Filtering Performance of Reducing the Sampling Rate of Sound Card: Perspectives on Different Signal-to-Noise Ratios

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***Abstract*— This study presented a theoretical analysis to prove that there exists an optimal sampling frequency to reduce the noise in the signal to reduce the processes of acoustic digital signal processing. The respiration sounds have been recorded by 2 to 44.1 KHz or higher sampling rates, however, the optimal frequency might be decided by the noise from environment. This study solves the problem from the point of theoretical view. The findings were interesting because the noise in a pure sine wave can be reduced by lower sampling rates. The sampling frequency of lung sound recording can be reduced in the range of 2 to 5 KHz. In addition, the results supported to enhance signal-to-noise ratio in the receivers of frequency modulation, under-water acoustics, and other communication applications.**

***Keyword*— noise reduction, sampling frequency, acoustic signal, lung sound, sound card, sonar, SNR.**

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