

ABSTRACT

This research is about automatic note detection for Turkish instrument “Saz”. The Harmonic Product Spectrum (HPS) method is used for detection. The reason of doing this research is that so many applications are created for usage of music industry. However there are only few research on Turkish traditional instruments. Today, even if we don’t have the notes written on a paper we can extract the notes with a software. This is possible for many instruments, such as guitar, piano, clarinet etc. however there is no application created to detect notes of Saz yet. Therefore this research is important for increasing the usage of Saz by Musicians.

In this research, Harmonic Product Spectrum (HPS) method is used as feature extraction method. HPS applies down sampling to the input data in spectrum format then multiplies the each result of the down sampled input. Saz Notes are recorded in Signal Laboratory as Wav file. A Matlab based algorithm is used to simulate the system. Notes are fed to the system offline. Firstly, the input is preprocessed and converted to feasible form for HPS. Secondly, preprocessed data is fed to the HPS. HPS extracts the feature of the note. The feature is consist of two frequency value. Finally the features are compared with the training data with k-NN method to identify the note.

In experiments we achieved 97% accuracy for noiseless notes and 89% accuracy for noisy notes. The software is able to extract the feature around 0.01 second. Overall computation time is around 0.0603 second. In a very similar research, done by Paul M. Brossier¹, the accuracy is 96% and the computation time of their software is 0.3 second. In another research, done by Chris Duxbury², the accuracy for onset detection was 92%. The common accuracy level for detection researches about musical instruments varies from 92% to 98%. Therefore the accuracy level of our research can be labeled as very satisfying.

Keywords: *Saz, Harmonic Product Spectrum, Pitch, Note Detection*

¹ Paul M. Brossier, Fast Labelling Of Notes In Music Signals, University Of London

² Chris Duxbury, A Hybrid Approach to Musical Note Onset Detection, University of London