

Noise cancellation using selectable adaptive algorithm for speech in variable noise environment

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Abstract Some of the teething problems associated in the use of two-sensor noise cancellation systems are the nature of the noise signals—a problem that imposes the use of highly complex algorithms in reducing the noise. The usage of such methods can be impractical for many real time applications, where speed of convergence and processing time are critical. At the same time, the existing approaches are based on using a single, often complex adaptive filter to minimize noise, which has been determined to be inadequate and ineffective. In this paper, a new mechanism is proposed to reduce background noise from speech communications. The procedure is based on a two-sensor adaptive noise canceller that is capable of assigning an appropriate filter adapting to properties of the noise. The criterion to achieve this is based on measuring the eigenvalue spread based on the autocorrelation of the input noise. The proposed noise canceller (INC) applies an adaptive algorithm according to the characteristics of the input signal. Various experiments based on this technique using real-world signals are conducted to gauge the effectiveness of the approach. Initial results illustrated the system

capabilities in executing noise cancellation under different types of environmental noise. The results based on the INC technique indicate fast convergence rates; improvements up to 30 dB in signal-to-noise ratio and at the same time shows 65% reduction of computational power compared to conventional method.

Keywords Adaptive filtering · Adaptive algorithms · Noise cancellation · Eigenvalue spread · Environmental noise

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