Musical thumbnailing: support understanding of music content

Diploma Thesis

René Klüber

LFE Medieninformatik

16.06.2009

Supervisor: Yaxi Chen

Responsible Professor: Prof. Dr. Andreas Butz

Ludwig-
Maximilians-
Universität
München

LMU

Outline

- Motivation

- Related Work

- Concept

- Online Survey

- Current Status & Further Directions

  - Expert Group

  - 30-sec Clip

- Next Steps

- Questions & Discussion

Motivation

≡ Thumbnail: People can tell what one photo is about

≡ Musical Thumbnail: Musical overview of a song

(visual / acoustic)

www.imageconverterplus.com

≡ Meaningful Design

(consistent mapping including transparency and traceability)

≡ Current content analysis of music works not well enough

≡ Integrate User feedback to improve performance

≡ Motivate people to make contribution

M. Carey   J. Jackson   Beethoven
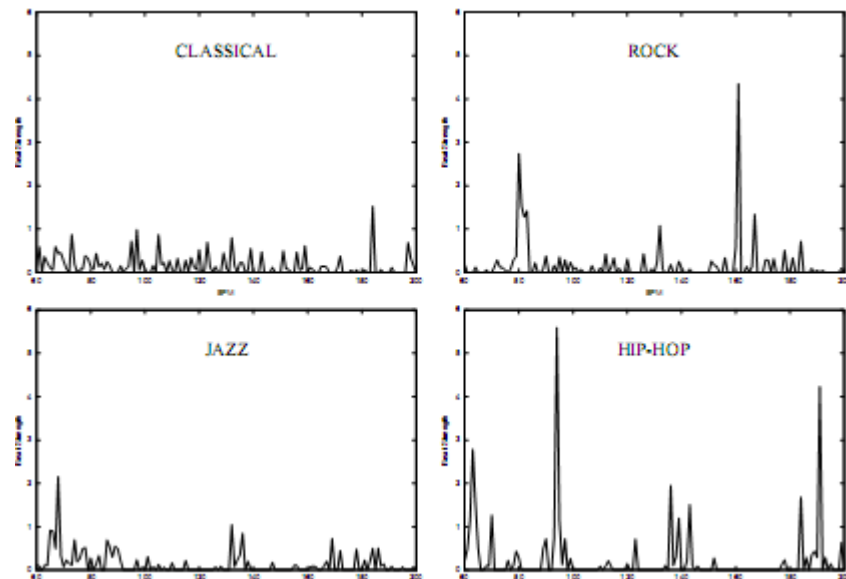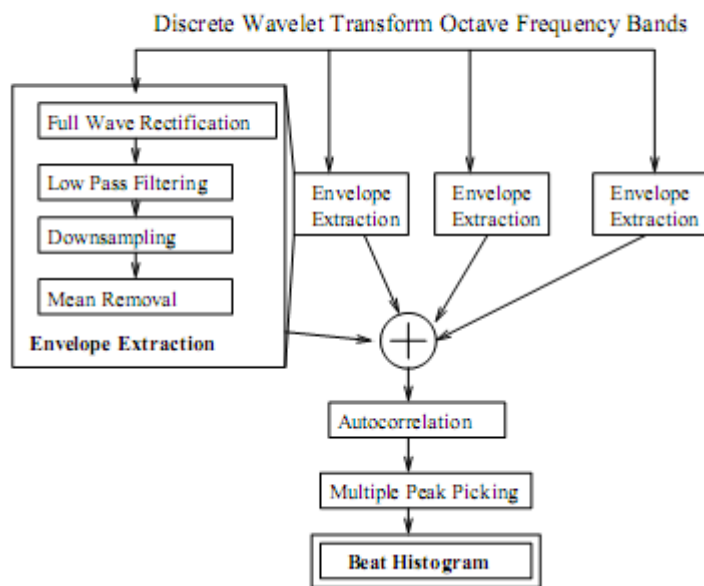
W. Houston   Haydn   Mozart
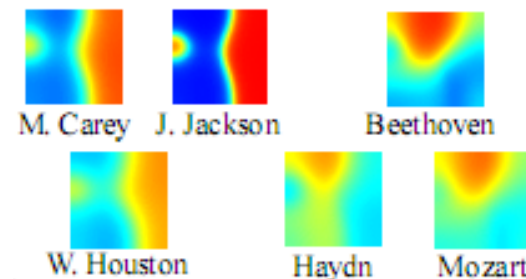
Yoshii and Goto – [ISMIR, 2008]

