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A non-intrusive method for estimating binaural speech intelligibility from noise-corrupted signals captured by a pair of microphones

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7 **Abstract**

A non-intrusive method is introduced to predict binaural speech intelligibility in noise directly from signals captured using a pair of microphones. The approach combines signal processing techniques in blind source separation and localisation, with an intrusive objective intelligibility measure (OIM). Therefore, unlike classic intrusive OIMs, this method does not require a clean reference speech signal and knowing the location of the sources to operate. The proposed approach is able to estimate intelligibility in stationary and fluctuating noises, when the noise masker is presented as a point or diffused source, and is spatially separated from the target speech source on a horizontal plane. The performance of the proposed method was evaluated in two rooms. When predicting subjective intelligibility measured as word recognition rate, this method showed reasonable predictive accuracy with correlation coefficients above 0.82, which is comparable to that of a reference intrusive OIM in most of the conditions. The proposed approach offers a solution for fast binaural intelligibility prediction, and therefore has practical potential to be deployed in situations where on-site speech intelligibility is a concern.

8 *Keywords:* objective intelligibility measure, non-intrusive, binaural
9 intelligibility, noise, glimpsing, neural network, blind source separation,
10 blind source localisation, microphone

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