(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 December 2014 (24.12.2014)

WIPO | PCT

(10) International Publication Number
WO 2014/202672 A3

(51) International Patent Classification:
G10L 21/04 (2013.01)

(21) International Application Number:
PCT/EP2014/062833

(22) International Filing Date:
18 June 2014 (18.06.2014)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
13173159.8 21 June 2013 (21.06.2013) EP
14167055.4 5 May 2014 (05.05.2014) EP

(71) Applicant: **FRAUNHOFER-GESELLSCHAFT ZUR FÖRDERUNG DER ANGEWANDTEN FORSCHUNG E.V.** [DE/DE]; Hansastraße 27c, 80686 München (DE).

(72) Inventors: **REUSCHL, Stefan**; Therese-Müller-Str. 24, 90451 Nürnberg (DE). **DÖHLA, Stefan**; Hartmannstr. 47a, 91052 Erlangen (DE). **LECOMTE, Jérémie**; Turnstrasse 7, 90763 Fürth (DE). **JANDER, Manuel**; Liebigstr. 2, 91052 Erlangen (DE). **FÄRBER, Nikolaus**; Thomas-Dehler-Strasse 28, 91052 Erlangen (DE).

(74) Agents: **BURGER, Markus** et al.; Schoppe, Zimmermann, Stöckeler, Zinkler, Schenk & Partner mbB, Radlkoferstrasse 2, 81373 München (DE).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ,

[Continued on next page]

(54) Title: TIME SCALER, AUDIO DECODER, METHOD AND A COMPUTER PROGRAM USING A QUALITY CONTROL

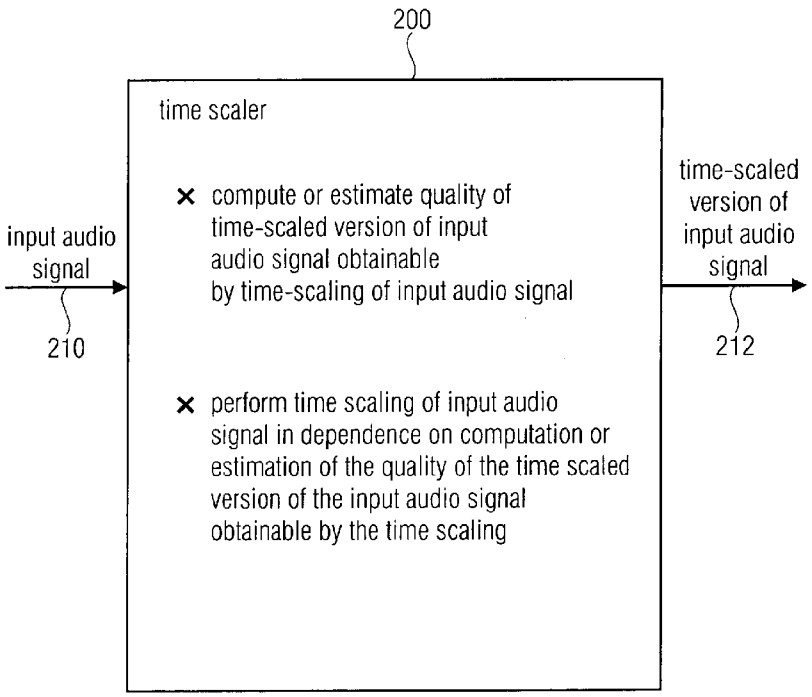

FIG 2

(57) Abstract: A time scaler for providing a time scaled version of an input audio signal is configured to compute or estimate a quality of a time scaled version of the input audio signal obtainable by a time scaling of the input audio signal. The time scaler is configured to perform the time scaling of the input audio signal in dependence on the computation or estimation of the quality of the time scaled version of the input audio signal obtainable by the time scaling. An audio decoder comprises such a time scaler.

WO 2014/202672 A3

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).

Published:

— *with international search report (Art. 21(3))*

— *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))*

(88) Date of publication of the international search report:
18 June 2015

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/062833

A. CLASSIFICATION OF SUBJECT MATTER
INV. G10L21/04
ADD.

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)
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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	SUNGJOO LEE ET AL: "Variable time-scale modification of speech using transient information", IEEE INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH, AND SIGNAL PROCESSING, 1997. ICASSP-97, MUNICH, GERMANY 21-24 APRIL 1997, LOS ALAMITOS, CA, USA,IEEE COMPUT. SOC; US, US, vol. 2, 21 April 1997 (1997-04-21), pages 1319-1322, XP010226045, DOI: 10.1109/ICASSP.1997.596189 ISBN: 978-0-8186-7919-3	1-10, 20-25, 28,29
A	abstract sections I-IV, VI	11-14