Related Work

≡ Tzanetakis, Essl and Cook [DAfx-02]: HUMAN PERCEPTION AND COMPUTER EXTRACTION OF MUSICAL BEAT STRENGTH

Related Work

≡ Wattenberg [INFOVIS, 2002]: Arc Diagrams: Visualizing Structure in Strings

A   A   B   B

www.turbulence.org
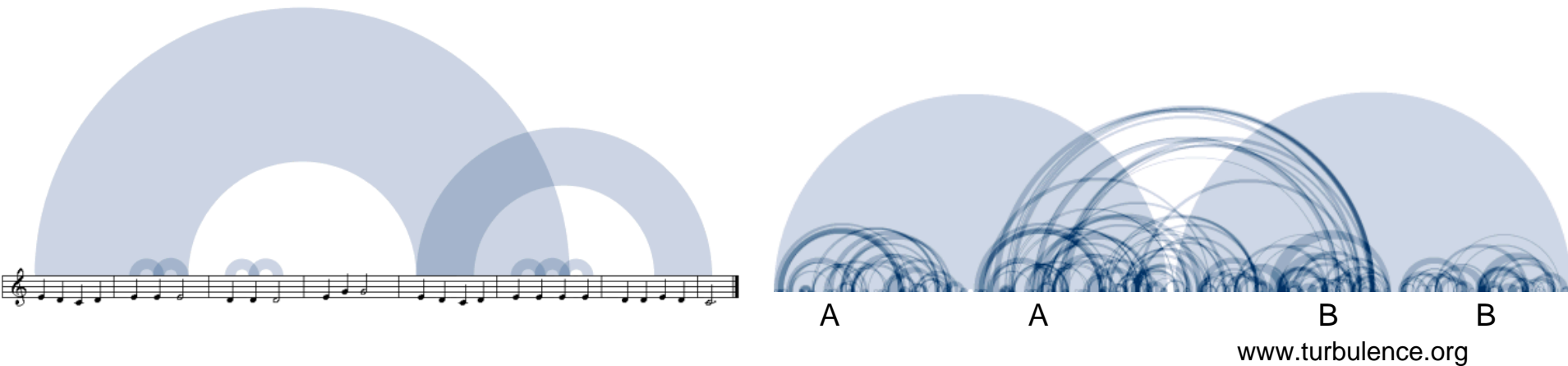
≡ Represent similarity in notes

≡ Composition of song (Song structure, Musical form)

