Research Thesis (3M) or Master Thesis (6M)

In collaboration with Bosch

Thesis title	Development of acoustic watermark algorithms and their evaluation
Thesis description	Autonomous vehicles must be able to hear siren signals in order to be able to react to emergency vehicles. The requirements for the reliability of the corresponding microphones are very high, since not listening to a siren can not only result in a severe fine, but in the worst case can even be the cause of a traffic accident.
	Microphones for autonomous vehicles are subject to special physical loads. They are exposed to wind and rain and can even be damaged by falling rocks. It is all the more important to continuously monitor the functioning of a microphone.
	In this work, different algorithms should be developed and evaluated, which ensure that the external microphones of an autonomous vehicle can monitor. The exact algorithm is not specified. We recommend only the acoustic watermarking algorithm class as a starting point for further research.
	Watermarking audio signal is used to mark music files. To this end, an inaudible signal is added to the music that contains further information. We use a similar approach. A car speaker creates a familiar but barely perceptible watermark that can be heard from the microphone. Now, if the microphone can no longer detect the watermark, we assume that the microphone (or speaker) must be defective.
Qualifications	• interest in acoustical signal processing • strong background in signal processing • programming skills in MATLAB or Python
Begin	According to agreement
Duration	6M for Master thesis or 3M for Research thesis in case of an excellent student
Language	English or German
Supervisor	Bosch + ISS

Please contact Prof. Bin Yang (bin.yang@iss.uni-stuttgart.de) by email together with your Master transcript.

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