

AUTOMATIC TRANSCRIPTION OF PIANO MUSIC BASED ON HMM TRACKING OF JOINTLY-ESTIMATED PITCHES

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ABSTRACT

Two systems are proposed for the multiple F0 estimation and tracking task of the Fourth Music Information Retrieval Evaluation eXchange (MIREX 2008). Both systems have been specifically designed for piano music.

1 OVERVIEW

Two systems are proposed for the multiple F0 estimation and tracking task of the Fourth Music Information Retrieval Evaluation eXchange (MIREX 2008). Both systems have been specifically designed for piano music.

The first system is described in [2]. The algorithms is composed as follows:

- onsets are first detected using [1] in order to segment the signal;
- in each resulting segment, a few note candidates are chosen and a (sub)frame-based analysis is performed; the transcription of the segment content is obtained by using a hidden Markov model (HMM) to simultaneously track the pitches along the frames of the segment;
- notes with the same pitch in two consecutive segments are merged if they are present at the end of the first segment and if the increase of an energy criterion is not greater than a predefined threshold; otherwise, notes are considered as repeated;
- a note-based output is generated;
- a frame-based output is created from the note-based output.

The second system is new version of the first one. Both share the same onset-synchronous, HMM-based architecture. The main difference comes from the multipitch estimation algorithm, the new features being:

- an enhanced model for spectral overlap between notes;
- a new decision function (likelihood function);
- an extension of the maximum polyphony from 5 to 6.

References

- [1] M. Alonso, G. Richard, and B. David. Extracting note onsets from musical recordings. In *Proc. of the ICME*, pages 1–4, Amsterdam, The Netherlands, July6–8 2005.
- [2] V. Emiya, R. Badeau, and B. David. Automatic transcription of piano music based on HMM tracking of jointly-estimated pitches. In *Proc. of EUSIPCO*, Lausanne, Switzerland, August 2008.