Related Work

Ludwig–
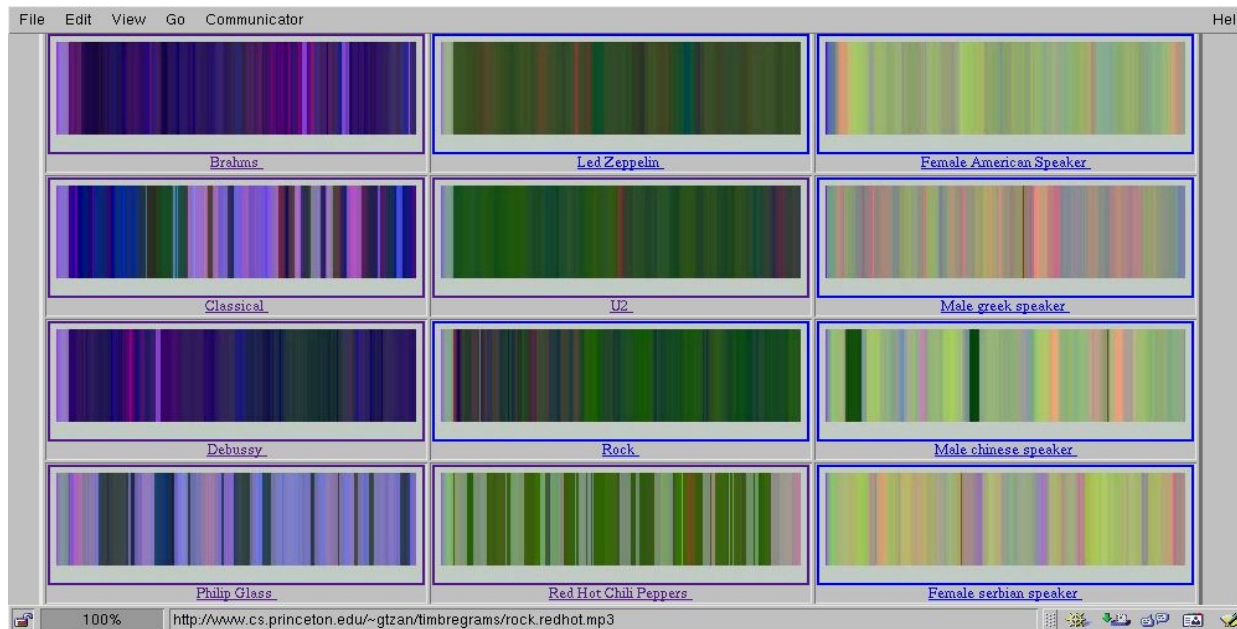Maximilians–
Universität
München

≡ Kolhoff, Preub and Loviscach [CGIP, 2006]:

Music Icons: Procedural Glyphs for Audio Files
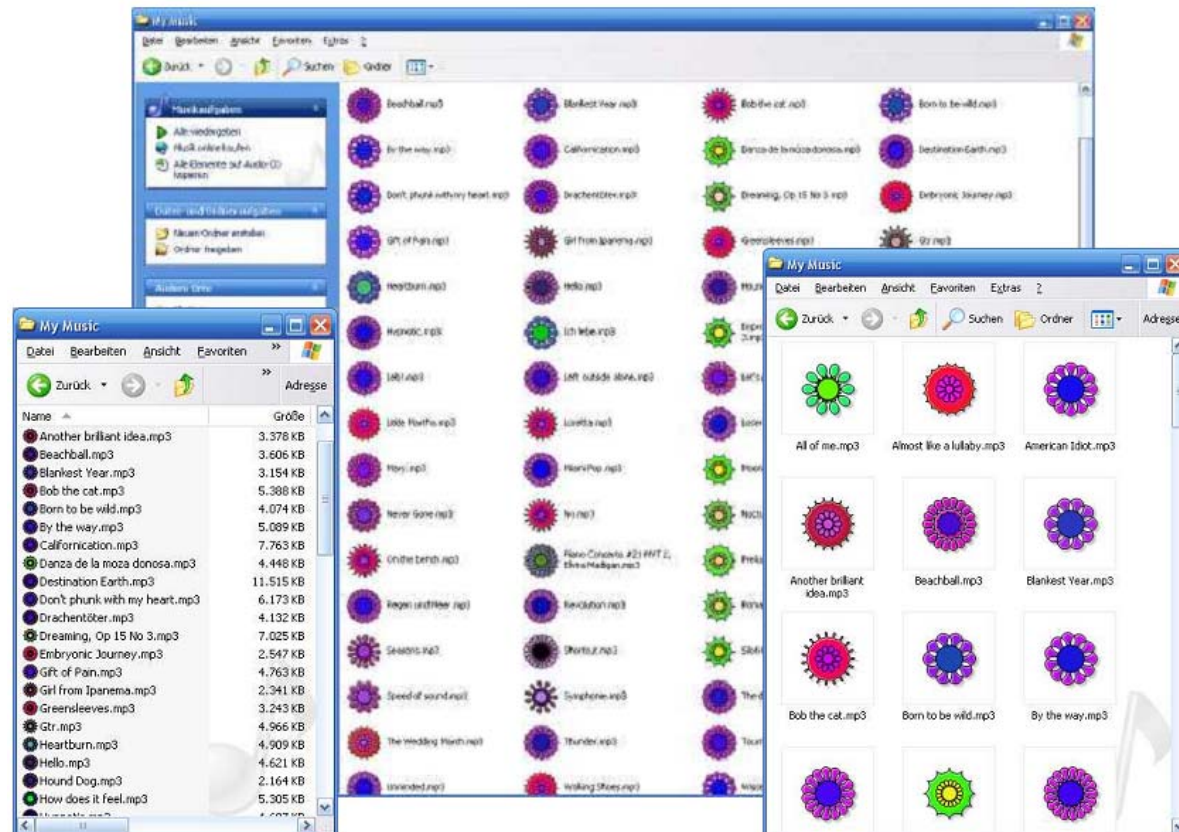
Related Work

≡ Tzanetakis and Cook [ISMIR, 2000]: Audio Information Retrieval (AIR)

Online Survey with visual thumbnails

≡ Comparison of these 4 concepts: Are they working ?

