



(51) International Patent Classification:

H04N 21/443 (2011.01) H04N 21/845 (2011.01)
H04N 21/442 (2011.01) H04N 21/2343 (2011.01)
H04N 21/462 (2011.01)

(21) International Application Number:

PCT/US2014/020999

(22) International Filing Date:

6 March 2014 (06.03.2014)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/773,379 6 March 2013 (06.03.2013) US
61/936,838 6 February 2014 (06.02.2014) US

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(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, 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))

(88) Date of publication of the international search report:
4 December 2014

(54) Title: POWER AWARE ADAPTATION FOR VIDEO STREAMING

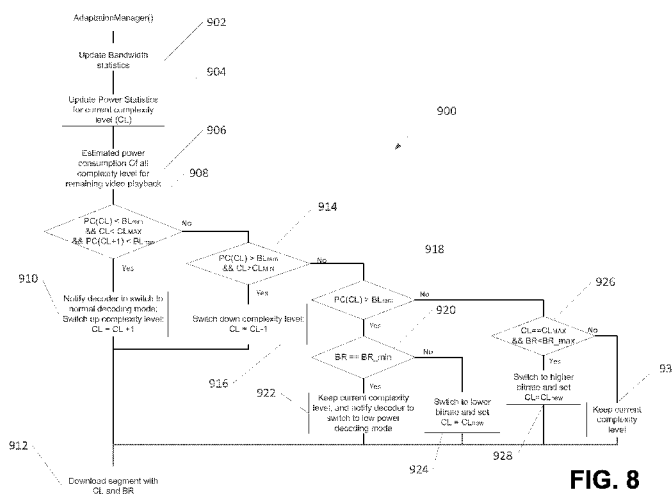


FIG. 8

(57) Abstract: Power aware adaptation for a power aware video streaming system may be based on the complexity information conveyed in different ways. A complexity level of a data stream, such as a video data stream, may be selected as a function of a remaining battery- power of a wireless transmit/receive unit (WTRU) and on a state set of a plurality of state sets that may be stored and/or managed by the WTRU. These state sets may correspond to, for example, different content sources and/or different complexity estimation algorithms and may be used to select the complexity level of the data stream. The data stream may then be received at the selected complexity level. The complexity level and/or a bitrate of the data stream may be adapted to accommodate, for example, the remaining battery power and/or other circumstances. The adaption may be customized according to the objectives of use cases.

WO 2014/138331 A3

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/020999

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04N21/443 H04N21/442 H04N21/462 H04N21/845 H04N21/2343
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)
H04N H04L

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	MORHIKO TAMAI ET AL: "Low Power Video Streaming for PDAs", INTERNET CITATION, 8 October 2003 (2003-10-08), pages 1-6, XP002571114, Retrieved from the Internet: URL:http://ito-lab.naist.jp/themes/pdffiles/031006.morihit-momuc2003.pdf [retrieved on 2010-03-12]	1-14
Y	page 1 - page 5	15
X	US 2004/158878 A1 (RATNAKAR VIRESH [US] ET AL) 12 August 2004 (2004-08-12)	1,2,5-7, 13,16-19
Y	figures 3, 4, 7-9, 11, 12 paragraph [0032] - paragraph [0038] paragraph [0058] - paragraph [0067]	3,4,15, 20
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Further documents are listed in the continuation of Box C.

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)

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"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

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"&" document member of the same patent family

Date of the actual completion of the international search 2 July 2014	Date of mailing of the international search report 10/09/2014
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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 Döttling, Martin
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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2014/020999

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	TAMAI M ET AL: "Energy-aware QoS adaptation for streaming video based on MPEG-7", 2004 IEEE INTERNATIONAL CONFERENCE ON MULTIMEDIA AND EXPO : JUNE 27 - 30, 2004, TAIPEI, TAIWAN, IEEE OPERATIONS CENTER, PISCATAWAY, NJ, vol. 1, 27 June 2004 (2004-06-27), pages 189-192, XP010770776, DOI: 10.1109/ICME.2004.1394157 ISBN: 978-0-7803-8603-7	1,2,5,6, 12-15,20
Y	page 189 - page 191 -----	3,4
X	TRESTIAN R ET AL: "Energy consumption analysis of video streaming to Android mobile devices", 2012 IEEE NETWORK OPERATIONS AND MANAGEMENT SYMPOSIUM (NOMS 2012) : MAUI, HAWAII, USA, 16 - 20 APRIL 2012, IEEE, PISCATAWAY, NJ, 16 April 2012 (2012-04-16), pages 444-452, XP032448681, DOI: 10.1109/NOMS.2012.6211929 ISBN: 978-1-4673-0267-8	1,2,5,6, 8-12
Y	the whole document -----	3,4,20
Y	ZHAN MA ET AL: "Draft Requirements and Discussion on Green MPEG", 103. MPEG MEETING; 21-1-2013 - 25-1-2013; GENEVA; (MOTION PICTURE EXPERT GROUP OR ISO/IEC JTC1/SC29/WG11),, no. m27770, 24 January 2013 (2013-01-24), XP030056323, the whole document -----	3,4
X,P	WO 2014/011622 A2 (VID SCALE INC [US]) 16 January 2014 (2014-01-16) figures 3-5, 7, 8 abstract paragraph [0003] - paragraph [0010] paragraph [0048] - paragraph [0050] paragraph [0070] - paragraph [0083] paragraph [0091] - paragraph [0096] -----	1-8, 10-15,20
X,P	HE YUWEN ET AL: "Power aware HEVC streaming for mobile", 2013 VISUAL COMMUNICATIONS AND IMAGE PROCESSING (VCIP), IEEE, 17 November 2013 (2013-11-17), pages 1-5, XP032543720, DOI: 10.1109/VCIP.2013.6706445 the whole document -----	1-20

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/020999

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.:

1-20

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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2014/020999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
US 2004158878	A1	12-08-2004	CN 1522074 A	18-08-2004
			JP 2004242308 A	26-08-2004
			KR 20040072030 A	16-08-2004
			US 2004158878 A1	12-08-2004

WO 2014011622	A2	16-01-2014	US 2014010282 A1	09-01-2014
			WO 2014011622 A2	16-01-2014

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-20

determination of a power dissipation rate / ensuring that a video can be played entirely

2. claims: 21-26

management of multiple state sets

3. claims: 27-35

changing the complexity level based on computing load
