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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, 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, IS, JP, KE, KG, KM, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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.

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**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

**Published:**

- with international search report (Art. 21(3))

**(88) Date of publication of the international search report:**  
21 February 2013

(54) **Title:** PROVIDING ADAPTIVE MEDIA OPTIMIZATION

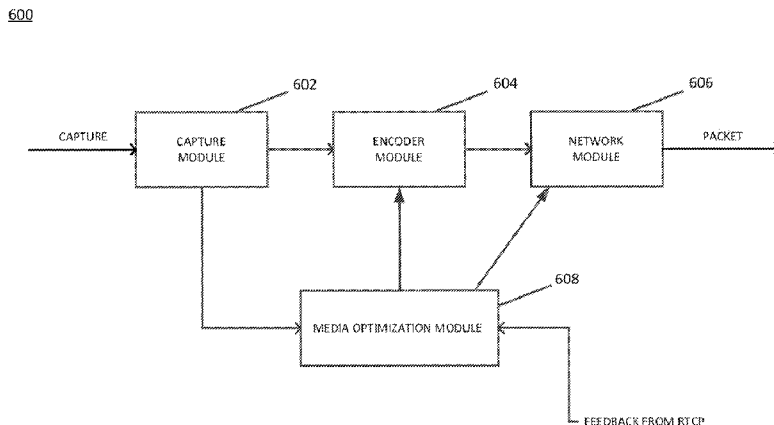


FIG. 6

**(57) Abstract:** A method and system for providing adaptive media optimization are described. Aspects of the invention modify video encoding and network transmission settings to optimize the user viewing experience. The system and method sample video content (102) to determine various content features (502) of the video. The system and method use the identified content features in conjunction with network statistics to modify (510) encoding settings and network transmission options to ensure a minimum of interruption in the transmitted video. Previously generated lookup tables (122) ensure efficient mapping of video content and network conditions to encoding and transmission settings.

WO 2012/154808 A3

# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2012/037055

**A. CLASSIFICATION OF SUBJECT MATTER**  
INV. H04N7/26 H04N7/66  
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

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	US 2007/153916 A1 (DEMIRCIN M U [US] ET AL) 5 July 2007 (2007-07-05)	1-9
Y	paragraphs [0071] - [0196] claim 1	10-13, 18-25
Y	----- WO 2005/112449 A1 (WORLDGATE SERVICE INC [US]; KRISBERG HAL M [US]; AUGENBRAUN JOSEPH E []) 24 November 2005 (2005-11-24) paragraphs [0016], [0022], [0042] - [0044], [0048] - [0060] claims 1,8,12 figures 8,11	10-13, 18-25
X,P	----- WO 2011/161450 A1 (GI PROVISION LTD [GB]; BULL DAVID [GB]; HOW JAMES CHUNG [GB]; NIX ANDR) 29 December 2011 (2011-12-29) the whole document -----	1,18

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)

"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

13 July 2012

Date of mailing of the international search report

26/11/2012

Name and mailing address of the ISA/

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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2012/037055

## 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.:

1-13, 18-23(completely); 24, 25(partially)

### 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: 1-13, 18-23(completely); 24, 25(partially)

A video content class is determined from e.g. motion level, frame rate, texture, edges, resolution, colour depth. Based on the above and determined network conditions are the encoding data rate and the transmission protocols (e.g., FEC or NACK) adapted.

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2. claims: 14-17(completely); 24, 25(partially)

By parameter fitting generating a video parameter LUT reflecting how the distortion of video content belonging to a certain content class depends on network data rates, packet loss values, error resilience and FEC protection factors. Other tables generated include FEC and residual packet loss LUT:s.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/037055

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2007153916 A1	05-07-2007	JP 2007184913 A US 2007153916 A1 WO 2007078358 A2	19-07-2007 05-07-2007 12-07-2007
-----			
WO 2005112449 A1	24-11-2005	AU 2005242348 A1 BR PI0509820 A CA 2606021 A1 EP 1754371 A1 JP 2007535875 A US 2008158333 A1 WO 2005112449 A1	24-11-2005 18-09-2007 24-11-2005 21-02-2007 06-12-2007 03-07-2008 24-11-2005
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WO 2011161450 A1	29-12-2011	GB 2484061 A WO 2011161450 A1	04-04-2012 29-12-2011
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