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Development of Speech Recognition Systems Based on Hidden Markov Models of Individual Words

A. N. Savin, N. E. Timofeeva, A. S. Geraskin, Yu. A. Mavlutova

Alexander N. Savin, orcid.org/0000-0001-5148-9166, Saratov State University, 83, Astrakhanskaya Str., Saratov, Russia, 410012, savinan@info.sgu.ru

Nadezhda E. Timofeeva, orcid.org/0000-0002-3976-3115, Saratov State University, 83, Astrakhanskaya Str., Saratov, Russia, 410012, timofeevane@yandex.ru

Aleksej S. Geraskin, orcid.org/0000-0002-3118-1022, Saratov State University, 83, Astrakhanskaya Str., Saratov, Russia, 410012, gerascinas@mail.ru

Yuliya A. Mavlutova, orcid.org/0000-0002-1190-90064, Saratov State University, 83, Astrakhanskaya Str., Saratov, Russia, 410012, yuliyamav@yandex.ru

The results of the development of software modules implementing the speech recognition system based on the hidden Markov models of individual words and the use of linear prediction in the coding of signs of an audio signal are presented. The structure of the speech recognition system is based on the hidden Markov models of individual words, consisting of four modules: a module for extracting words from the sound stream, a module for analyzing the features of a word, a module for learning the hidden Markov models, and a word recognition module. Algorithms for the formation of hidden Markov models with left-right topology for individual words of the required dictionary of commands of the object control system are based on the coding of signs of a sound signal using linear predictions. Results of an estimation of reliability of a sequence of observations corresponding to separate words obtained with the help of the proposed processing algorithm are given. The developed software modules allow to prepare efficiently the necessary initial data and thus form the required dictionary of commands of the object management system, build hidden Markov models of individual words, and conduct their training using the Baum – Welsh algorithm. The designed command dictionaries are supposed to be used in intelligent control systems for various objects.

Key words: Hidden Markov models, cepstral analysis, speech recognition, method of Baum – Welch.

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