

# On a Pitch Detection Method Using Noise Reduction

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**Abstract.** It can be used to easily change or to maintain the naturalness and intelligibility of quality in speech synthesis and to eliminate the personality for speaker-independence in speech recognition. In this paper, we proposed a new pitch detection algorithm. And Kalman filters are implemented for filtering speech contaminated by additive white noise or colored noise and an iterative signal and parameter estimator which can be used for both noise type is presented. The performance was compared with LPC and Cepstrum, ACF. we have obtained the pitch information improved the accuracy of pitch detection and gross error rate is reduced in voice speech region and in transition region of changing the phoneme. Also the results indicate that the additive white noise Kalman filters provide an audible improvement in output speech quality, and an improved pitch detection. This paper clearly shows the feasibility of using the Kalman filter for noise reduction.

## 1 Introduction

In speech signal processing, it is very important to detect the pitch exactly in speech recognition, synthesis, analysis. If we exactly pitch detect in speech signal, In the analysis, we can use the pitch to obtain properly the vocal tract parameter. It can be used to easily change or to maintain the naturalness and intelligibility of quality in speech synthesis and to eliminate the personality for speaker-independence in speech recognition. And a lot of methods for the pitch detection have been proposed until now.

However, these methods may be brought about the errors, when there are some phonemic transitions within the analysis frame and the speech signals are corrupted by background noises. And it is often necessary to perform speech enhancement through noise removal in speech processing systems operating in noisy environments. As the presence of noise degrades the performance of speech coders and voice recognition systems, it is therefore common to incorporate speech enhancement as a pre-processing step in these systems. In this paper, we proposed new pitch detection algorithm, and for the removal of additive white noise, we employed Kalman filtering.