

# Automated musical instrument recognition

Alireza Amiri

Georg-August-University Göttingen  
Institute of Computer Science  
Göttingen, Germany  
alireza.amiri@stud.uni-goettingen.de

Thorben Janz

Georg-August-University Göttingen  
Institute of Computer Science  
Göttingen, Germany  
t.janz@stud.uni-goettingen.de

Dimitra Despoina Maoutsa

Georg-August-University Göttingen  
Institute of Computer Science  
Göttingen, Germany  
d.maoutsa@stud.uni-goettingen.de

## I. INTRODUCTION

The expanding volume of available musical data leads to a rapid growth of the research field of automated music information retrieval due to the need of efficient administration and exploration of musical content. This need results from the change of the way people listen to and interact with music. Modern music streaming applications enable the user to listen to music, which is selected based on tags the user indicates.

One important aspect of music information retrieval is the automated musical instrument recognition. It has several applications, such as automatic musical transcription. This process consumes a lot of effort and time for human beings. Therefore a tool supporting the extraction of musical scores is capable of saving time thus money.

The project discussed in this paper deals with the automated recognition of musical instruments. The goal is to hierarchically classify musical instruments according to their family (strings, woodwinds etc.) and furthermore, in case of success, to proceed to intra-family instrument distinction. This will be achieved by developing a classifier which uses the machine learning approaches. This project is part of the master's level class "Machine Learning and Pervasive Computing" at the Georg-August-University of Göttingen.

Obviously audio signals are needed as the input data. One alternative is recording audios by microphone. Another choice is using previously recorded audio files. In this project the second option is used due to the lack of high-quality devices. Therefore audio files represent the more suitable choice, to reduce misclassification caused by noisy data. Consequently no sensors are required to obtain the input data.

The majority of the research projects on this field is based either on the data of single note recordings or isolated solo-performances of single instruments, which are referred to as "monophonic" recordings. Only a small part of researches deals with polyphonic recordings, where two or more instruments are played simultaneously. In terms of recognizing instruments from monophonic recordings, most problems are solved accurately. Accordingly the present focus is set on polyphonic instrument recognition. In addition

polyphonic recordings are closer to real-world music. For that reason polyphonic audio files are in this project's interest.

The novelty of our approach is the additional use of context information besides content information. Namely we are going to include information regarding the musical genre in order to provide some prior knowledge about the possible instrumentation of the songs of the recordings.