≡ Simplifying concept of SemantIcons:

   ≡ Colour of receptacle: Genre (for surveying purposes no direct assignment of genre)

   ≡ Amount of petals: Tempo (4 - slow, 8 – medium tempo, 16 - fast)

   ≡ Shape of petals: Aggressiveness (round – calm, curved – aroused, tapered – aggressive)
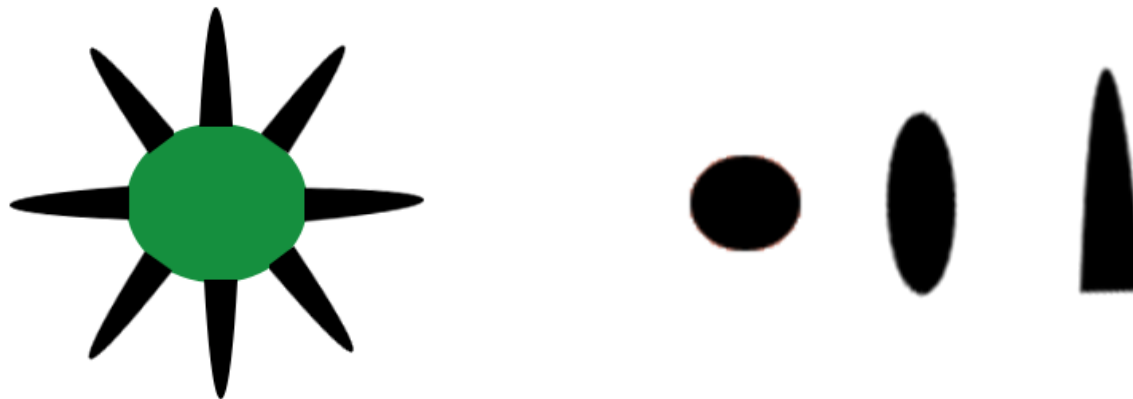
Online Survey - Demography
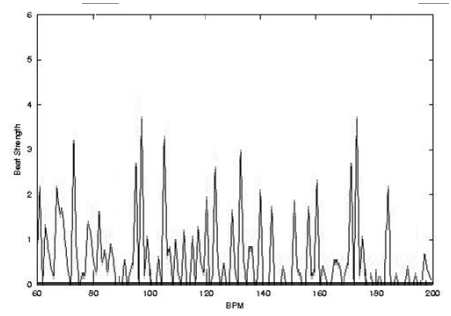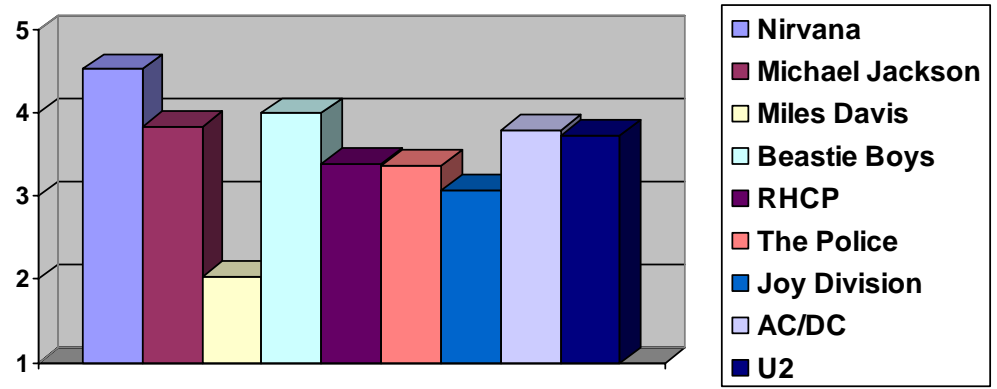
- Target Group: Mainly Last.FM Users

