SuperAcoustics - Development of Android application to measure sound reduction index

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Acoustic measurements are becoming more important by the day, given the densification of cities. This thesis has been the development of a smartphone application that will simplify and widen acoustic measurements, using the smartphones already in our pockets.

Is it possible to calculate sound reduction index using only a smartphone? This thesis aims to develop an android application to measure the sound reduction index of a building element. As well as studying the smartphones ability to measure the acoustic variables needed and the restrictions of performing acoustic measurements using a smartphone. To acquire trustworthy results when evaluating acoustic environments, the equipment needs to be calibrated. Calibrating the smartphone to measure correct weighted dB(A) values, provides the application with the information needed for accurate measurements.

Main goals of thesis:

o Develop an easy to use Android application
o Measure acoustic variables to calculate sound reduction index
o Is the smartphones microphone sufficient to perform these types of measurements?

Smartphones have over the past few years become a more common and reliable tool within acoustic measurements. From measuring sound pressure level to reverberation time, there are a number of applications available. However there is no simple tool for measuring sound reduction index available on the market. This thesis aims to study the possibility of using a smartphone to measure sound reduction index as this could greatly simplify acoustic measurements. This would eliminate the need to have professional acoustics equipment available as you always have a smartphone with you. The reliability of the smartphone as a measurement tool is restricted by the so-called *dynamic range* of the smartphones microphone. The dynamic range can be seen as the loudness span in which the microphone works properly. Therefore the environment cannot be too noisy or too quiet.

The application SuperAcoustics was developed on the Android studio platform, written in Java code. The application is compatible with all smartphones that run on the Android OS.

Results Within the dynamic range, the android phones tested in this study prove to be sufficient instruments to measure and calculate the sound reduction index of a building element. The application provides an easy alternative to measure sound reduction index, providing proficient results with some restrictions.