TECHNOLOGY

Optimal Design of a Large Scale Microphone Network and Filtering System

OVERVIEW

Background
Microphone arrays, a series of individual microphones operating in tandem for a given area, have a variety of uses including extracting specific sounds from an ambient environment, surround sound recording, and localization, among others. However, using a very large microphone array can be difficult. A very large array will generate a large amount of data simultaneously, which presents problems with bandwidth, data processing, and power consumption needed for handling large amounts of audio in real time. Therefore, there is a need to develop systems for minimizing the amount of sensors that are active in a large array while maintaining the usefulness a large array provides. In addition, being able to identify a single sound source and to filter out interfering noise without distorting the source is a valuable tool in multiple contexts.

Innovative Technology
Researchers at the University of Maryland have developed a method for determining the optimal way to place a microphone sensor network in order to minimize the number of microphones needed and to reduce bandwidth requirements. This method improves over prior results by being able to account for sources from all sound frequencies (i.e. white noise) and adding additional filters to allow for easier adaptation to modern hardware. The end result of the method generates the sound of a target source with no gain while also minimizing distortion from interferences. Given a fixed number of microphones, the invention can determine a best possible beampattern. The algorithm also allows for the optimization of both the physical placement of microphones in an array and design of the multirate filterbanks simultaneously. The algorithm seeks to minimize the number of active subchannels per microphone, further reducing computational costs for filtering interference in an array. The algorithm used is flexible in that it allows for adjustable limits of subchannel filtering and number of microphones used.

APPLICATIONS

· Audio surveillance
· Microphone arrays
· Acoustic source localization

ADVANTAGES

· Allows for improved microphone array configurations
· Works across multiple frequencies simultaneously
· Reduces the number of active sensors in an array, saving bandwidth, power, and computing resources

CONTACT INFO

UM Ventures
0134 Lee Building
7809 Regents Drive
College Park, MD 20742
Email: umdtechtransfer@umd.edu
Phone: (301) 405-3947 | Fax: (301) 314-9502

Additional Information

INSTITUTION

University of Maryland, College Park

LICENSE STATUS

Contact OTC for licensing information

EXTERNAL RESOURCES

- US Patent 10,206,035

IS-2014-134