

T1.1-P15. On the use of the Kalman Filter for infrasonic detection

Currently, usual detection algorithms are based on a temporal segmentation of the signal into multiple windows of fixed size in which a test function is applied to test the presence of spatially coherent signal. This temporal segmentation presents limitations such as the choice of the window size and the time step between windows of analysis. We therefore introduce an innovative detection algorithm based on the likelihood ratio updated at each new observation. The signals of interest are considered to be autoregressive random processes buried in white noise that propagate under the plane wave assumption. With this online approach, the function of test relies on the entire signal and is thus able to discriminate a signal of interest from the noise, even for low SNR. This algorithm also allows us to perform a detection with multiple simultaneous sources. Then we propose an improved method to estimate the frequency content of the signals of interest based on the expectation maximization algorithm useful for source characterisation. The derived algorithms are applied on few months of IMS data.

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