Computational rhythm analysis from a multicultural perspective

Martín Rocamora

Facultad de Ingeniería, Universidad de la República

rocamora@fing.edu.uy

During the last thirty years, a new multidisciplinary field of research, known as Music Information Retrieval/Research (MIR), has emerged and steadily grown at the intersection of audio music processing, machine learning, music theory and musicology [1]. Primarily fuelled by the revolution brought by digital technology applied to music distribution and storage, it focuses on the processing of digital data related to music (such as editorial metadata, symbolic representations, scores, lyrics, and audio), and the development of methodologies to process and understand that data. Most of the proposed methods and systems rely on audio content, which is extracted by means of signal processing techniques [2]. The gap between low-level descriptors extracted from audio signals (e.g. energy, spectral content), mid-level representations (e.g. note onsets, pitch estimates) and high-level musical concepts (e.g. meter, tempo, key), known as the "semantic gap" [3], is usually tackled by the application of machine learning.

The vast majority of the technologies and models developed in the field of MIR have been oriented towards mainstream popular music in the so-called 'Western' tradition, which has certainly conditioned the problems addressed and the solutions obtained thus far. Although they proved to be effective for various music styles and repertoires, new approaches are needed to deal with other music traditions, such as those from Africa, China, India, or the Arab world. Fortunately, over the last few years there have been increasing efforts devoted to the study of traditional, folk or ethnic music [4]. The computational analysis of the rhythmic/metrical structure of music from audio signals remains a challenging task in several cases [5], for instance, for syncopated or polyrhythmic music.

References

[1] M. Schedl, E. Gmez, and J. Urbano, "Music information retrieval: Recent developments and applications," *Foundations and Trends in Information Retrieval*, vol. 8, no. 2-3, pp. 127–261, 2014.

[2] M. M uller, D. P. W. Ellis, A. Klapuri, and G. Richard, "Signal processing for music analysis," *IEEE Journal of Selected Topics in Signal Processing*, vol. 5, pp. 1088–1110, Oct 2011.

[3] Ò. Celma, P. Herrera, and X. Serra, "Bridging the music semantic gap," in *Workshop on Mastering the Gap: From Information Extraction to Semantic Representation*, vol. 187, 2006.

[4] X. Serra, "A multicultural approach in music information research," in *Proc. of the 12th Int. Society for Music Information Retrieval Conf.*, (Miami, USA), pp. 151–156, October 24-28 2011.

[5] A. Srinivasamurthy, A. Holzapfel, and X. Serra, "In search of automatic rhythm analysis methods for Turkish and Indian art music," *Journal of New Music Research*, vol. 43, pp. 94–114, Mar. 2014.