486. Preliminary study of the automatic speech recognition for devices supporting the ill and disabled

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Abstract. In this article we will deal with some initial problems encountered while recognizing speech from among a limited set of vocabulary, which may be used as a means of controlling devices. We will propose a conception of how to extract single words from an audio signal and we will investigate possibilities of implementing the characteristics of time and amplitude of an acoustic signal into further work and consideration. The method of extracting single words from the registered acoustic signal was proposed. The algorithm applied proved to be effective in the case of compact words and those containing a short pause between the syllables. As a criterion for extraction of a single word, the sum of amplitudes of the signal was assumed with corresponding level of the frame. Based on alternating use of frames: 10 [ms] for finding the beginning of the word, 120 [ms] for initial allocation of the word’s end, 10 [ms] for allocation of the end of word. The usefulness of time and amplitude characteristics for further studies, with the goal to find an automatic system of speech recognition was checked. Calculations executed in MATLAB.

Keywords: automatic speech recognition, filtration, spectrum analysis

1. INTRODUCTION

Contemporary societies comprise large groups of disabled people. According to the data collected by the Office of the Government Plenipotentiary for the Disabled [1], in 2007 there were about 3.8 million people with verified disability in Poland, which constitutes 12 % of Polish population of citizens above the age of 15. There is a lack of data concerning exact figures for how many of them suffered from permanent injuries of locomotors system. Another category is represented by people who need help with locomotion or even fulfilling their basic physiological needs owing to their disabilities. The possibility of using various devices controlled by human voice may be the only chance for disabled people with intact voice to lead normal life, acquire education and work.

Among several possible ways of human communication, talking proved to be the best means of information exchange and, as such, contributed to major changes in human environment. During social development, humankind created a simplified code in the form of the alphabet which enabled people to transmit information in interpersonal relations.

Human beings are an integral part of the aforesaid system that records pieces of information that are to be transmitted. Thus, an aspiration after machines effectively controlled by voice seems to be a natural human endeavor. Nowadays, numerous projects on developing automatic