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What/when causal expectation modelling applied to percussive audio

Amaury Hazan, Paul Brossier, Ricard Marxer and Hendrik Purwins
Pomeu Fabra University, Ocata 1, 08003 Barcelona, Spain

A causal system for representing a musical stream and generating further expected events is presented. Starting from an auditory front-end which extracts low-level (e.g. spectral shape, mel frequency cepstral coefficients) and mid-level features such as onsets and beats, an unsupervised categorisation process builds and maintains a set of symbols aimed at representing musical stream events using both timbre and time descriptions. The time events are represented using inter-onset intervals relative to the beats. These symbols are then processed by an expectation module based on Predictive Partial Match, a multiscale technique derived from N-grams.

The system capacity to generate an expectation that matches its transcription is evaluated using drum recordings from the ENST-drums database. We show that the MFCC-based representation leads to a more compact set of symbols and a better match between transcription and expectation. Also, we suggest that the system is sensitive to exposure and illustrate some properties of the expectation entropy while attending percussive audio patterns.