



(43) International Publication Date
27 March 2014 (27.03.2014)

- (51) International Patent Classification:
G06F 9/44 (2006.01)
- (21) International Application Number:
PCT/US2013/057379
- (22) International Filing Date:
29 August 2013 (29.08.2013)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/703,270 20 September 2012 (20.09.2012) US
- (71) Applicant: IFWIZARD CORPORATION [US/US]; 760 Sw Madison, Suite 200, Corvallis, OR 97333 (US).
- (72) Inventor: SELLERS-BLAIS, Dominic; 1609 Sw Otana Drive, Corvallis, OR 97333 (US).
- (74) Agents: STOLOWITZ, Micah, D. et al.; Stolowitz Ford Cowger LLP, 1140 Sw 11th Street, Suite 400, Portland, OR 97205 (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, 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, 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))
- 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:
26 June 2014

(54) Title: METHOD AND SYSTEM FOR SIMPLIFIED KNOWLEDGE ENGINEERING

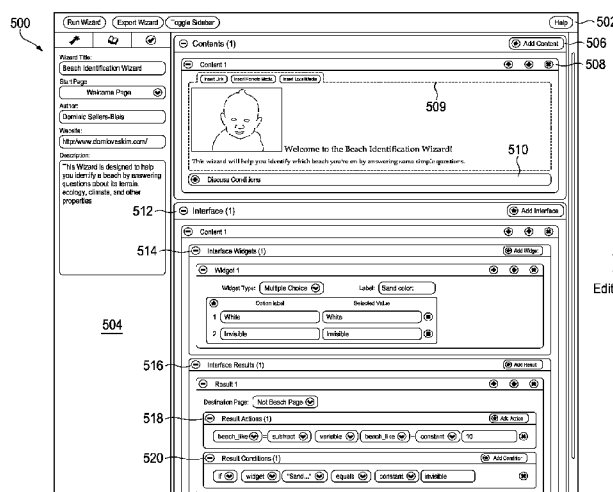


Fig. 5
Editor User Interface

(57) Abstract: A system and method is disclosed for knowledge engineering using a computerized graphical editor to manage and create knowledge-based systems containing a navigable graph of modal pages with conditional content and user interface knowledge. The invention enables the entire knowledge engineering workflow to be performed within a non-technical graphical environment and without requiring a computer programming or mathematical background. Further, the presentation of knowledge as modal pages allows for simple ontological discovery and end-user player operation. Once editing is complete, the method allows for the set of pages, variables, and settings of which the knowledge-based system is composed to be exported into an independently executable knowledge-based system player containing an embedded inference engine.

WO 2014/046861 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 13/57379

<p>A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - G06F 9/44 (2014.01) USPC - 717/110 According to International Patent Classification (IPC) or to both national classification and IPC</p>																	
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) IPC(8): G06F 9/44 (2014.01) USPC: 717/110</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC: 717/100 or 717/110 or 715/200 or 715/234 IPC(8): G06F 9/44 (2014.01)</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) Patbase; Google Scholar; Modal, web, page, create, generate, inference engine, domain knowledge, variable, export, publish, deploy, run, controls, elements, buttons, user, developer, programmer, navigable, graph, form, interface, GUI, UI</p>																	
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;">Category*</th> <th style="width:70%;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="width:20%;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td align="center">X</td> <td>US 2011/0161941 A1 (Thomson et al.) 30 June 2011 (30.06.2011) entire document (especially para [0100]-[0104], [0110]-[0116], [0132]-[0135], [0164]-[0172], [0180], [0212], [0412]-[0414], [0490]-[0494], [0557], Fig. 8)</td> <td align="center">1-10</td> </tr> <tr> <td align="center">A</td> <td>US 6,311,194 B1 (Sheth et al.) 30 October 2001 (30.10.2001) entire document</td> <td align="center">1-10</td> </tr> <tr> <td align="center">A</td> <td>US 2006/0149833 A1 (Dan et al.) 06 July 2006 (06.07.2006) entire document</td> <td align="center">1-10</td> </tr> <tr> <td align="center">A</td> <td>US 2008/0313215 A1 (Beker et al.) 18 December 2008 (18.12.2008) entire document</td> <td align="center">1-10</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	X	US 2011/0161941 A1 (Thomson et al.) 30 June 2011 (30.06.2011) entire document (especially para [0100]-[0104], [0110]-[0116], [0132]-[0135], [0164]-[0172], [0180], [0212], [0412]-[0414], [0490]-[0494], [0557], Fig. 8)	1-10	A	US 6,311,194 B1 (Sheth et al.) 30 October 2001 (30.10.2001) entire document	1-10	A	US 2006/0149833 A1 (Dan et al.) 06 July 2006 (06.07.2006) entire document	1-10	A	US 2008/0313215 A1 (Beker et al.) 18 December 2008 (18.12.2008) entire document	1-10
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<p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/></p>																	
<p>* Special categories of cited documents:</p> <table style="width:100%;"> <tr> <td style="width:50%; vertical-align: top;"> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“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)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width:50%; vertical-align: top;"> <p>“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</p> <p>“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</p> <p>“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</p> <p>“&” document member of the same patent family</p> </td> </tr> </table>			<p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“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)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“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</p> <p>“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</p> <p>“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</p> <p>“&” document member of the same patent family</p>													
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<p>Date of the actual completion of the international search</p> <p>18 April 2014 (18.04.2014)</p>		<p>Date of mailing of the international search report</p> <p align="center">01 MAY 2014</p>															
<p>Name and mailing address of the ISA/US</p> <p>Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201</p>		<p>Authorized officer:</p> <p align="center">Lee W. Young</p> <p>PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774</p>															