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"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)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 April 2015	30/04/2015

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Hofe, Robin

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011/246205 A1 (LIN ZHONGSONG [CN] ET AL) 6 October 2011 (2011-10-06) abstract paragraph [0001] - paragraph [0008]; figure 4 paragraphs [0017], [0030], [0034] - [0036]; claims 1, 3	1-8, 20-25, 28,29
X	ROUCOS S ET AL: "HIGH QUALITY TIME-SCALE MODIFICATION FOR SPEECH", INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH & SIGNAL PROCESSING. ICASSP. TAMPA, FLORIDA, MAR. 26 - 29, 1985; [INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH & SIGNAL PROCESSING. ICASSP], NEW YORK, IEEE, US, vol. 2, 26 March 1985 (1985-03-26), pages 493-496, XP008036343, abstract sections 1 and 3	1-6, 20-23, 28,29
X	VERHELST W ET AL: "An overlap-add technique based on waveform similarity (WSOLA) for high quality time-scale modification of speech", 2002 IEEE INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH, AND SIGNAL PROCESSING. PROCEEDINGS. (ICASSP). ORLANDO, FL, MAY 13 - 17, 2002; [IEEE INTERNATIONAL CONFERENCE ON ACOUSTICS, SPEECH, AND SIGNAL PROCESSING (ICASSP)], NEW YORK, NY : IEEE, US, 27 April 1993 (1993-04-27), pages 554-557vol.2, XP031984214, DOI: 10.1109/ICASSP.1993.319366 ISBN: 978-0-7803-7402-7 the whole document	1-6,22, 28,29
X	US 2007/260462 A1 (ANDRSEN SOREN V [SE] ET AL) 8 November 2007 (2007-11-08) abstract; figure 2 paragraphs [0002], [0005] paragraph [0031] - paragraph [0038] paragraph [0101] - paragraph [0104]	1,2,15, 17, 22-26, 28,29

-/--

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2014/062833

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2006/106466 A1 (KONINKL PHILIPS ELECTRONICS NV [NL]; HARMA AKI S [NL]) 12 October 2006 (2006-10-12) abstract page 1, line 16 - page 2, line 2 page 2, line 31 - page 4, line 3 page 5, line 6 - line 33 page 10, line 15 - line 25 -----	1,2,15, 16, 18-23, 28,29
X	US 2008/285599 A1 (JOHANSSON INGEMAR [SE] ET AL) 20 November 2008 (2008-11-20) abstract; figures 2, 4-6 paragraph [0037] - paragraph [0043] paragraph [0051] -----	1,15,20, 22-29
X	US 2007/186145 A1 (OJALA PASI [FI] ET AL) 9 August 2007 (2007-08-09) abstract; figure 1 paragraph [0001] - paragraph [0031] paragraph [0044] - paragraph [0047] paragraphs [0058], [0059] paragraph [0074] - paragraph [0079] -----	1,24-29

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2014/062833

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: 1-14, 20-25, 28, 29

   Performing time scaling in consideration of an estimated quality of the scaled signal

   ---

2. claims: 15-19

   Adapting to quality requirements by varying a quality threshold for time scaling

   ---

3. claims: 26, 27

   Employing a time scaler in an audio decoder

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2014/062833

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011246205 A1	06-10-2011	CN 102214464 A	12-10-2011
		US 2011246205 A1	06-10-2011
US 2007260462 A1	08-11-2007	AT 360300 T	15-05-2007
		AU 2241701 A	09-07-2001
		CN 1433561 A	30-07-2003
		DE 1243090 T1	20-03-2003
		DE 60034484 T2	10-01-2008
		EP 1243090 A1	25-09-2002
		US 2003167170 A1	04-09-2003
		US 2007260462 A1	08-11-2007
		WO 0148736 A1	05-07-2001
WO 2006106466 A1	12-10-2006	NONE	
US 2008285599 A1	20-11-2008	CN 101305417 A	12-11-2008
		EP 1946293 A1	23-07-2008
		JP 4673411 B2	20-04-2011
		JP 2009510855 A	12-03-2009
		US 2008285599 A1	20-11-2008
		WO 2007051495 A1	10-05-2007
US 2007186145 A1	09-08-2007	AT 463030 T	15-04-2010
		CN 101379556 A	04-03-2009
		EP 1982332 A1	22-10-2008
		ES 2340545 T3	04-06-2010
		KR 20080083206 A	16-09-2008
		PT 1982332 E	06-05-2010
		TW 200807395 A	01-02-2008
		US 2007186145 A1	09-08-2007
		WO 2007091204 A1	16-08-2007