Chapter 16
Voice–Based Speaker Identification and Verification

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ABSTRACT

In recent years, the advancement in voice-based authentication leads in the field of numerous forensic voice authentication technology. For verification, the speech reference model is collected from various open-source clusters. In this chapter, the primary focus is on automatic speech recognition (ASR) technique which stores and retrieves the data and processes them in a scalable manner. There are the various conventional techniques for speech recognition such as BWT, SVD, and MFCC, but for automatic speech recognition, the efficiency of these conventional recognition techniques degrade. So, to overcome this problem, the authors propose a speech recognition system using E-SVD, D3-MFCC, and dynamic time wrapping (DTW). The speech signal captures its important qualities while discarding the unimportant and distracting features using D3-MFCC.

INTRODUCTION

In day-to-day life, people will frequently use textural, pictorial, and speech to share their information. But among those techniques speech is one of the powerful ways for communication. There are various studies is conducted on speech identification, verification, conversion (speech to text), and emotion detection Furui et al., 2004). The speech signals are classified into three different types based on the requirement of the study. Figure 1 represents the classification of speech signals.

Figure 1. The classification of the speech signal
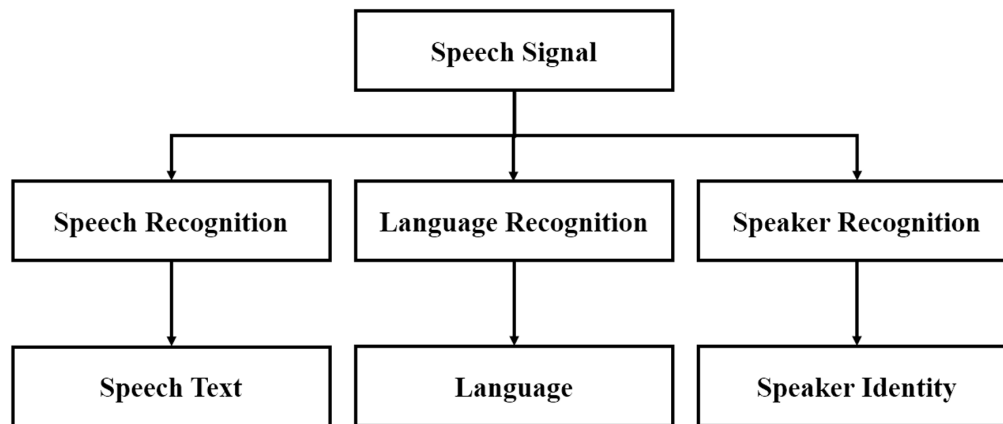
Here, the speech signal is consists of countless messages and it is extracted based on the interest of speaker attention. The speech is the representation of waveform which is most useful in various practical applications. However, in this chapter, the author is mostly concentrated on speaker recognition systems (SRS). The purpose of SRS is to deploy this system in the forensic department which helps to identify the culprits.

Speech Recognition (SR)

In the era of computing, there are various speech processing techniques have been proposed by different researchers. The motive is to encourage high-speed development algorithms, computational architecture, and hardware. Speech recognition is the ability of a machine to identify the spoken words that are carried out in voice (Kushida et al., 2007). The digital words are in the form of a sequence that is matched against the coded dictionaries. Speech recognition is classified into two aspects (i) the system has to train for the identification of the patterns, and (ii) to identify the continuous or discrete word. The implementations of speech in the field of normal condition will become the alternative of keywords. However, the principle of speaker recognition is to identify and verify based on the speech wave (Sinha et al., 2019). This will help in many applications like voice dialing, speech-based banking, shopping, voice mail, security based on speech, forensic applications like determining the person's authenticity using the speaker verification process (etc.).

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