Institut für Industrielle Informationstechnik
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Bachelor's Thesis, Master's Thesis

Alignment and Training for Mandolin Transcription

Motivation

Automatic transcription and note tracking of plucked string instruments are central tasks in the field of Music Information Retrieval. For the mandolin, characteristic playing techniques such as tremolo and vibrato pose particular challenges, as they affect the temporal and tonal structure of the signal and make the precise assignment to note events more difficult.

As part of an ongoing project, recordings of mandolin players have already been collected and roughly aligned with the corresponding musical scores or sheet music. The goal of this thesis is to further refine these alignment annotations in order to create a high-quality dataset for mandolin note tracking. Based on this dataset, a suitable transcription or note-tracking model will subsequently be trained and systematically evaluated.

Task Description

The goal of this thesis is to develop a methodology for refining existing alignments between mandolin recordings and the corresponding musical scores. To this end, existing methods for audio-to-score alignment will first be researched and analyzed with regard to their suitability for mandolin recordings. Particular attention will be paid to the challenges caused by tremolo and vibrato playing techniques.

Subsequently, an appropriate alignment methodology will be implemented, adapted, or extended in order to refine the existing coarse alignments. Based on this, a new dataset for mandolin note tracking will be created and examined for consistency and quality.

In a further step, a suitable note-tracking model will be selected, trained, and evaluated on the generated dataset. The results will be assessed using appropriate evaluation metrics and analyzed with respect to robustness against mandolin-specific playing techniques.

Prerequisites

- Basic programming skills in Python
- Basic knowledge of Machine Learning or Deep Learning
- Interest in signal processing, Music Information Retrieval, or automatic music transcription
- Enjoyment of scientific work

Research Area

- Music Information Retrieval
- Signal Processing
- Automatic Music Transcription
- Deep Learning

Degree Program

- [x] Electrical Engineering and Information Tec
- [x] Computer Science
- [x] Music Informatics (HfM Karlsruhe)

Focus

- [x] Signal Analysis
- [x] Modeling
- [x] Implementation

Start

Immediately

Links

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