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Comparison of Methods for Detecting and Quantifying Amplitude Modulation of Wind Farm Noise

Authors : Phuc D. Nguyen, Kristy L. Hansen, Branko Zajamsek

Abstract : The existence of special characteristics of wind farm noise such as amplitude modulation (AM) contributes significantly to annoyance, which could ultimately result in sleep disturbance and other adverse health effects for residents living near wind farms. In order to detect and quantify this phenomenon, several methods have been developed which can be separated into three types: time-domain, frequency-domain and hybrid methods. However, due to a lack of systematic validation of these methods, it is still difficult to select the best method for identifying AM. Furthermore, previous comparisons between AM methods have been predominantly qualitative or based on synthesised signals, which are not representative of the actual noise. In this study, a comparison between methods for detecting and quantifying AM has been carried out. The results are based on analysis of real noise data which were measured at a wind farm in South Australia. In order to evaluate the performance of these methods in terms of detecting AM, an approach has been developed to select the most successful method of AM detection. This approach uses a receiver operating characteristic (ROC) curve which is based on detection of AM in audio files by experts.

Keywords : amplitude modulation, wind farm noise, ROC curve
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