Abstract

The process of speech recognition is carried out phase wise. Sufficient volume of work related to the recognition for the languages like English, Japanese, Chinese, and Arabic etc. is found in the literature. Research work was initiated for languages of Indian origin in late decades of the twentieth century. One can find advanced stages or almost complete speech recognition system for some of the languages like Hindi. The efforts for other Indian languages are ongoing. Gujarati is among one of them where the work is almost untouched for speech recognition. In this thesis the recognition of Gujarati and Hindi speech is considered with the assumption that limited words are to be recognized using existing speech recognizer for English language.

English and Gujarati are phonetic language in which spoken and written form of words are similar to each other. In phonetic languages the rules are generally capture the mapping of spelling to phonemes very well. However, profound knowledge of language is required to write all possible rules, and there is some complexity in the language that is difficult to capture with rules.

The objective of the research is to address the problem of transcription of continuous speech recognition for Indian languages such as Gujarati and Hindi, widely used by Indian people. We have developed system that supports small vocabulary continuous speech recognition system for Gujarati and Hindi Language and generates appropriate text output using Java Speech API and Speech engine for windows platform.

This thesis is divided into six chapters. The first Chapter covers a brief history of speech recognition and current trends in speech recognition. An overview of speech recognition activities for Indian language, general model of speech recognition and major issues and
challenges of speech recognition are also discussed. It states objectives, scope and limitations of study.

Second Chapter provides details of study of related work and speech recognition activity for international and Indian languages. It also covers overview of speech technology, speech production model, characteristics of speech signal and various phases of signal processing. It discusses techniques for extracting, storing and processing different features of speech signals.

Third chapter introduces the implementation, requirement and design goals for Java Speech API. It also discusses root package for Java speech API, classes and interfaces that define basic speech engine functionality. It also introduces the package that supports speech recognition capabilities, functions of a recognizer, recognizer state systems, rule grammars, dictation Grammar, recognition results and recognizer properties.

Fourth chapter discusses the system requirements, model for small vocabulary Gujarati speech recognition using Java speech API. Development of Gujarati Speech Enabled Editor with its features, Grammar Design, Interface Design and algorithm for Speech recognition and results obtained for Gujarati Speech Recognition

Fifth Chapter covers architecture of continuous Gujarati/Hindi speech recognition system and hypothesis search used in continuous speech recognition. It also discusses benchmarking for continuous speech recognition system performance, recent advancement in continuous automatic speech recognition systems and bootstrapping of phone model for large vocabulary continuous speech recognition system. It presents experiment performed and result obtained for small vocabulary continuous Gujarati and Hindi speech recognition system.
The last chapter explains benefits of proposed work, conclusion and details of future work that can be carried out.