

COMPUTER-ASSISTED TRANSCRIPTION OF ETHNIC MUSIC

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1. EXTENDED ABSTRACT

This research presents a system that eases the difficult, and time consuming task of transcribing ethnic music, especially if the pitch organization used in that music, is not well documented, or even unknown beforehand. The system analyses the music, suggests pitch organization automatically, and has features to assist transcription.

A system assisting pitch transcription should tackle the following challenges: it should be easy to repeat a small audio excerpt and to go from one loop to the next. Preferably, it should be possible to play loops slower than real-time, without affecting pitch, so that the transcriber can pick up on small details, and is able to follow quick passages. Another practical feature should be a way to visualize the main melody. The system should also provide a suggestion of the used pitch organization automatically. The transcriber also might want to check if the transcription is correct by performing the transcription. Therefore, an interface is wanted that allows musical performances in any tone scale.

Our system to transcribe pitch is based on Tarsos. Tarsos¹ is a modular software platform to extract and analyze pitch and scale organization in music. It is especially geared towards the analysis of non-Western music. Tarsos aims to be a user-friendly, interactive tool to explore tone scales and pitch organization in music of the world. An overview of Tarsos and its applications can be found in Six & Cornelis (2011); Six et al. (2013). Tarsos was mainly developed for analysis, but is now extended with features to assist transcription:

- A way to loop small audio excerpts, and to go from one loop to another easily has been built-in.
- A time stretching feature has been added, it allows to slow down audio playback without affecting pitch. The WSOLA (Verhelst & Roelands, 1993) time stretch algorithm has been implemented in TarsosDSP². The

feature allows transcribers to pick up on details in quick passages.

- The melograph shows the contour of the main melody. The contour depends on the pitch detection scheme chosen. Tarsos contains several pitch detection algorithms. In Figure 1, the melograph can be found in the top pane.
- Pitch histograms and pitch class histograms are computed automatically. They suggest the pitch organization and can be used to extract pitch classes. In Figure 1, the pitch class histogram can be found at the bottom right.
- Tarsos contains a MIDI synthesizer that supports tuning dump messages, the synthesizer can be tuned to using any tone scale³. This means that a transcription can be played in the original tuning, e.g. to see if the transcription aligns well with the original material.

¹ Tarsos is available on <http://tarsos.0110.be> and is open source software. It runs on all major operating system with a recent Java Runtime.

² TarsosDSP is a Java DSP library which contains various practical audio processing algorithms, of which some are used within Tarsos. For

easy re-use it is separated from the main Tarsos project and available on GitHub <https://github.com/JorenSix/TarsosDSP>

³ mid (1996) defines how tuning can be done. In essence, it defines how to assign arbitrary pitch values, in cent, to 128 available keys.

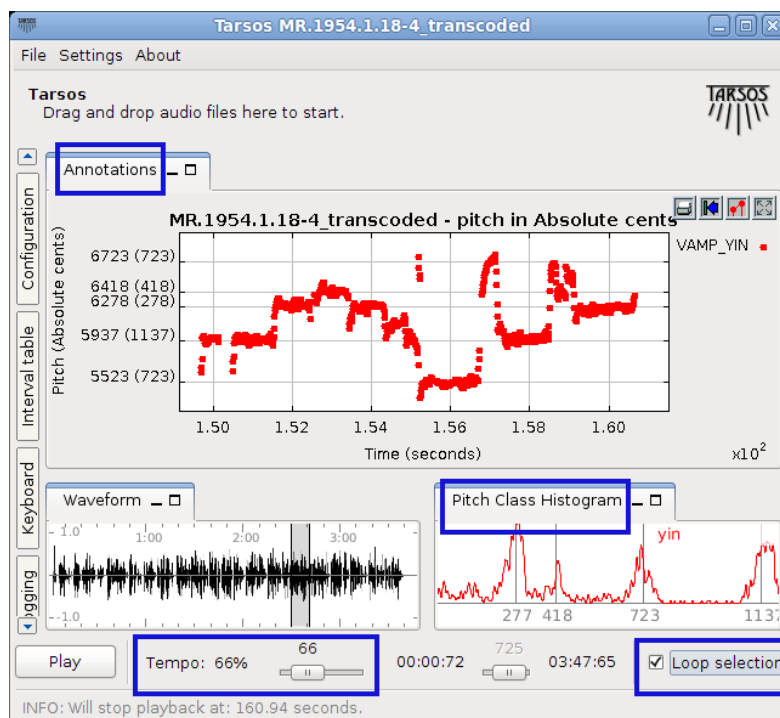


Figure 1: Transcription features in Tarsos, from upper-left to bottom right: The melograph with a pitch contour, the pitch class histogram of the current selection, the playback tempo, and the check box that determines if the current selection is looped.

1.1 Conclusion

Extensions to Tarsos have been presented, which allow Tarsos to assist in transcription of ethnic music, even when the pitch organization of the music is unknown beforehand. The system in its current form does not deal directly with timbral or rhythmical features, but is well suited for transcribing melodic material. It enables the transcriber to easily go from one, optionally time stretched, audio loop to the next. It has a visual representation of the main melody, and suggests pitch organization automatically. It also offers a way to play transcribed material on an automatically tuned MIDI synthesizer.

2. REFERENCES

- (1996). *The Complete MIDI 1.0 Detailed Specification*. MIDI Manufacturers Association.
- Six, J. & Cornelis, O. (2011). Tarsos - a Platform to Explore Pitch Scales in Non-Western and Western Music. In *Proceedings of the 12th International Symposium on Music Information Retrieval (ISMIR 2011)*.
- Six, J., Cornelis, O., & Leman, M. (2013). Tarsos, a Modular Platform for Precise Pitch Analysis of Western and Non-Western Music. *Journal of New Music Research (JNMR)*. Accepted for the upcoming special issue on computational ethnomusicology.
- Verhelst, W. & Roelands, M. (1993). An Overlap-Add Technique Based on Waveform Similarity (WSOLA) for High Quality Time-Scale Modification of Speech. In *IEEE International Conference on Acoustics Speech and Signal Processing (ICASSP 1993)*, (pp. 554-557).