Songle: A Web Service for Active Music Listening Improved by User Contributions

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Our Goal

- Enrich music listening experiences by music-understanding technologies based on signal processing

- Toward this goal, we have already developed

  **Active Music Listening Interfaces**

  [Goto, 2003-]

- Active music listening
  - A way of listening to music through *active* interactions
  - You can take control of *your own* listening experience
Active Music Listening Interface

- **SmartMusicKIOSK** (chorus-section detection)
  - Access directly your favorite part of a song
  - View a visual representation of its music structure

[Goto, 2003-06]
Active Music Listening Interface

- **SmartMusicKIOSK** (chorus-section detection)
  - Access directly your favorite part of a song
  - View a **visual representation** of its **music structure**

The general public has not had the chance of using such research-level interfaces and technologies in daily life.

[GoTo, 2003-06]
Songle (http://songle.jp)

- Web service for **active music listening**
  - Allow anonymous users to enjoy **any songs (MP3 files) available on the web** by using **active music listening interfaces**
Demonstration (Web Service)
Use automatic music-understanding technologies

- Estimate four major types of music scene descriptions

- A user can enjoy playing back a song while seeing the visualization of the estimated descriptions

Songle (http://songle.jp)

Music structure
(chorus / repeated sections)

Chords
(root note and chord type)

Melody line
(F0 of the vocal melody)

Beat structure
(musical beats and bar lines)
Demonstration (Visualization)
Songle facilitates deeper understanding of music by visualizing music scene descriptions.
Songle with SmartMusicKIOSK

- Implement all functions of **SmartMusicKIOSK**
  - Jump and listen to the **chorus** with just a push of a button

[Diagram showing repeated sections and a song track]
Demonstration (Active Music Listening)
Songle makes it easier for a user to find desired parts of a piece.
Estimation Errors

- **Automatic music-understanding technologies**
  - Estimation errors are inevitable
  - Given the variety of musical pieces on the web

- Users of Songle might be disappointed by its performance

![Diagram of music structure with annotations](Image)
Let’s Overcome Estimation Errors Together

- **Songle** enables anonymous users to **contribute** by **correcting** estimation errors to improve the web service.

- **Efficient error correction interface (editor)**
  - If a user finds an error while listening, the user can **easily correct** the error by selecting from a **list of candidates** or by providing an alternative description.
Demonstration (Error Correction)

- Music structure

![Diagram of music structure](image-url)
Demonstration (Error Correction)

- Beat structure
Demonstration (Error Correction)

- Melody line
Demonstration (Error Correction)

- Chords
Chords

The resulting corrections are then shared and used to immediately improve the user experience.
Let’s Enrich Music Listening Experiences

- **Songle** is not just for collecting annotations, but for **better user experiences**
  - Users can simply enjoy **active music listening** without correcting any errors!
  - We understand that it is too difficult for some users to correct

- Users are not expected to correct all errors, only some according to each user's interests
Songle as a Showcase

- **Songle serves as a showcase**
  - Demonstrate how people can **benefit from** music-understanding technologies
  - Understand their **nature** through **user experiences**
    - “What kinds of sound mixture are difficult to handle?”

- **Prevent overestimation of the technologies behind**
  - The **originally estimated values** are visualized as **trails** with different colors after **user corrections**
  - **All correction histories** are recorded and can be compared
Songle as a Research Platform

- We hope Songle will serve as a research platform
  - Other researchers could exhibit results of their own music-understanding modules to jointly promote the popularization of our research field
  - The modules can be executed anywhere in the world without sharing source and binary codes
    Receive an audio file and send back the results via HTTP
  - Interesting to visualize/compare/integrate differences of music-understanding results
  - Let’s add other types of music scene descriptions
Implementation

- **Web server**
  - Ruby on Rails, MySQL, Passenger, Apache

- **Client user interface**
  - ActionScript 3, Adobe Flex Compiler, JavaScript

- **Music-understanding modules**
  - **Music structure**: RefraiD [Goto, 2003-06]
  - **Beat structure**: HMM-based method [Mauch, 2010-11]
    - Supporting tempo changes, and 3/4, 4/4, and 6/8 meters
  - **Chords**: HMM-based method [Mauch, 2010-11]
    - 14 types x 12 root notes, encouraging chord changes at bar lines
Conclusion

- **Songle: Web service for active music listening**
  - 2009/06: Started the project and development
  - 2011/10/20: Launched the beta version
  - Designed to set into motion a **positive spiral**
    1. Enable users to experience a service based on **music understanding** to let them **better understand its performance**
    2. Users **contribute** to improved performance
    3. The improved performance leads to a better user experience, encouraging further use of the service at step (1)

Game-based or crowdsourcing approaches often lack step (3) and depend on the feeling of fun or money

[Turnbull *et al.*, '07] [Mandel *et al.*, '07] [Law *et al.*, '07][Lee, '10][Mandel *et al.*, '10]
Conclusion

- **Songle as a social correction framework**
  - Users gain a real sense of contributing for their own benefit and that of others
  - Users can be further motivated to contribute by seeing corrections made by other users

- **Future work**
  - Use corrected errors and machine learning techniques to gradually improve music-understanding technologies

Better user experiences
Better technologies
Let’s Enjoy and Collaborate!

English and Japanese versions are available.
You can register any song (MP3 file) on the web!