

**The role of phonemes duration, energy and frequency features in prominencing accent and sentence boundaries in spoken Polish**

abstract

Selected prosodic features of Polish phonemes were analyzed statistically in order to establish their correlation with their location in a sentence. The accents and the ends of sentences were considered with a special focus.

Polish speech database CORPORA, including 5130 sentences and 9810 isolated words of 45 speakers (male, female and children) and their time annotations into phonemes was used. For each phoneme, mean values of phonemes duration, energy and power of the phoneme, and a fundamental frequency of voiced phonemes were counted. The distribution of the features in the entire database was visualized.

In reference to the average values, the significant changes in the considered statistics were investigated. The phenomenon of preboundary lengthening of the phonemes was described, as well as decrease of energy and pitch in the end of affirmative sentences. The results can be used for automatic punctuation recognition in spoken language. In the place of accented syllables, vocal stress was observed as significant increase of total energy of phonemes and the ratio of energy per second and the pitch accent was characterized by local increase of F0. The accent measures were analyzed for both sentences and isolated words. The phenomena were analyzed also in dependence on the number of syllables in the word.

The regularity of the correlations was demonstrated quantitatively for all processed data. The methods of analysis and the obtained data were presented and compared to expected values from phonetic and phonologic literature. The results of the study will be used for language modeling in automatic speech recognition system, developed at AGH.