Chapter 5
Conclusion

This case study contributes to understand the speaker identification process, in a situation, where the unknown speech sample is in different language/dialect from the recording of suspect. Hindi, being the most spoken language in India, is selected for the study and its seven popular dialects are chosen including Khariboli as the base language. Speech samples of 20 male and 20 females from each regional dialect are recorded and analyzed to obtain the distinctive features. These features, when combined together, are found useful in the area of forensic voice identification.

The spectrographic study of vowel quality and quantity for various dialects reveals that each dialect possesses its own vowel quality, which is distinguishable while, compared with Khariboli and also the vowel quantity is quite distinct when compared with each other. Therefore, vowel quality is proved to be a useful feature for profiling of speakers, yet there are a few similarities among the regional dialect speakers. The features, based on the vowel quality, are cooperated with features of prosody as discussed later in the chapter.

Vowel quantity analysis reflects various observations; speakers of Bhojpuri, Chattisgarhi, Kannauji, Marwari, Bundeli, and Haryanvi dialects use longer vowel /ə/ as compared with Khariboli. Speakers of Bhojpuri, Chattisgarhi, Bundeli, Kannauji, and Marwari dialects use longer vowel /a/ as compared with Khariboli, whereas speakers of Haryanvi dialect use short vowel. Dialectal speakers of Chattisgarhi, Kannauji, Haryanvi, and Marwari dialects use longer vowel /i/ as compared with Khariboli, whereas speakers of Bhojpuri and Bundeli dialects use short vowel. Likewise, speakers of Bhojpuri, Chattisgarhi, Kannauji, Bundeli, and Marwari dialects use long vowel /o/ as compared with Khariboli, whereas speakers of Haryanvi dialectuse short vowel. Dialectal speakers of Chattisgarhi and Haryanvi dialects use long vowel /u/ as compared with Khariboli, whereas speakers of Bhojpuri, Kannauji, Bundeli and Marwari dialects use short vowels.

This study also suggested that specific acoustic features of Bhojpuri, Chattisgarhi, Kannauji, Marwari, Khariboli, Bundeli, and Haryanvi dialects, based on the results of prosody analysis, are unique and distinguishable for profiling of speakers belonging

to the regional dialectal group, validating that the acoustic features associated with lexical and sentence intonation are useful for speaker profiling.

Quality of front vowels' expressed in terms of first and second formants is found more significant as profile characteristic than that of back vowels. Thus, overall distribution of vowel quality on vowel quadrilateral is very critical in characterization of dialectal accent based speaker profiling. Due to exposure to other nonnative dialects, there is a chance of variation in accent features, although accent features are likely to remain as profile characteristic for quite some time. Some of the speakers' vowel quality and quantity is deviating from the vowel quality and quantity of the accented dialect. The observations imply that some of the regional dialect speakers use vowel quality and quantity other than the vowel quality and quantity of their own dialect, maybe because of the influence of other language or dialect. It is very important that words with similar vowel quality and quantity should be chosen as clue word. In actual crime case examination, if the auditory impression is of accented utterances in either questioned or specimen speech exemplars, it is recommended to study the vowel quality and quantity of the utterances in the questioned sample as well as in the specimen sample. Consequently, an enormous number of possible syllabic nuclei of same vowels is required to be selected and the preliminary study of variant of vowels within questioned as well as within specimen is required to be conducted in order to understand the variant of vowel quality due to the production of accented and unaccented utterances by the accused or by the suspect(s).

As the population distribution of speakers of Kannauji is in close proximity to the population distribution of speakers of Khariboli, there are similarities in features among the native speakers of Khariboli and Kannauji dialects. Although Haryanvi dialect speakers' distribution is in close proximity to the Khariboli dialect speakers' distribution, there are larger distinctive features among the native speakers of Haryanvi and Khariboli as the Haryanvi dialect of Hindi is heavily influenced by the Panjabi on the northwest of Haryanvi region. Likewise, the Bundeli and Chattisgarhi dialect speakers are showing some similarities in the initial and the end of the sentence intonation. However, differences occur in the middle of the sentence. The clear distinction between Bundeli and Chattisgarhi can be made in terms of the vowel quality, where Bundeli speakers are showing a closer form of the vowels than the Chattisgarhi speakers. The study reveals that most of the female native speakers of the regional dialect are showing a constraint to the process of language change as far as accented delivery is concerned. The identification is better among female speakers than the male speakers. Most of the dialect speakers of Hindi are found to be different in terms of tonal characteristics when compared with Khariboli. In this study, a majority of the speakers of the chosen dialects use tonal features different from the tonal features of Khariboli speakers.

However, there is influence of regional dialects or deviated accented features among the Khariboli speakers, identification with larger number of representative data, i.e., (80±10%) is possible. Likewise, Haryanvi speakers can also be identified with the larger representative data. Other dialects of Hindi, namely, Bhojpuri, Chattisgarhi, Kannauji, Marwari, Khariboli, and Bundeli are observed to be influenced by nonnative

accent and lesser number of representative data for identification is used specially among the male speakers. The observations imply that there is a constant influence of other regional dialect on the native accented features of these dialects of Hindi. Dialect accent of male speakers are found more variable than the female speakers. The discussed findings encourage us to collect similar data from other dialects of Hindi in order to create a database for speaker profiling. Such database is one of the very important and informative databases for forensic labs working with Speaker Identification.