- Participants: 38 valid (80)

- Age:18 - 53 (ø age:26,6)

- Gender: 24% female, 76 % male

- Nationality: US, UK, Can, Cro, NL, F, Ger, GR, N, P, Rus, Esp, Swe

- Occupation: 50% Student, 32% Emloyee, 18% Unemployed/Self-Employed

Online Survey - General experience

≡ How often listen to music: 70% > 3 hours/day

≡ Experience in music: 66% 4 or 5 (1-5 scale)

≡ Quite familiar with music related terms overall

≡ Discovering new music: Others' recommendations 66%, Popular Lists (Billboard Charts)76%, Web pages 74%

≡ Methods to get overall impression of a song:

  ≡ 30-sec Clip: 67% 4 or 5

  ≡ Similar Artists/Tracks 42% 4 or 5

  ≡ Top tags : 34% 4 or 5

    ≡ Genre : 18% 4 or 5

  ≡ Visual thumbnail: 13% 4 or 5

Online Survey - Visualization

Familiar with most songs presented

Legend:
- Nirvana
- Michael Jackson
- Miles Davis
- Beastie Boys
- RHCP
- The Police
- Joy Division
- AC/DC
- U2

Which song is represented by this Visualization ?

≣ Histogram: 23,7% Nirvana – Smells like Teen Spirit

≣ ArcDiagram: 21,1% Beastie Boys - Fight for Your Right

≣ SemantIcon: 36,8% Miles Davis – So What

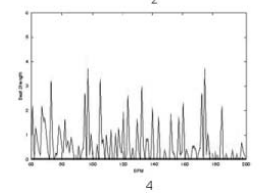≣ TimbreGram: 31,1% Red Hot Chilli Peppers - Scar Tissue
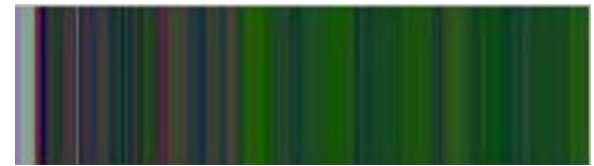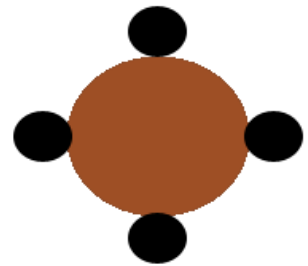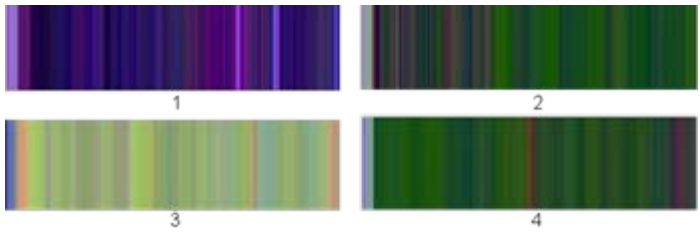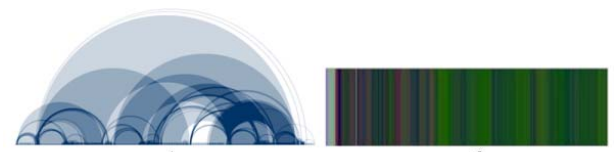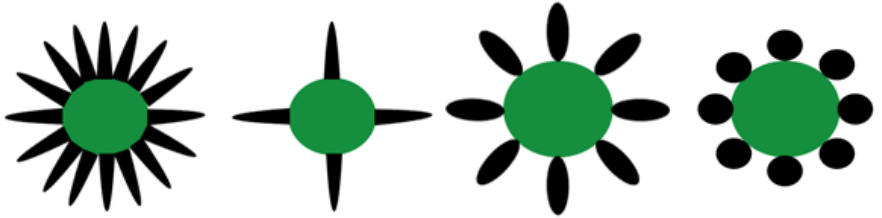
Online Survey - Visualization

Which of the 4 Visualizations displays this song ?

≡ 4 Histograms: 42,1% Police - Message in a Bottle

≡ 4 ArcDiagram: 26,3% Joy Division – Love will ..

