Abstract

The doctoral thesis focuses on the variability of a wide range of acoustic parameters of the speech signal in the Czech language. It summarizes the methodological approaches applied in previous studies on the acoustic characteristics of speech and presents a comprehensive analysis of intra-speaker and inter-speaker variability of an extensive set of selected parameters through original experiments conducted using a unified speech material. The individual experiments examined acoustic parameters that characterize fundamental frequency, vowel formants, short- and long-term frequency spectrum, and the temporal domain of speech, employing a total of 61 metrics. The variability of all parameters was observed within an individual's speech during one type of utterance as well as in relation to speaking style, with recordings of both read and spontaneous speech from thirty speakers being analyzed. Based on the experimental results, information regarding the distribution of parameter values in both speaking styles within the given population was obtained. In the final experiment, a comprehensive analysis of all investigated parameters was conducted, focusing on their mutual relationships and their contribution to the overall variability of the speech signal. The results of this comprehensive analysis indicate that the parameters of short- and long-term spectral slope and vowel formants play a decisive role in the acoustic variability of the speech signal, while indicators such as fundamental frequency, characteristics of consonant frequency spectra, and temporal parameters contribute to this variability to a lesser extent.

Key words

acoustic analysis, speech signal variability, intra-speaker variability, inter-speaker variability, fundamental frequency, vowel formants, frequency spectra, spectral slope, spectral moments, LTAS, speech rate, global temporal metrics