

Multimedia Encryption, Transmission and Authentication

Edited by

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INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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Chapter 13

Speech Coding Techniques and Algorithms

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13.1 INTRODUCTION

Due to the growing need for bandwidth conservation and enhanced quality in wireless cellular and satellite communication, the research of low bit rate speech coder with acceptable quality is becoming increasingly important. Applications like Digital cellular and satellite telephony, video conferencing and internet voice communications, all have an increasing demand efficient use of bandwidth without compromising the quality [1].

Speech coding is the process of obtaining compact digital representations of voice signals for purpose of efficient transmission or storage. In all modern coders, the analog speech signal is first digitized. The sampling process converts the analog electrical variations into a sequence of bits. The sequence is processed by an encoder to produce the coded representations. The coded representation is either sent to the receiver or stored. The receiver reconstructs an approximation of the original signal [2].

Speech coding can be divided into two broad categories; waveform coding and parametric coding [3] [15]. Waveform coding tries to acquire the most similar reconstructed signal to the original one. Pulse Code Modulation (PCM) and Adaptive Differential PCM (ADPCM) are practical examples of waveform coding. In general, waveform coding has relatively simple algorithms and better speech quality [3].

On the other hand, parametric coding tries to obtain high quality speech by extracting and encoding the feature parameters of the speech signals. Parametric coding algorithms mostly include several components, like channel vocoder, format vocoder and linear predictive coding (LPC). Parametric coders can achieve a lower bit rate than waveform coders. However, the quality of the synthesized speech degrades both in clearness and naturalness [4].