≡ 4 Semanticons: 44,7% AC/DC – Highway to Hell

≡ 4 TimbreGram: 21,1% U2 – One
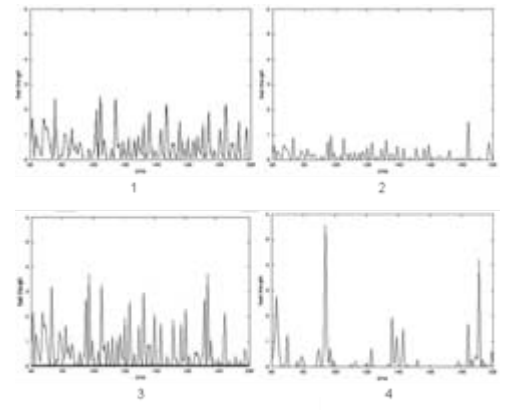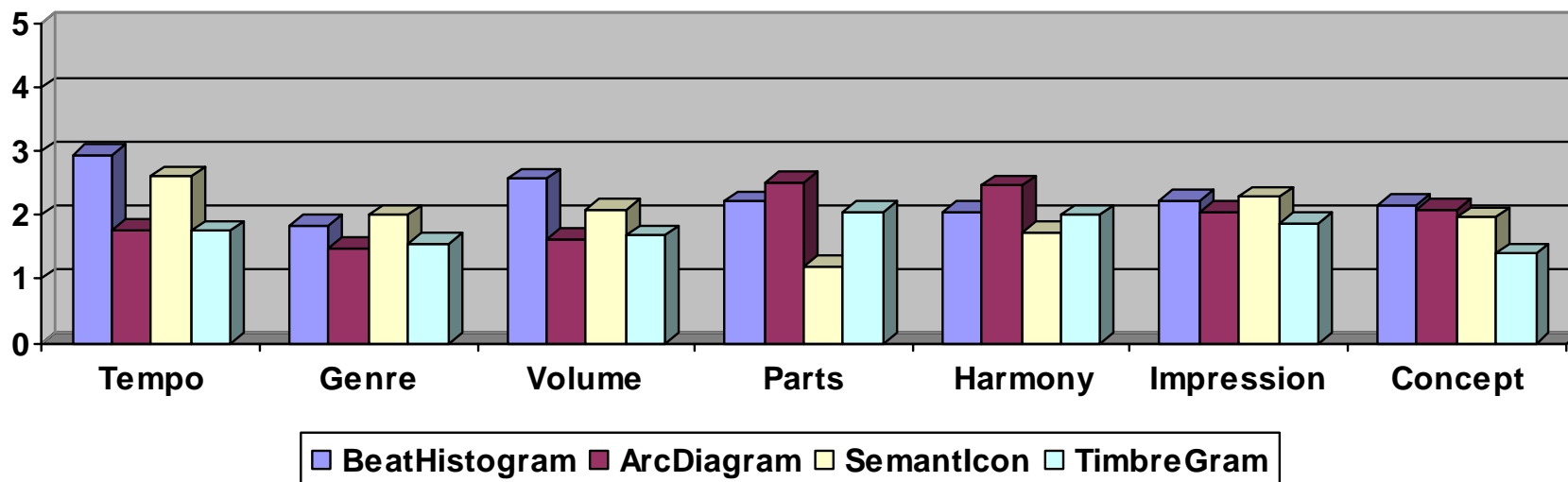
Which Genre is represented by these 4 visualizations ?

≡ 52,6% Rock (6 options)

Online Survey - Result

- Loss of participants: 9 quitted before visualization part, 33 skipped
- 27 of 38 dislike any visualization

Is this visualization helpful to get the following information?

Current Status & Further Directions

≡ Shift Target Group: from normal users who have no professional knowledge with music to professionals who practically analyze the content, structure or composistion of songs.

≡ Acoustic thumbnail (30-Second Clips): it is claimed in the survey that most of participants rate 30-mins clip is most helpful for understanding an unknown song.

Next Steps – Expert Interviews

≡ Information which can be extracted from visual or acoustic content.

≡ Is visual information helpful?

≡ Current methods of teaching/learn professional knowledge.

≡ Are there problems or difficulties with current methods?

≡ Will our visualization concepts help?

If we get some positive Feedback

Target group as professionals and produce visualizations for them

Questions & Discussion