

# Robust Clustering - Based Realtime Vowel Recognition

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## Abstract

In the therapy of the hearing impaired one of the key problems is how to deal with the lack of proper auditive feedback which impedes the development of intelligible speech. The effectiveness of the therapy relies heavily on accurate phoneme recognition. Because of the environmental difficulties, simple recognition algorithms may have a weak classification performance, so various techniques such as normalization and classifier combination are applied to raising the overall recognition accuracy. In earlier work we came to realise that the classification accuracy is higher on a database that is manually clustered according to the gender and age of the speakers. This paper examines what happens when we cluster the database into a few groups automatically and then we train separate classifiers for each cluster. The results shows that this two-step method can increase the recognition performance by several percent.

**Keywords:** speech recognition, speech therapy, two-step classification method

## 1 Introduction

In the therapy of the hearing impaired one of the central problems is how to deal with the lack of proper auditive feedback that hinders the development of intelligible speech. Our Phonological Awareness Teaching System, the "SpeechMaster" package, seeks to apply speech recognition technology to speech therapy. It provides a visual phonetic feedback to supplement the insufficient auditive feedback of the hearing impaired. Our computer-aided training software package uses an effective phoneme recognizer and provides a realtime visual feedback in the form of flickering letters positioned over calling pictures.

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