

Bachelorthesis/Masterthesis/Project Module

Embedded Analysis of Structure-Borne Sound in Microphones using MEMS-accelerometers

Recording audio signals plays an important role in our daily lives, for example in telephone conversations or online meetings. These recorded signals usually contain noise in addition to the useful signal, which can significantly affect the quality of the audio recordings, to the point where the recorded signal becomes unusable. To deal with this problem, several approaches have been developed that attempt to improve the quality of the recording by removing the noise.

In our project, we want to analyze noise in microphone recordings generated by mechanical vibrations. To do this, we plan to place a MEMS accelerometer near the microphone. The accelerometer will record the generated mechanical vibrations. The recorded acceleration signal will then serve as a reference signal for the noise. Using various signal processing algorithms, we will study embedded implementations to improve the quality of the microphone recordings by attenuating the noise from the recording preferably in real-time.

There are several open tasks in this project that can be explored in a refined version during a thesis or project module:

- Research and evaluation of different scenarios
- Research, implementation and evaluation of different signal processing algorithms for structure-borne noise mitigation
- Designing and evaluating an experimental setup to investigate the topic

If you would like to learn more about the individual tasks or are interested in working on one of the topics, please contact Nico Schumacher.

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