



- (51) **International Patent Classification:**
G07C 5/08 (2006.01) *G05B 23/02* (2006.01)
- (21) **International Application Number:**
PCT/US2012/025802
- (22) **International Filing Date:**
20 February 2012 (20.02.2012)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
13/031,565 21 February 2011 (21.02.2011) US
- (71) **Applicant (for all designated States except US):** **SNAP-ON INCORPORATED** [US/US]; 2801 80th Street, Kenosha, WI 53141-1410 (US).
- (72) **Inventors; and**
- (75) **Inventors/Applicants (for US only):** **THERIOT, Mark** [US/US]; 6810 Waterford Drive, Unit 21, McHenry, Illinois 60050 (US). **MERG, Patrick S.** [US/US]; 750 Arbonne Avenue, Hollister, California 95023 (US). **BRO-ZOVICH, Steve** [US/US]; 605 Wendell Drive, Campbell, California 95008 (US).
- (74) **Agent:** **LOOS, Thomas J.**; McDonnell Boehnen Hulbert & Berghoff LLP, 300 South Wacker Drive, Suite 3200, Chicago, Illinois 60606 (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, 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).

[Continued on next page]

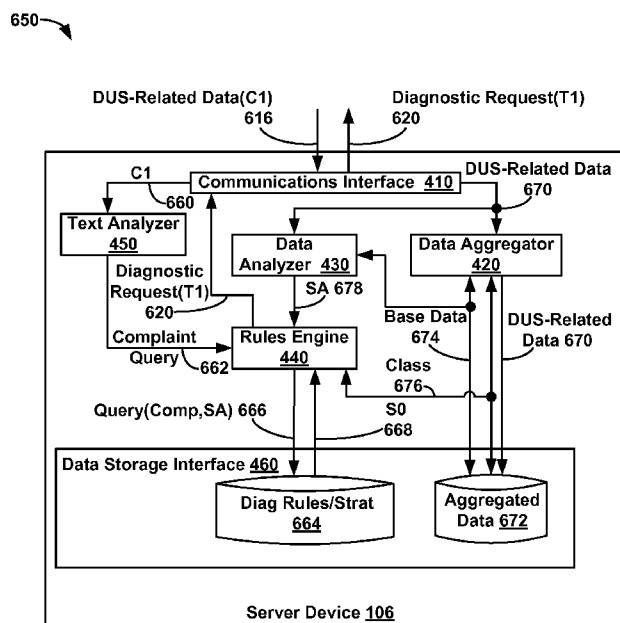
(54) **Title:** METHODS AND DEVICES FOR DIAGNOSING A DECIVE - UNDER - SERVICE

FIG. 6B

(57) **Abstract:** Methods and devices related to diagnosing a device-under- service (DUS) are disclosed. DUS-related data is received. The DUS-related data is determined to be aggregated into aggregated data based on a determined classification of the DUS-related data. An aggregated- data comparison of the DUS-related data and aggregated data is generated. The aggregated- data comparison can include a statistical analysis of the DUS-related data and/or a differential analysis of DUS-related data taken while the DUS is operating in two or more operating states. A DUS report is generated based on the aggregated- data comparison. The DUS report can include one or more sub - strategies. At least one of the one or more sub - strategies can include a sub - strategy- succes estimate. The DUS report can be sent and a DUS -report display can be generated based on the DUS report

WO 2012/115899 A3



Published:

(88) Date of publication of the international search report:

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

2 May 2013

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2012/025802

A. CLASSIFICATION OF SUBJECT MATTER

INV. G07C5/08 G05B23/02
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)

G07C G05B

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 2002/007237 A1 (PHUNG TAM A [US] ET AL) 17 January 2002 (2002-01-17) abstract paragraph [0002] paragraph [0010] - paragraph [0011] paragraph [0017] - paragraph [0018] paragraph [0032] - paragraph [0033] paragraph [0037] - paragraph [0038] paragraph [0041] - paragraph [0050] paragraph [0055] paragraph [0064] figures 1-7B ----- -/-	1-15



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

21 June 2012

Date of mailing of the international search report

14/01/2013

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

Van der Haegen, D

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/025802

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 1 569 176 A2 (FUJI HEAVY IND LTD [JP]) 31 August 2005 (2005-08-31) paragraph [0007] paragraph [0020] - paragraph [0024] paragraph [0034] - paragraph [0044] figures 4-7 claims 1,10 -----	4-9
A	CHAITANYA SANKAVARAM ET AL.: "Event-driven Data Mining Techniques for Automotive Fault Diagnosis", 21ST INTERNATIONAL WORKSHOP ON PRINCIPLES OF DIAGNOSIS, 13 October 2010 (2010-10-13), 16 October 2010 (2010-10-16), pages 1-8, XP002677127, Portland, Oregon (US) Retrieved from the Internet: URL:http://www.phmsociety.org/sites/phmsociety.org/files/phm_submission/2010/phmc_10_109.pdf [retrieved on 2012-06-05] the whole document -----	3,10, 12-15
A	US 2006/095230 A1 (GRIER JEFF [US] ET AL) 4 May 2006 (2006-05-04) paragraph [0008] - paragraph [0010] paragraph [0027] - paragraph [0029] paragraph [0067] - paragraph [0073] figures 1-6B -----	1,2,11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/025802

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.:

1-15

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/US2012/025802

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2002007237	A1	17-01-2002	NONE

EP 1569176	A2	31-08-2005	CN 1661352 A 31-08-2005
			EP 1569176 A2 31-08-2005
			JP 4509602 B2 21-07-2010
			JP 2005239085 A 08-09-2005
			US 2005192722 A1 01-09-2005

US 2006095230	A1	04-05-2006	US 2006095230 A1 04-05-2006
			WO 2006068658 A2 29-06-2006

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-15

Method for providing a diagnostic and repair strategy that is based on a comparison of DUS-related data with aggregated data, the strategy consisting of one or more substrategies.

2. claims: 16-18

Client device for use in a diagnostic system.

3. claims: 19-24

Method for providing a diagnostic and repair strategy that is based on differences in the DUS-related data of different DUS operating modes.
