

A Novel RLS Based Adaptive Filtering Method for Speech Enhancement

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Abstract : Speech enhancement is a long standing problem with numerous applications like teleconferencing, VoIP, hearing aids, and speech recognition. The motivation behind this research work is to obtain a clean speech signal of higher quality by applying the optimal noise cancellation technique. Real-time adaptive filtering algorithms seem to be the best candidate among all categories of the speech enhancement methods. In this paper, we propose a speech enhancement method based on Recursive Least Squares (RLS) adaptive filter of speech signals. Experiments were performed on noisy data which was prepared by adding AWGN, Babble and Pink noise to clean speech samples at -5dB, 0dB, 5dB, and 10dB SNR levels. We then compare the noise cancellation performance of proposed RLS algorithm with existing NLMS algorithm in terms of Mean Squared Error (MSE), Signal to Noise ratio (SNR), and SNR loss. Based on the performance evaluation, the proposed RLS algorithm was found to be a better optimal noise cancellation technique for speech signals.

Keywords : adaptive filter, adaptive noise canceller, mean squared error, noise reduction, NLMS, RLS, SNR, SNR loss

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