



- (51) International Patent Classification:  
G06F 19/22 (2011.01) C12Q 1/68 (2006.01)
- (21) International Application Number:  
PCT/US2011/063495
- (22) International Filing Date:  
6 December 2011 (06.12.2011)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
61/423,069 14 December 2010 (14.12.2010) US  
61/424,481 17 December 2010 (17.12.2010) US  
61/475,927 15 April 2011 (15.04.2011) US
- (71) Applicant (for all designated States except US): LIFE TECHNOLOGIES CORPORATION [US/US]; 5791 Van Allen Way, Carlsbad, California 92008 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): SUBRAMANIAM, Yerramalli [IN/US]; Life Technologies Corporation, Attention: IP Department, 5791 Van Allen Way, Carlsbad,

California 92008 (US). SURI, Puneet [US/US]; Life Technologies Corporation, Attention: IP Department, 5791 Van Allen Way, Carlsbad, California 92008 (US). CHANG, Sylvia [US/US]; Life Technologies Corporation, Attention: IP Department, 5791 Van Allen Way, Carlsbad, California 92008 (US). YANG, Chengyong [CN/US]; Life Technologies Corporation, Attention: IP Department, 5791 Van Allen Way, Carlsbad, California 92008 (US).

(74) Agent: SCHELL, David; LIFE TECHNOLOGIES CORPORATION, Attention: IP Department, 5791 Van Allen Way, Carlsbad, California 92008 (US).

(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,

[Continued on next page]

(54) Title: SYSTEMS AND METHODS FOR RUN-TIME SEQUENCING RUN QUALITY MONITORING

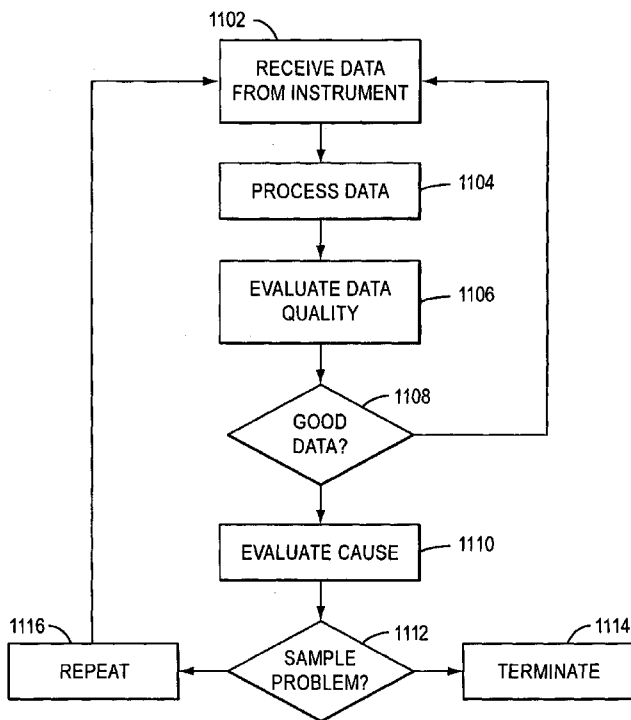


FIG. 11

(57) Abstract: Systems and methods of providing run-time quality control and monitoring of a single or multiple sequencing runs are provided herein. In some embodiments, the run-time system includes or is in communication with a processor capable of determining various types of run-time information relating to the quality, progress, etc. of various sequencing runs. In some embodiments, the system can also be in communication with a user interface, for example, a GUI, capable of representing and communicating various types of information to a user regarding the quality of the individual or multiple runs, the functioning of the instrument, an error event, etc. Additionally, the system can capable of receiving actionable information from a user via the GUI thereby allowing the user to terminate or repeat various sequencing steps in a particular run, terminate an entire run, terminate all runs, allow a run to proceed, etc.

WO 2012/082464 A3

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, MD, 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, 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:**

11 October 2012

# INTERNATIONAL SEARCH REPORT

International application No PCT/US2011/063495
---

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. G06F19/22 C12Q1/68 ADD.				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) G06F C12Q				
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				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	WO 2008/092150 A1 (ILLUMINA INC [US]; KAIN ROBERT C [US]; HEINER DAVID L [US]; ZHAO CHANF) 31 July 2008 (2008-07-31) paragraph [0005] - paragraph [0008] paragraph [0023] - paragraph [0027] paragraph [0033] - paragraph [0072] claims 1,3,18-20 figures 1,2,5	1-19,32		
X	WO 99/08233 A1 (IMAGING RESEARCH INC [CA]; RAMM PETER [CA]; SUN GANG [CA]) 18 February 1999 (1999-02-18) abstract page 4, line 22 - page 7, line 12 page 13, line 14 - page 22, line 23 page 38, line 30 - page 46, line 11 claims 1-3 figures 1,7,8	1-19,32		
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.</td> <td style="width: 50%; border: none;"><input checked="" type="checkbox"/> See patent family annex.</td> </tr> </table>			<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> 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			
30 May 2012	01/08/2012			
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  Hilbig, Matthias			

**INTERNATIONAL SEARCH REPORT**

International application No PCT/US2011/063495
---

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 2006/293558 A1 (DE GROEN PIET C [US] ET AL) 28 December 2006 (2006-12-28) abstract paragraph [0010] - paragraph [0012] paragraph [0024] - paragraph [0030] paragraph [0089] - paragraph [0090] claims 1,2 figure 2 <p align="center">-----</p>	1-19, 32

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2011/063495

## 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.:

1-19, 32

### 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: 1-19, 32

Systems, method and computer program product for interrogating a control set and a nucleic acid sample for producing control data and sample data and to perform an event handling routine based on the comparison of the control data and the sample data.

---

2. claims: 20-24

Computer program product for determining a duration for sequencing a nucleic acid sample, to display a graph indicating the duration, to monitor the process of the sequencing and to determine a data quality for the sequencing.

---

3. claims: 25-31

Method for processing first and second call data for a sample and to evaluate a run quality of the sequencing based on said data.

---

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/US2011/063495
---

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2008092150	A1	31-07-2008	AT 521948 T 15-09-2011
			CA 2676570 A1 31-07-2008
			EP 2126765 A1 02-12-2009
			EP 2126766 A2 02-12-2009
			EP 2374902 A1 12-10-2011
			JP 2010516285 A 20-05-2010
			US 2008182757 A1 31-07-2008
			US 2008262747 A1 23-10-2008
			US 2011009278 A1 13-01-2011
			US 2011009296 A1 13-01-2011
			WO 2008092150 A1 31-07-2008
			WO 2008092155 A2 31-07-2008
-----			
WO 9908233	A1	18-02-1999	AU 8846498 A 01-03-1999
			CA 2299325 A1 18-02-1999
			EP 1002297 A1 24-05-2000
			JP 4286447 B2 01-07-2009
			JP 2001512875 A 28-08-2001
			US 6345115 B1 05-02-2002
			WO 9908233 A1 18-02-1999
-----			
US 2006293558	A1	28-12-2006	US 2006293558 A1 28-12-2006
			WO 2006138504 A2 28-12-2006
-----			