

## Improving the Recognition of Noisy Arabic Speech Via Wavelet Compression

**Abdullah Ahmad Salem Basuhail**

*Jeddah College of Technology, Saudi Arabia*

**ABSTRACT.** This paper presents a method that uses the wavelet transform in compressing a noisy speech signal and then, testing its effect on the reconstruction of noisy Arabic speech utterances after decompression. The ability of wavelets in compacting signal energy is employed to separate the significant signal features from the noise contribution. The technique showed an improved SNR for the processed speech samples. In each experiment performed, the correlation coefficients are computed and compared to the correlation coefficient yielded by a similar compression scheme based on the Fourier transform. The use of the wavelet-based compression technique is superior in improving the recognition of speech signals especially at high input SNR values.

**KEYWORDS:** Speech Compression, Wavelet Transform, Pattern Recognition.

### 1. Introduction

Speech signals are one of the most important means of communication among the human beings. The speech signal is a slowly time varying signal in the sense that, when examined over a sufficiently short period of time, its characteristics are fairly stationary; however, over long periods of time the signal characteristics change to reflect the different speech sounds being spoken [[1]]. Consequently, speech signals are represented in the time domain by relatively long sequences which reveal the speech signal energy of the spoken utterances.

Speech recognition is affected by noise. Therefore, the probability of detection of an unknown sample within a library decreases as the noise power increases. This means that comparisons of an unknown sample to samples that are very similar to each other leads to a higher probability of error; consequently, to false recognition and an increased error rate.

Wavelet-based compression technique can be used to reduce the effect of the noise in order to increase the probability of recognition of the input sample [[2]]. In general, wavelet-based processing techniques of noisy data are important methods that can be applied in data analysis and of great significance in many applications. Such as, signal identification, and pattern recognition. Speech compression is important in mobile communications, to reduce transmission time, and in digital answering machines [[3]].