

## Abstract:

We present an evaluation of different time-frequency features for analyzing bird song signals on the basis of syllable comparison. The evaluation is performed on 2237s (37 minutes) of bird song data, originally recorded with an analogue tape recorder and then digitized with 44.1 kHz. The data consist of 6 songs from two individuals, recorded 3 different years, in total 190 strophes with 2903 syllables. The syllables are subsequent pairs classified by hand, to be equal or not equal, representing ground truth.

The usual single window spectrogram as well as more robust multitaper methods are applied for the time-frequency analysis of the syllables. The time-frequency spectra are converted to Ambiguity and Doppler spectra to avoid dependence of time jitter. Singular Value Decomposition (SVD) is applied to the Ambiguity and Doppler matrices and the first singular vectors are used as features.

The best algorithm for correct classification of equal syllables are based on the Hermite multitaper spectrogram, followed by SVD of the Doppler spectrum and use of a non-linear (minimum) choice between the two singular vectors. The best algorithm for correct classification of not equal syllables are based on the same method but with use of the Doppler spectra.