A Musically Aware System for Browsing and Interacting with Audio Music Collections

Mohamed Sordo, Gopala Krishna Koduri, Sertan Şentürk, Sankalp Gulati and Xavier Serra
outline

• Motivation
• System overview
  • Functional components
  • Use cases
  • Architecture
• Work Plan
motivation

Data gathering

Musicological validation

Ontology design

Audio description

Discovery system

Community profiling
system overview

Client

Web/Mobile Browser

Linking Open Data

Linked Data

Presentation Layer

Web Server

Application Programming Interface (API)

HTML
JavaScript
CSS

JSON
??xml??

Processing Layer

Information Processing

Data Linking

Similarity measures

Data Processing

Audio mid- and high-level descriptors

Semantic descriptors

Ontology Definition

Data Sources

Audio Database

Audio Features

Music Scores

Editorial Information

Semantic Information
system overview
<table>
<thead>
<tr>
<th>Performer</th>
<th>Instrument</th>
<th>Composer</th>
<th>Lyricist</th>
<th>Form</th>
<th>Release</th>
<th>Raga</th>
<th>Tala</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Title</strong></td>
<td><strong>Artist</strong></td>
<td><strong>Release</strong></td>
<td><strong>Raga</strong></td>
<td><strong>Tala</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>--------</td>
<td>------------</td>
<td>---</td>
<td>------</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rag Gunakari (Teental)</td>
<td>Kumar Gandharva</td>
<td>Raga Bhairav Ke Prakaar</td>
<td>gunakri</td>
<td>teental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raga Basant</td>
<td>Gauri Pathare</td>
<td>Malhar</td>
<td>basant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raga - Bhimpalasi</td>
<td>Jasraj</td>
<td>Legends: Sangeet Martand Pandit Jasraj (Vol. 2)</td>
<td>bhimpalasi</td>
<td>ekta, teental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raga Shuddha Nat</td>
<td>Jasraj</td>
<td>Legends: Sangeet Martand Pandit Jasraj (Vol. 4)</td>
<td>shuddha nat</td>
<td>ekta, teental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raga - Khamaj</td>
<td>Amjad Ali Khan</td>
<td>Mesmerizing Maestros</td>
<td>khamaj</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raga Aarahi</td>
<td>Ashwini Bhide Deshpande</td>
<td>Classical Vocal - Ashwini Bhide-Deshpande</td>
<td>arahbi</td>
<td>matta tal, teental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raga Bageshree</td>
<td>Ajay Chakraborty</td>
<td>The Genius Of Pt. Ajay Chakraborty</td>
<td>bhageshree</td>
<td>toental, bhaltal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raga Kedar Alap</td>
<td>Buddhadev Das Gupta</td>
<td>Raga Jalaiavanti, Raga Kedar, Raga Gorak Kalyan</td>
<td>kedar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CompMusic browser**

A culture-specific way to browse music collections

**Session 1** | **Session 2** | **Session 3** | **Session 4**

---

**playlist**
functional components::browsing
### Functional Components: Browsing

**Artist**: Kaushiki Chakrabarty  
**Title**: Raga Madhuvanti: Khayal 'Shyam bhaee, Ghanashyam nahi aye more dware' in Ektaal  
**Release**: Pure  
**Length**: 28:10  
**Work**: Shyam bhaee Ghanashyam nahi aye more dware  
**Section**: bandish  
**Tala**: ektal  
**Form**: khayal  
**Raga**: madhuvanti  

<table>
<thead>
<tr>
<th>Performers</th>
<th>Instrument</th>
<th>Gharana</th>
<th>Guru</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yogesh Samsi</td>
<td>tabla</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ajoy Chakraborty</td>
<td>harmonium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaushiki Chakraborty</td>
<td>lead</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ranjana Ghatak</td>
<td>tambura</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chiranjib Chakraborty</td>
<td>harmonium</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Release Information**  
**Artist**: Kaushiki Chakrabarty  
**Title**: Pure  
**Status**: Official  
**Date**: 2004

**Playlist**: [Pure](#)
functional components::visualization
functional components::user contributions
functional components::user contributions
functional components::discovery

- Discover recordings sharing few peculiarities, e.g.:
  - intonation profiles
  - motives
  - structural elements
  - artistic expression
use cases

• Research
  • generate a dataset of recordings related to works with the most number of performances.
  • matching of a specific audio section with its corresponding score

• Education
  • all the raaga alapanas of a lineage from a given period
  • the most salient differences between the performances of a given raaga across two gharanas/schools

• Enriched listening
architecture
architecture::data sources (1)

- audio recordings
architecture::data sources (1)

- audio recordings
architecture::data sources (2)

- editorial/descriptive metadata

![CompMusic browser interface](image)
architecture::data sources (2)

- editorial/descriptive metadata
architecture::data sources (2)

- editorial/descriptive metadata
architecture::data sources (3)

• low-level audio features
architecture::data sources (3)

- low-level audio features
architecture::data sources (4)

- music scores
architecture::data sources (5)

- community data
architecture
architecture::data processing

- audio mid- and high-level descriptors
  - melodic structure
  - rhythmic structure
  - motifs

- semantic descriptors
  - emotions
  - gharanas
  - interactions/relations/discussions derived from social communities
architecture::info. processing

• Similarity measures:
  • Intonation profiles of raagas/artists
  • Motives in performances
  • Rhythmic analysis
  • Community modeling

• Data linking:
  • Definition of heuristics for the combination of the different sources
  • Audio to score section matching
architecture
architecture::presentation (1)

• Linking Open Data
architecture::presentation (1)

- Linking Open Data
Work plan
Thanks!