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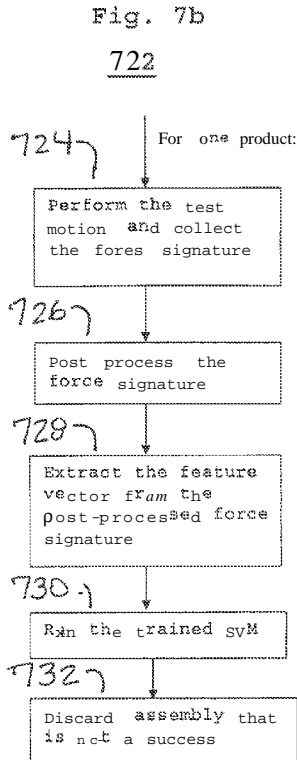
tunavagen 18c, S-72217 Vasteras (SE). **ROSSANO, Gregory [US/US];** 13 Riviera Drive, Enfield, CT 06082 (US). **BOURNE, David, Alan [US/US];** 204 Fern Rock Lane, Acme, PA 15610 (US). **ZHANG, Biao [CN/US];** 62 Hilldale Road, West Hartford, CT 061 17 (US). **GARCIA, Alberto, Rodriguez [ES/US];** 5850 Centre Avenue, Unit 406, Pittsburgh, PA 15206 (US).

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[Continued on nextpage]

(54) **Title:** METHOD AND APPARATUS FOR USING POST ASSEMBLY PROCESS INTERACTION SIGNATURES TO DETECT ASSEMBLY FAILURES



(57) **Abstract:** There is described a technique for detecting the success of an automated process that produces an article of manufacture. A statistically significant number of successful and failed articles are produced by the automated process. Each of these articles is interacted with a test platform to measure interaction signatures that indicate successful and failed articles. A correlation of the difference between the interaction signatures is calculated. An interaction signature is then obtained for an article manufactured by the process after the earlier made articles. The new interaction signature is analyzed against the calculated correlation difference to automatically categorize as either a success or a failure the additional article of manufacture. There is also described a technique for optimizing the motion used to test the manufactured articles to improve the correlation of the difference between the interaction signals of successful articles and the interaction signals of failed articles.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER  
INV. G05B19/418 G05B23/02 G01R31/28  
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)  
G05B G01R

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	RODRIGUEZ A ET AL: "Failure detection in assembly: Force signature analysis", AUTOMATION SCIENCE AND ENGINEERING (CASE), 2010 IEEE CONFERENCE ON, IEEE, PISCATAWAY, NJ, USA, 21 August 2010 (2010-08-21) , pages 210-215 , XP031762575 , ISBN: 978-1-4244-5447-1 the whole document	1-9
A	----- US 2008/262795 AI (WEBB MARCUS [US] ET AL) 23 October 2008 (2008-10-23) paragraph [0006] - paragraph [0020] paragraph [0027] - paragraph [0058]	1-9
A	----- US 2010/235140 AI (SATONAGA TETSUICHI [JP] ET AL) 16 September 2010 (2010-09-16) paragraph [0040] - paragraph [0124]	1-9

Further documents are listed in the continuation of Box C.

See patent family annex.

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

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Date of the actual completion of the international search <b>9 September 2014</b>	Date of mailing of the international search report <b>17/09/2014</b>
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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 <b>Patsi opoulos, N</b>
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## INTERNATIONAL SEARCH REPORT

International application No  
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>BURGES C J C: "A tutorial on support vector machines for pattern recognition", JOURNAL OF DATA MINING AND KNOWLEDGE DISCOVERY, NORWELL, MA, US, vol . 2, no. 2, 1 January 1998 (1998-01-01), pages 121-167, XP002087854, ISSN: 1384-5810, DOI: 10.1023/A: 1009715923555 the whole document</p> <p style="text-align: center;">-----</p>	1-9
A	<p>LINDSAY I SMITH: "A tutorial on Principal Components Analysis", 20020226 , 26 February 2002 (2002-02-26), pages 1-27, XP007910954, Retrieved from the Internet: URL: <a href="http://www.cs.otago.ac.nz/cosc453/student_tutorials/principal_components.pdf">http://www.cs.otago.ac.nz/cosc453/student_tutorials/principal_components.pdf</a> [retrieved on 2014-08-18] page 12 - page 22</p> <p style="text-align: center;">-----</p>	1-9

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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