

Popular science summary of the PhD thesis

PhD student Helia Relación Iborra

Title of the PhD thesis

PhD school/Department DTU Health Tech

Science summary

According to the World Health Organization (WHO), more than 460 million people worldwide have a disabling hearing loss. Hearing deficiencies often lead to difficulties in understanding speech, especially in noisy and reverberant environments. In order to develop hearing aids that are able to improve speech intelligibility in noisy acoustic environments, it is crucial to understand the relevant characteristics of the speech signal that are related to speech intelligibility as well as the effect that specific hearing deficiencies have on different aspects of intelligibility.

This thesis presented two modelling approaches to explore and predict speech intelligibility in various listening conditions. First, a simple but strong model is presented that can predict speech perception in normal-hearing listeners in conditions of stationary and fluctuating additive interferers as well as in the case of several non-linear distortions. Additionally, a more realistic non-linear computational model of auditory processing is used to predict speech intelligibility for both normal-hearing and hearing-impaired listeners. The proposed model can account for changes in speech perception related to hearing losses for speech in the presence of different types of noise interferers.

These models are proposed as tools to evaluate the effects of a large variety of interferences and distortions on speech intelligibility, including effects of hearing impairment and hearing-instrument signal processing. Thus, they might be a useful guide for the design of new hearing instruments, speech processing algorithms and communication devices.

Please email the summary to the PhD secretary at the department