A BINAURAL MODEL FOR PREDICTING SPEECH INTELLIGIBILITY IN ENCLOSED SPACES USING NOISE AND REVERBERATION SUPPRESSION MECHANISMS

By

Vanessa Li

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Approved:

Dr. Ning Xiang, Thesis Adviser

Dr. Jonas Braasch, Thesis Adviser

Rensselaer Polytechnic Institute
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ABSTRACT

The common metrics for predicting speech intelligibility are described by the speech intelligibility index (SII) and the speech transmission index (STI). Both measures are determined using only a monophonic signal. While a single channel is suitable for evaluating speech intelligibility across transmission lines, predicted intelligibility values in room acoustics do not accurately correspond to subjective results. This is mainly due to the fact that, within a space, binaural cues are used to suppress the effects of reverberation and unmask noise. Monophonic measures do not adequately account for such phenomena. The proposed research aims to address this problem through the implementation of a binaural model. Current binaural models for speech intelligibility model a specific psychoacoustic attribute which do well under certain conditions, but fall short in other situations. The proposed model aims to account for the major detriments to speech intelligibility within rooms: background noise and reverberation. The noise unmasking algorithm will be based on equalization-cancellation (EC) theory, while implementation of reverberation suppression will be based on interaural coherence. Finally, the STI will be determined given the binaural signal-to-noise ratio values from the EC model, and the modified impulse responses from the reverberation suppression algorithm.