Master’s Thesis Defense

An Instance-based Classification Approach to Automatic Transcription of Monophonic Melodies

Fatemeh Pishdadian

Thesis Director: Dr. Jill Nelson

Committee Members: Dr. Kathleen Wage, Dr. Bernd-Peter Paris

Date: 07/18/2013
Time: 10:00 - 11:00 AM
Location: Engineering 3202

Abstract

Automatic music transcription (AMT) is a relatively new application in the field of music signal processing. The purpose of an AMT algorithm is to transform a raw acoustic musical signal into a written version, namely a score. The most basic pieces of information an AMT system aims to extract from a raw acoustic musical signal are the properties of individual note events, such as the starting time (onset), duration, and pitch. Pitch detection is an important part of any transcription system, and has been the subject of a vast volume of research over the past two decades.

Estimation of a single pitch at each time step is known as monophonic pitch detection. In this work, we present an instance-based classification approach to transcription of monophonic melodies. Depending on the size of training database, two different pitch classification methods are proposed. The conventional K-Nearest Neighbor algorithm is trained on a large database of piano notes and employed for pitch detection. A two-step algorithm, combining semi-KNN pitch candidate selection and note sequence tracking is suggested to deal with cases in which the training database is of minimum size, containing one sample per class. It is demonstrated that in the abundance of training data, the KNN algorithm along with a proper choice of the distance measure and K, yields high performance accuracy. Furthermore, while maintaining low computational complexity, the proposed two-step algorithm is capable of compensating for the shortage of data by incorporating prior musicological information in the transcription process.