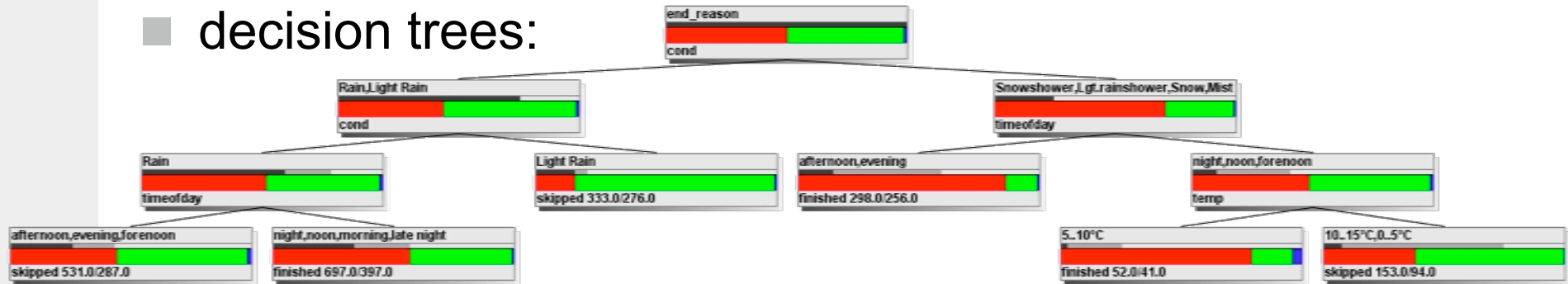
RHS Support: 0,484

Leverage: 0,047

Support: 0,096



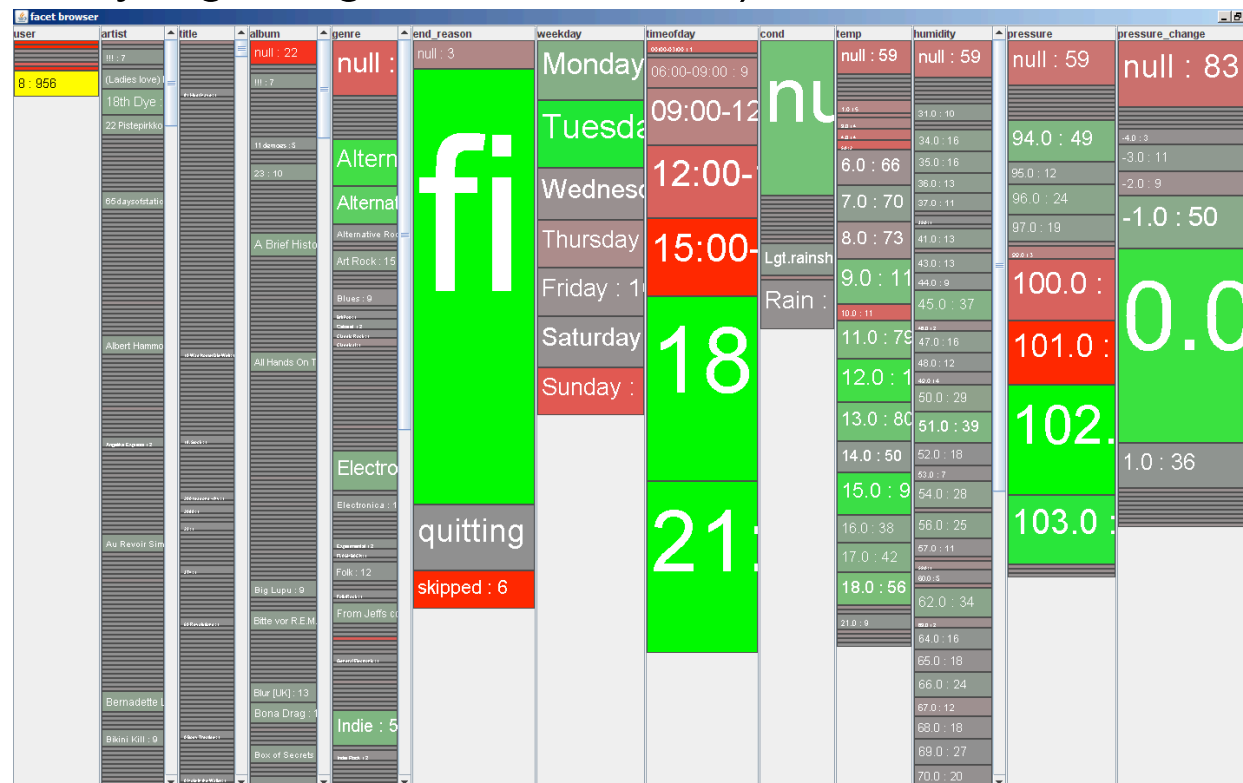
■ decision trees:



■ frequent item sets:

\mathcal{Y}	t	w	ϑ (°C)	p (hPa)	Δp	weekday	rel. supp.
skip		rain	5..10	1000..1050	zero		16.0%
finished		rain	5..10	1000..1050	zero		15.2%
skip		light rain					13.4%
finished						Saturday	12.3%
skip	afternoon		0..5				11.8%
skip	afternoon					Saturday	11.3%
skip			0..5			Saturday	11.0%
skip	night	rain			zero		10.9%
finished	night	rain		1000..1050	zero		10.8%
skip	night		5..10	1000..1050	zero		10.7%
finished		light rain shower					10.6%
finished					zero	Monday	10.6%
skip			10..15				10.4%
finished			0..5		zero		10.3%
finished	evening			1000..1050	zero		10.1%
finished			10..15	1000..1050	zero		10.1%

- based on elastic list technique (Stefaner & Muller 2007)
- selected elements (yellow) = filter
- size = relative proportions of values
- brightness/color = unusualness (significantly higher=green, lower=red)



Round-up

- motivated usage of context data
- overview of systems using context data
- highlighted different aspects of context and which data could be used
- prototype context logger, user study
- early data mining results
- facet-browser interface



Discussion

How much context is too much?
or
Where do we encounter privacy issues?



THANK YOU FOR YOUR ATTENTION

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