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

Estimation of Transcription Confidence using Symbolic Music Language Models

Motivation

Automatic music transcription makes it possible to generate symbolic representations such as MIDI notes from audio signals. Modern transcription systems already achieve high accuracy; however, they often lack a reliable estimate of how confident the system is about individual transcription decisions. Such uncertainty estimation would be particularly important for applications such as automated music notation, music education, or interactive music software.

This thesis investigates how the plausibility or probability of a transcription can be estimated using symbolic music models. To this end, large language models for music, such as MusicBERT, will be used. These models are trained on symbolic music data (MIDI) and are capable of modeling musical structures.

Task Description

The goal of this thesis is to develop a method for estimating the probability or confidence of an automatic music transcription. The approach is based on analyzing symbolic MIDI sequences using a pretrained Music Language Model such as MusicBERT.

In a first step, a literature review will be conducted on methods for automatic music transcription, uncertainty estimation, and symbolic music modeling. Subsequently, a suitable model (e.g., MusicBERT) will be analyzed and a pipeline will be developed to evaluate MIDI sequences.

Building on this, a method will be developed that computes a likelihood or plausibility metric for given transcriptions. This metric should reflect how likely a transcription is in the context of musical structures. Finally, the developed methods will be applied to existing transcription datasets, and the validity of the likelihood estimation will be evaluated using appropriate metrics.

Prerequisites

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

Research Area

- Music Information Retrieval
- Deep Learning
- Symbolic Music Processing

Degree Program

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

Focus

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

Start

Immediately

Links

MusicBERT Model
Klangio

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