

Intelligent System for Natural Language Processing

Maciej Majewski and Wojciech Kacalak

Technical University of Koszalin, Department of Mechanical Engineering
Raclawicka 15-17, 75-620 Koszalin, Poland

{maciej.majewski, wojciech.kacalak}@tu.koszalin.pl

Abstract. Nowadays technological devices can already be provided with enough intelligence to understand and act appropriately on voice commands. The voice communication with technological devices becomes a stronger challenge as technology becomes more advanced and complex. In this paper, a natural language interface is presented which consists of the intelligent mechanisms of human identification, speech recognition, word and command recognition, command syntax and result analysis, command safety assessment, technological process supervision as well as human reaction assessment. In this paper, a review is carried out of selected issues with regards to recognition of speech commands in natural language given by the operator of the technological device. A view is offered of the complexity of the recognition process of the operator's words and commands using neural networks made up of a few layers of neurons. The paper presents research results of speech recognition and automatic recognition of commands in natural language using artificial neural networks.

1 Intelligent Two-Way Speech Communication

If the operator is identified and authorized by the natural language interface in Fig. 1, a command produced in continuous speech is recognized by the speech recognition module and processed in to a text format. Then the recognised text is analysed by the syntax analysis subsystem. The processed command is sent to the word and command recognition modules using artificial neural networks to recognise the command, which is sent to the effect analysis subsystem for analysing the status corresponding to the hypothetical command execution, consecutively assessing the command correctness, estimating the process state and the technical safety, and also possibly signalling the error caused by the operator. The command is also sent to the safety assessment subsystem for assessing the grade of affiliation of the command to the correct command category and making corrections. The command execution subsystem signalises commands accepted for executing, assessing reactions of the operator, defining new parameters of the process and run directives [4]. The subsystem for voice communication produces voice commands to the operator [5].

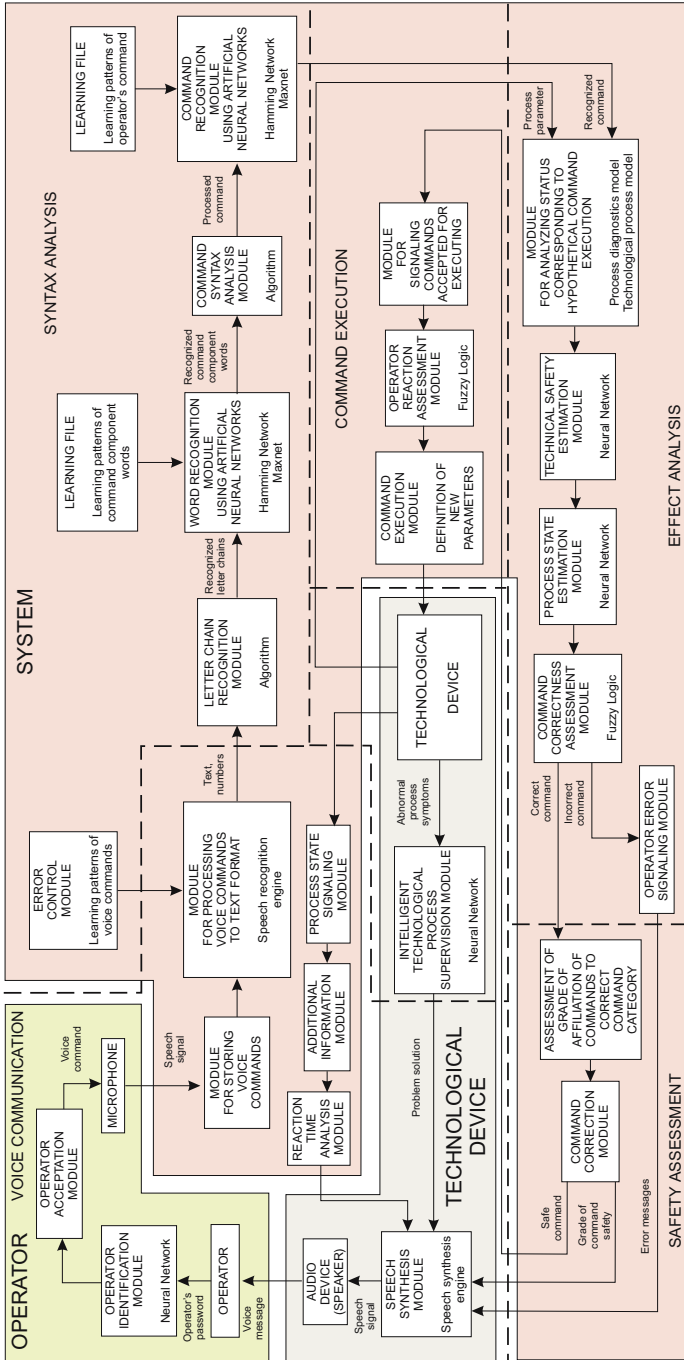


Fig. 1. Architecture of the natural language human-machine interface