
基于 MATLAB 的麦克风阵列语音增强技术的研究与设计

摘 要

伴随科学与社会的发展，人们对信息交流的探讨也越来越深刻，而作为日常交流的主要方式——语音交流，自然而然的成为人们所极力研究的对象。而在语音交流过程中，不可避免的要受到外界物质的干扰，麦克风阵列的语音增强的目的就是减少这些干扰，得到良好的语音信号。

首先本文介绍了语音、噪声、接受者三者的联系及传输信号在当中的作用，对信号的预处理做了详细的过程描述，在预处理所要注意哪些要求。

其次，本文在算法上阐述了固定波束形成、广义旁瓣抵消法、后置滤波算法等算法的实现原理，通过 MATLAB 对性能进行仿真处理，将算法放进搭建的环境中进行验证，研究麦克风阵列在空间上的性能。

实验结果表明，麦克风阵列在空间性上具有单通道所不具备的优势，能更优的在噪声环境中降低噪声，它的实用性也更加的贴近生活，在一定程度上能被广泛的使用，同时也能更好的发展。

关键词：语音增强 麦克风阵列 预处理 GSC

Abstract

With the development of science and society, people's discussion on information exchange is more and more profound. As the main way of daily communication, voice communication naturally becomes the object of people's study. In the process of speech communication, it is inevitable to be interfered by external substances. The purpose of microphone array speech enhancement is to reduce these interferences and get good speech signals.

First of all, this paper introduces the connection of voice, noise, receiver and the role of transmission signal in it, describes the process of signal pre-processing in detail, and what requirements should be paid attention to in pre-processing.

Secondly, this paper describes the realization principle of fixed beam forming, generalized side lobe cancellation, post filter algorithm and other algorithms in algorithm. Through MATLAB, the performance is simulated, the algorithm is put into the built environment to verify, and the performance of microphone array in space is studied.

The experimental results show that the microphone array has the advantages that single channel does not have in space, and it can reduce the noise better in the noise environment, and its practicability is more close to life, which promotes the development of society to a certain extent.

Key words: speech enhancement microphone array preprocessing GSC

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