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Title:

Measurement, analysis and simulation of noise radiated by vehicles passing-by in road traffic

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Abstract:

As part of the EU-research project CityHush a microphone array system including a camera module is being developed allowing for the detection, separation and quantification of the various noise sources contributing to the overall noise of road traffic, which consists of many individual vehicles. Each vehicle contains a number of noise sources (e. g. tire-road interaction, engine etc.). The combination of optical and acoustical information will be used for identifying the noise sources of each passing vehicle.

The spatial resolution of a microphone array depends strongly on the array size. To resolve the complex traffic noise, a modular system consisting of square grids (1.5m x 1.5m) has been developed. The grids can be combined arbitrarily to build e. g. an array of 6m x 3m with up to 192 microphones and 3 video cameras to cover an entire street.

This paper describes the physical setup of the measurement system and a non-linear optimization technique to identify the positions of all microphones needed for source localization.

Further work within the project is related to developing and implementing algorithms for vehicle detection, classification (e. g. passenger car, motorcycles, trucks) and tracking. At the end, the system will be tested and validated with measurements of real vehicles passing-by and complex traffic scenarios.

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