

Title (en)

A method and an apparatus for enhancing received desired sound signals from a desired sound source and of suppressing undesired sound signals from undesired sound sources

Title (de)

Verfahren und Vorrichtung zur Verbesserung empfangener gewünschter Signale und Unterdrückung unerwünschter Signale

Title (fr)

Procédé et dispositif permettant d'améliorer des signaux désirée et atténuer des signaux non désirées

Publication

**EP 1343351 A1 20030910 (EN)**

Application

**EP 02388021 A 20020308**

Priority

EP 02388021 A 20020308

Abstract (en)

In a method of enhancing received desired sound signals such as speech signals, and of suppressing undesired sound signals such as noise. The method uses I microphones each feeding into a bank of K band pass filters. In the I identical banks of K band pass filters each bank receives an input from one microphone and has K outputs of distinct frequency sub-bands. K beam-formers, one for each frequency sub-band, each receives one input from each of the I filter banks representing the same frequency sub-band. The output from each beam-former is the beam-formed signal for one distinct frequency sub-band. From the beam-formed frequency sub-band signals a time domain output signal is reconstructed. Stored estimates of the desired sound source are used in the method of the invention. Such estimates are obtained from received signals from the desired sound source at times with no or insignificant undesired sound signals. The method lends itself in particular to hands-free mobile communication in noisy environments such as in a motor vehicle. <IMAGE>

IPC 1-7

**H04R 3/00**; **H04R 1/40**; **G10K 11/178**

IPC 8 full level

**G10K 11/34** (2006.01); **H04R 3/00** (2006.01)

CPC (source: EP)

**G10K 11/34** (2013.01); **H04R 3/005** (2013.01)

Citation (search report)

- [X] PATENT ABSTRACTS OF JAPAN vol. 2002, no. 06 4 June 2002 (2002-06-04)
- [X] SYDOW C: "BROADBAND BEAMFORMING FOR A MICROPHONE ARRAY", JOURNAL OF THE ACOUSTICAL SOCIETY OF AMERICA, AMERICAN INSTITUTE OF PHYSICS. NEW YORK, US, vol. 96, no. 2, PART 1, 1 August 1994 (1994-08-01), pages 845 - 849, XP000466113, ISSN: 0001-4966
- [A] DAHL M ET AL: "ACOUSTIC NOISE AND ECHO CANCELING WITH MICROPHONE ARRAY", IEEE TRANSACTIONS ON VEHICULAR TECHNOLOGY, IEEE INC. NEW YORK, US, vol. 48, no. 5, September 1999 (1999-09-01), pages 1518 - 1526, XP000912523, ISSN: 0018-9545
- [A] LLEIDA E ET AL: "Robust continuous speech recognition system based on a microphone array", ACOUSTICS, SPEECH AND SIGNAL PROCESSING, 1998. PROCEEDINGS OF THE 1998 IEEE INTERNATIONAL CONFERENCE ON SEATTLE, WA, USA 12-15 MAY 1998, NEW YORK, NY, USA, IEEE, US, 12 May 1998 (1998-05-12), pages 241 - 244, XP010279154, ISBN: 0-7803-4428-6 & US 2002048376 A1 20020425 - UKITA MASAKAZU [JP]

Cited by

CN106303838A; EP1475997A3; US8260442B2; US9805738B2; US10623854B2; WO2004100602A3; US8724822B2; US9002028B2; US7643641B2; US9613633B2

Designated contracting state (EPC)

AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

DOCDB simple family (publication)

**EP 1343351 A1 20030910**

DOCDB simple family (application)

**EP 02388021 A 20020308**