Chapter 12

Wireless Enhanced Security Based on Speech Recognition

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ABSTRACT

Security is the most notable fact of all computerized control gadgets. In this chapter, a voice ID computerized gadget is utilized for the security motivation using speech recognition. Mostly, the voices are trained by extracting mel frequency cepstral coefficient feature (MFCC), but it is very sensitive to noise interference and degrades the performance; hence, dynamic MFCC is used for speech and speaker recognition. The registered voices are stored in a database. When the device senses any voice, it cross checks with the registered voice. If any mismatches occur, it gives an alert to the authorized person through global system for mobile communication (GSM) to intimate the unauthorized access. GSM works at a rate of 168 Kb/s up to 40 km and it operates at different operating frequencies like 800MHz, 900MHz, etc. This proposed work is more advantageous for the security systems to trap the unauthorized persons through an efficient communication.

INTRODUCTION

1. Digital Signal Processing Techniques: Digital Signal Processing is a technique where digital signals are sampled and processed by many DSP techniques namely multirate processing, Fast Fourier Transform (FFT), Discrete Cosine Transform (DCT) and so on under the stream of VLSI. Each technique is processed according to its architecture.
Multirate Signal Processing: The term Multirate is defined as the sampling of different frequencies. The process of sampling of the already sampled datum for multiple times is termed as Multirate signal processing. Due to multi-rate DSP, the processing efficiency is increased, which minimize the requirements of DSP hardware. Theories like filter bank and multi-resolution play an essential role of multiple sampling. This sampling technique is used for analysis of signals, compression, denoising etc. According to the past facts, these sorts of techniques show their hike involvement in signal processing domain and also in digital communication. In Multirate signal processing, the signal rate used in a corresponding system is expected to either increase or decrease, and some kind of signal processing is required for that. Therefore “Multi-rate DSP” is referred to the changing of the different sampling rate.

The multirate signal processing has many applications. One of its applications is speech and speaker processing and it has been explained elaborately below.

Speech Processing: Speech Recognition gives the knowledge and research in linguistics and in engineering stream. This would enrich the recognition methodologies and its technologies which recognize the spoken language to display as a text by any computerized gadget, which is categorized as the smart technologies. Hence, it is said as Speech to Text.

The production of speech produces the spoken words based on the phonemes for each and every specific word. Speech production is spontaneously generated when the words are read from a paragraph and such speech is speech repetition. Speech production differs from each language production. Language production involves embedding grammar of the language to the produced speech. Normally, during a casual conversation people tend to use four syllables, twelve phonemes etc., for each and every single second. They are also able to speak a two to three word which contains up to 100 words of vocabulary. Error occurs in case of spontaneous speech and it is about one in every 900 words during the production of speech.

The speech transmission is done through the sound waves and the principle behind in this transmission is acoustics. A sample speech transmitted signal is shown in Figure 1. The source of all sound is vibration. A source (something put into vibration) and a medium (something to transmit the vibrations) are necessary in order to make the sound. Sound waves are produced by vibrating vocal tract.

The application of speech recognition is voice user interfaces which include domestic appliance control, voice dialing, call routing, and dictation system and speech-to-text conversion.

Speaker Recognition: Speaker Recognition is the one that recognizes and identifies the voice of a person. This kind of recognition is also called as pattern recognition or voice recognition. The difference between speaker and speech is that the speech recognition identifies the person’s speech but the speaker recognition denotes person’s voice. Speaker verification and speaker identification are the two processes carried out through speaker recognition. Perceiving the speaker can be done by interpreting specific speaker features of the speech as part of a security procedure. The speaker identification can be done for text –independent speech and also for text -dependent speech.