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[Continued on next page]

(54) Title: CONTENT-AWARE AUDIO MODES

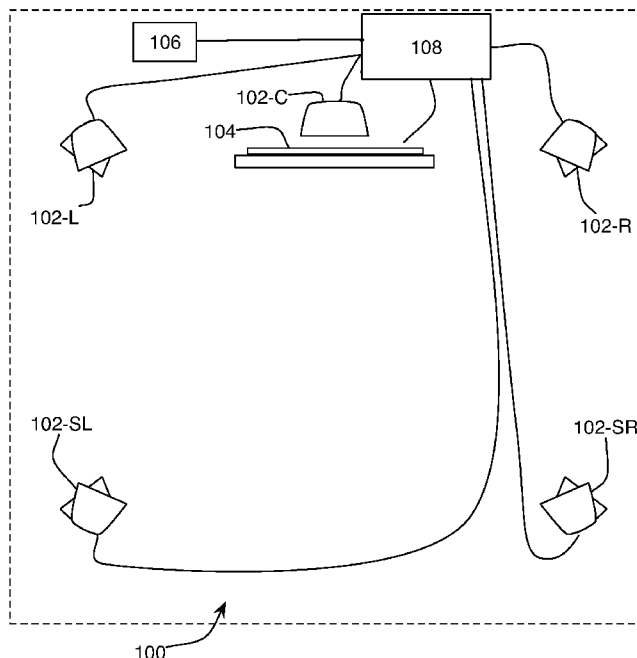


Fig. 1

(57) Abstract: An audio system for manipulating audio material for playback based on the content of the material includes an input for receiving input audio signals, an output for providing output audio signals to loudspeakers, and an audio processor that processes the input audio signals to produce the output audio signals. The audio processor determines a type of content represented by the input audio signals, selects a set of processing instructions to control the spatial presentation of the audio material based on the determined type, and applies the selected set of processing instructions to the input audio signals.

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TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
 INV. H04S7/00 G10L25/81
 ADD. G06F17/30 H04N21/233 H04N21/439

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
 G06F H04N H04S G10L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
 EPO-Internal, WPI Data

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2008/016532 A1 (WANG HOUNG-JYH [TW] ET AL) 17 January 2008 (2008-01-17)	1-3,7,9, 10,19, 20, 28-30,36
Y	page 2, paragraph 28 - page 4, paragraph 50; figures 2, 4, 6	2-8,22, 23,25, 26,29, 31,32
X	----- US 2007/083904 A1 (LO WEN-YU [TW]) 12 April 2007 (2007-04-12) page 1, paragraph 14 - page 2, paragraph 19; figure 1	1
Y	----- CA 2 849 062 A1 (SONY CORP [JP]) 23 May 2013 (2013-05-23) page 9, paragraph 34 - page 19, paragraph 67; figure 1	3,5
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Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>
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Date of the actual completion of the international search 14 August 2015	Date of mailing of the international search report 21/08/2015
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer Duffner, Orla
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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2015/016125

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2012/005701 A1 (QUAN RONALD [US]) 5 January 2012 (2012-01-05) page 3, paragraph 54 - page 9, paragraph 129; figures 1, 4, 7, 10 -----	2-4,6-8, 29
X,P	WO 2014/160542 A2 (DOLBY LAB LICENSING CORP [US]) 2 October 2014 (2014-10-02) page 1, paragraph 2 - page 15, paragraph 93 page 30, paragraph 171 - page 37, paragraph 209 page 41, paragraph 231 page 46, paragraph 253 - page 51, paragraph 286 page 59, paragraph 331 - page 69, paragraph 383; figures 7, 11, 29 -----	1,11-15, 18,27, 33-36
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A	US 2004/044525 A1 (VINTON MARK STUART [US] ET AL) 4 March 2004 (2004-03-04) page 3, paragraph 33 - page 4, paragraph 45; figures 2, 4, 5 -----	1-32
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2015/016125

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10, 19, 20, 28-30, 36

Determine the identity of the audio program using metadata that accompanies the input audio signals or computing a digital signature to look up the audio program. The metadata may include closed-captioning signals, program data in a HDMI signal or data in a side-channel. The processing instructions are downloaded based on the identity of the audio program. The change in content type determines the time-sequence of processing to be applied, either based on a program schedule or a sequence of scenes in a single program.

Problem addressed: Determine the identity of the audio program and apply the processing instructions relevant to that program.

2. claims: 11-18

Analyze the input audio signals to determine their type (e.g. voice, music, non-voice). This analysis includes determining the relative spectral content, identifying voice-band components, music, voice and non-voice noises. Each audio signal type determines which stored processing instructions is used.

Problem addressed: Determine the type of audio signal and apply the processing instructions relevant to the type(s) of audio signal(s) present.

3. claims: 21-27, 31-35

How to present an output audio signal to the user. Apply the processing instructions to

- extract a voice component and outputs it on a center channel (claim 24)
- decrease the presence of musical content when voice content is also present (claim 25)
- decrease low-frequency signal energy (claim 26)
- decrease the output level of a first set of sounds relative to a second set of sounds (claim 27)
- output the audio over fewer channels for a first type of content and all the output channels for a second type of content (claim 31)
- distribute different portions of the input audio to different loudspeakers, based on the type of audio content and radiation patterns of the loudspeakers (claim 32)
- control the spectral presentation of the audio material (claim 33)
- maintain the intelligibility of speech while adjusting the program volume (claim 34)
- change the volume of speech at a different rate to the

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

volume of non-speech (claim 35)
- calibrate the system with the user preferences used for
calibration (claims 22-23)
Problem addressed: How to aurally present different types of
audio content in line with the users' preferences.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2015/016125

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