COMPUTER BASED BLIND AID SYSTEM

Hirosha S.H. Liyanage

MSC/IT 14110028

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Abstract

"Computer Based Blind Aid System" (BAS) is a Hidden Markov Model (HMM) based speech synthesis and speech recognition system to offer communication and information support activities for blinds in their day to day activities.

BAS consists with combination of selected essential applications. Such as browsing, SMS, word processing, radio listening and calculations etc for blind people who use computers. Even though many modem systems are developed, they are unable to facilitate above given functions in one package. This suggested system has improved and organized voice based command driven menu system with screen reading facility.

I have used algorithm based on HMM to implement BAS with signal processing technique. Sequences of steps were carried out to prepare user's voice, train, test and analyze etc to integrate speech recognition and speech synthesis with BAS. So that, not only HMM but also some other models used together with HMM. Before pass the signal in to HMM training, it should be digitized and compute the spectral features of it using Acoustic model. Phoneme, time based matrix is the input to HMM. Viterbi search algorithm is used in HMM to find out the most suitable letter through Acoustic, language, lexicon models.

In HMM based speecli synthesis consists with several steps. Text analysis, Phonetic analysis and Prosodic analysis are the sequential inputs for speech synthesis module. BAS tested with blind user's group to evaluate the system in real world. Conclusion made is, BAS is a fine solution with signal processing technique to achieve speech recognition and speech synthesis with 15% of error margin. And it is a rapid solution for word processing, web browsing, SMS, calculation etc. for blind people.

Keywords: Hidden Markov Model, Viterbi search algorithm, Acoustic model, language model, lexicon models, Phonetic analysis, Prosodic analysis