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## Speaker verification system using a hierarchical adaptive network-based fuzzy inference systems (HANFIS)

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### Abstract

We propose the use of a hierarchical adaptive network-based fuzzy inference system (HANFIS) for automated speaker verification of Persian speakers from their English pronunciation of words. The proposed method uses three classes of sound properties consisting of linear prediction coefficients (LPC), word time- length, intensity and pitch, as well as frequency properties from FFT analysis. Actual audio data is collected from fourteen Persian speakers who spoke English. False acceptance ratio and false rejection ratio as are evaluated for various HANFIS trained with different radius. Results indicate that vowel sounds can be a good indicator for more accurate speaker verification. Finally, the hierarchical architecture is shown to considerably improve performance than ANFIS. © 2010 IFIP.

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# Speaker Verification System Using a Hierarchical Adaptive Network-Based Fuzzy Inference Systems (HANFIS)

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**Abstract.** We propose the use of a hierarchical adaptive network-based fuzzy inference system (HANFIS) for automated speaker verification of Persian speakers from their English pronunciation of words. The proposed method uses three classes of sound properties consisting of linear prediction coefficients (LPC), word time- length, intensity and pitch, as well as frequency properties from FFT analysis. Actual audio data is collected from fourteen Persian speakers who spoke English. False acceptance ratio and false rejection ratio as are evaluated for various HANFIS trained with different radius. Results indicate that vowel sounds can be a good indicator for more accurate speaker verification. Finally, the hierarchical architecture is shown to considerably improve performance than ANFIS.

**Keywords:** ANFIS, Speaker verification, LPC, FFT, intensity and pitch coefficients, HANFIS.

## 1 Introduction

The computer industry controls most informational, financial and security systems. Currently, the research community has considered properties of face, sound, fingerprint, and iris for new identification schemes [1]. In addition to above approaches, sound is an important information source, is very simple for the user, and can potentially provide high speed recognition. To date, sound recognition for security purposes and with the use of ANFIS in particular, has been largely neglected. Few articles have applied neural networks and considered sound samples directly as input to the network, without any pre-processing. In this paper, we advocate the use of a hierarchical ANFIS (HANFIS) for fast clustering and identification of sound. Initially, several features are produced from sound of individuals after omission of noise and silence [2], and validation function is accomplished with these features by ANFIS. The experimental result of this paper which is practical represented by final Table at the end and it is MATLAB programme.