Intelligent Music Interfaces

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ABSTRACT

Automatic music-understanding technologies (automatic analysis of music signals) make possible the creation of intelligent music interfaces that enrich music experiences and open up new ways of listening to music. In the past, it was common to listen to music in a somewhat passive manner; in the future, people will be able to enjoy music in a more active manner by using music technologies. Listening to music through active interactions is called *"active music listening."*

In this keynote speech I first introduce active music listening interfaces [1] demonstrating how end users can benefit from music-understanding technologies based on signal processing and/or machine learning. Music-understanding technologies can automatically estimate *music scene descriptions* [2] in musical audio signals: descriptions such as melody and bass lines, beat structure (beat and bar), and music structure (chorus section). By using the estimated music structure, for example, the active music listening interface *"SmartMusicKIOSK"* [3] enables people to access their favorite part of a song directly (skipping other parts) while viewing a visual representation of the song's structure. Other interfaces enable people to also customize (personalize) music by changing the volume or timbre of instrument sounds in existing music recordings and to browse a large music collection to encounter interesting musical pieces or artists.

I then introduce our recent challenge of deploying such research-level music interfaces as web services open to the public. For example, a web service for active music listening, *"Songle"* (http://songle.jp) [4], has analyzed more than 1,100,000 songs on the web and augments people's understanding of music by visualizing music scene descriptions estimated automatically. Since the current accuracy of automatic music understanding is less than that of human music understanding, Songle features a crowdsourcing interface that enables users to collectively correct analysis errors. Songle is used to provide a web-based multimedia development framework, *"Songle Widget"* (http://widget.songle.jp) [5], that enables music-synchronized control of computer-graphics animation and robots. It makes it easy to develop web-based applications with rigid music synchronization by leveraging music-understanding technologies. Furthermore, by using web-mining and music-understanding technologies, a web service for large-scale music browsing, *"Songrium"* (http://songrium.jp) [6], provides various bird's-eye views on more than 780,000 music video clips on video-sharing services.

In the future, further advances in music-understanding technologies and music interfaces based on them will make interaction between people and music even more active and enriching.

Author Keywords

Music interface; music understanding; music analysis; active music listening; web service; music information research

BIOGRAPHY

Masataka Goto received the Doctor of Engineering degree from Waseda University in 1998. He is currently a Prime Senior Researcher at the National Institute of Advanced Industrial Science and Technology (AIST). In 1992 he was one of the first to start working on automatic music understanding and has since been at the forefront of research in music technologies and music interfaces based on those technologies. Over the past 25 years he has published more than 250 papers in refereed journals and international conferences and has received 46 awards, including several best paper awards, best presentation awards, the Tenth Japan Academy Medal, and the Tenth JSPS PRIZE.

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He has served as a committee member of over 110 scientific societies and conferences, including the General Chair of the 10th and 15th International Society for Music Information Retrieval Conferences (ISMIR 2009 and 2014). As the Research Director he began a 5-year research project (OngaCREST Project) [7] in 2011 and follow-on 5-year research project (OngaACCEL Project) in 2016, both of which have focused on music technologies and been funded by the Japan Science and Technology Agency (CREST/ACCEL, JST).

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