MIDI To Score Automated Drum Transcription
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Overview

We propose our method for automated drum transcription, which is a special case of music transcription of polyphonic instruments.

We implemented this method in qparse, a C++ and python library able to build a whole dataset of music scores from a set of MIDI recorded performances.

Drum Notation

Drums have a notation specific to each of the elements, and for also the way that the drummer has to hit the drum or cymbal.

Elements of the drumkit

- Bass Drum (BD, also called kick),
- Snare Drum (SD),
- 3 toms, from left to right: High (HT), Medium (MT) and Floor (FT),
- Hi-Hat (HH): the two cymbals that can be joined (open) or disjoined (closed) using a pedal,
- ride (RC), hit on the bar (the body) or the bell (the top part) of the cymbal,
- crash (CC) or splash (SD), usually hit on the edge to produce an explosive sound.

Dynamics

- accent: indicates that a particular technique ought to be used, according to the related pitch,
- ghost notes: notes with low dynamics, but played firmly.

Ornaments

- flam: figure made of one grace note, played with lower intensity and slightly ahead the main note,
- drag: two grace notes are played with the same hand, ahead of a main note played by the other hand.

Transcription Using Weighted Parsing Techniques

In order to transcribe a MIDI file into drum notation, we use weighted parsing techniques [1]. At the beginning, a transducer calculates the cost of aligning the MIDI and the output score, and detects MIDI errors. Moreover, a weighted tree automata specifies the language of the preferred output notation [2]. Together, they perform the transcription as the search for an optimal parse tree. To make the output easy to read, we then proceed with some post-processing on the parse tree: separating voices (one tree per voice), and rewriting for minimal notation.

Evaluation

In our experiment, we used the Magenta’s Groove MIDI Dataset [3].

- proposes 1,150 audio files (~22,000 measures of drumming),
- diverse styles (e.g. funk, rock, jazz...),
- recorded from professional drummers performing on an electronic drum kit ROLAND T-11,
- recorded with a metronome: no need for a preliminary beat detection task.

Here is an example with one of the files from the Google’s Groove MIDI Dataset. We have no ground truth to make a quantitative evaluation, so we can only proceed to qualitative comparison between our result, and MIDI output by score typesetting softwares.

References