

# **COMPARISON OF SIGNAL ENHANCEMENT TECHNIQUES IN COMMUNICATIONS AND SPEECH CONTROL TASKS FOR A SINGLE-DSP IN-CAR APPLICATION**

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## **ABSTRACT**

Speech related in-car tasks can be subdivided into hands-free communication and speech control oriented tasks. While the former is characterized by signal processing in the telephone bandwidth, the latter uses multimedia-bandwidth. The accuracy and ergonomics of both types of applications is severely influenced by external noise conditions and the technologies applied for signal enhancement. Different techniques for signal enhancement are discussed like a four channel microphone array, a single channel noise reduction and an acoustic echo cancellation, implemented on a single DSP chip. A suitable system design is introduced which matches both types of applications by an optimal combination of the different signal enhancement approaches. A number of objective and subjective experiments using real world speech and noise corpora recorded in a car and in a truck environment are accomplished for evaluation of the system quality. Finally, some recommendations for noise reduction techniques in low cost applications are derived.