Assessment and control of speech intelligibility in virtual chat rooms

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The spatial rendering of sounds - via headphone-based binaural or multi-loudspeaker-based techniques - currently lives a renaissance. Due to the increasing processing capabilities, signal processing formerly achievable only with expensive and bulky DSP-technology can now efficiently be implemented on desktop and mobile devices. This provides new opportunities also in telecommunications: Together with Voice over Internet Protocol (VoIP), speech from multiple interlocutors can flexibly be transmitted in a multi-party conferencing fashion and then be spatially rendered. This way, telecommunication systems can support the stream segregation capabilities of the human auditory system, and the Cocktail Party Process can be exploited to yield better intelligibility.

In this talk, an approach for instrumental speech intelligibility prediction and control in a multi-party virtual chat room is presented. It is based on the speech reception threshold (SRT), i.e. the signal-to-distracter-ratio threshold for 50% intelligibility. The aim of our approach is to assist binaural rendering systems in the choice of the acoustical configuration to be employed, based on information regarding the interlocutors. In order to collect intelligibility test data complementing the data available from the literature, we have developed a new method for measuring the SRT in French. The talk describes the adaptive measurement method, which is based on semantically unpredictable sentences (SUS). With this method, we have conducted a series of intelligibility tests on different acoustical configurations. The test results and data from the literature served to develop an extension of a simple parametric approach suggested by Bronkhorst (2000, Acta Acustica) for predicting the advantage of a spatial configuration over presenting all available sources from front. The performance of our first modelling approach is discussed, and an outlook on future work is provided.