

**DESENVOLVIMENTO DE UM SISTEMA DE  
RECONHECIMENTO DE FALA  
(DEVELOPMENT OF A SPEECH RECOGNITION SYSTEM)**

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# Abstract

In this thesis the problem of Automatic Speech Recognition is presented in a general manner. The main goal of the work done which led to this dissertation was to study and to build a system capable of recognizing continuous speech, in a perspective of getting in touch with that research area, which is in constant development, and with the multiple disciplines it involves, from the core of Signal Processing and Pattern Recognition until the fields of Linguistics and Statistics.

This work can be divided in two major parts: a theoretical one and an experimental one.

The theoretical part presents the problem of automatic speech recognition, going through its goals, principles, difficulties and known solutions. This is followed by an historical review on the issue. After that, it enters the scientific specification of the matter, namely at the speech processing level, or analysis level, and the classification processes, taking special care of the predominant acoustic models in these days. Hidden Markov Models, neural networks and hybrid systems which combine both previous models are treated. There is also a reference to some the language models and to algorithms used for classification as well.

The experimental part has three main aspects. One is on the use of existing resources, of public domain, such as the HTK system, which was the basic tool for the development of the speech recognition system, and the database which was used in experimenting the system: the TIMIT database. On the other hand, there is the developed software from scratch and which allowed the coordination of the tool and the databases to the intended purpose, which was an off-line type, as well as a better use of the resources already mentioned, as well as provided a good basis for the development of this and future systems. In a third part, relative to the experiments, the description of the developed system is done, by presenting their characterization, the results obtained and by doing a brief discussion on their quality.

The thesis ends with the presentation of the main conclusions redrawn from the work done and some future directions for future developments are also presented.