

Efficacy of a Wiener Filter Based Technique for Speech Enhancement in Hearing Aids

Authors : Ajish K. Abraham

Abstract : Hearing aid is the most fundamental technology employed towards rehabilitation of persons with sensory neural hearing impairment. Hearing in noise is still a matter of major concern for many hearing aid users and thus continues to be a challenging issue for the hearing aid designers. Several techniques are being currently used to enhance the speech at the hearing aid output. Most of these techniques, when implemented, result in reduction of intelligibility of the speech signal. Thus the dissatisfaction of the hearing aid user towards comprehending the desired speech amidst noise is prevailing. Multichannel Wiener Filter is widely implemented in binaural hearing aid technology for noise reduction. In this study, Wiener filter based noise reduction approach is experimented for a single microphone based hearing aid set up. This method checks the status of the input speech signal in each frequency band and then selects the relevant noise reduction procedure. Results showed that the Wiener filter based algorithm is capable of enhancing speech even when the input acoustic signal has a very low Signal to Noise Ratio (SNR). Performance of the algorithm was compared with other similar algorithms on the basis of improvement in intelligibility and SNR of the output, at different SNR levels of the input speech. Wiener filter based algorithm provided significant improvement in SNR and intelligibility compared to other techniques.

Keywords : hearing aid output speech, noise reduction, SNR improvement, Wiener filter, speech enhancement

Conference Title : ICASLPDS 2018 : International Conference on Audiology, Speech-Language Pathology and Deaf Studies

Conference Location : Kyoto, Japan

Conference Dates : November 15-16, 2018