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 13/57379

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:
This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I: Claims 1-10 are drawn to the computer program comprising: an editor component that enables the creation and configuration of a set of modal pages that reflect domain knowledge; and a player component arranged for interacting with a user and conditionally displaying exactly one of the set of modal pages at a time, based on the interactions with the user.

Group II: Claims 11-20 are drawn to the computer program comprising a graphical editor for building a knowledge-based application program, the graphical editor comprising: an expert system manager element 102 arranged to enable an authorized user to select a knowledge-based system ("Wizard") 200; a variable listing corresponding to the selected Wizard; a page listing corresponding to the selected Wizard; a page editor component; a test subsystem; and an export subsystem arranged to export the selected Wizard in a portable format.

-- See extra 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 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.:
1-10

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.

Continuation of Box III: Observations where unity of invention is lacking

Group III: Claims 21-29 are drawn to the computer program comprising series of instructions for causing the machine to perform operations comprising: loading knowledge-based system data including a set of pages and associated variables; checking whether a current page of the set has any content elements; if the current page has at least one content element, determining whether a first content element of the page has any associated content conditions; displaying the first content element if and only if all of the associated content conditions are met; checking whether the current page has any user interface elements; if the current page has at least one user interface element, determining whether a first user interface element has any associated user interface conditions; and displaying the first user interface element 416 of the current page if and only if all of the associated user interface conditions 414 are met.

The inventions listed as Groups I through III do not relate to a single general inventive concept under PCT Rule 13.1 because under PCT Rule 13.2 they lack the same or corresponding technical features for the following reasons:

Special Technical Features

The special technical feature of Group I is the computer program comprising: an editor component that enables the creation and configuration of a set of modal pages that reflect domain knowledge; and a player component arranged for interacting with a user and conditionally displaying exactly one of the set of modal pages at a time, based on the interactions with the user, not required in any other group.

The special technical feature of Group II is the computer program comprising a graphical editor for building a knowledge-based application program, the graphical editor comprising: an expert system manager element 102 arranged to enable an authorized user to select a knowledge-based system ("Wizard") 200; a variable listing corresponding to the selected Wizard; a page listing corresponding to the selected Wizard; a page editor component; a test subsystem; and an export subsystem arranged to export the selected Wizard in a portable format, not required in any other group.

The special technical feature of Group III is the computer program comprising series of instructions for causing the machine to perform operations comprising: loading knowledge-based system data including a set of pages and associated variables; checking whether a current page of the set has any content elements; if the current page has at least one content element, determining whether a first content element of the page has any associated content conditions; displaying the first content element if and only if all of the associated content conditions are met; checking whether the current page has any user interface elements; if the current page has at least one user interface element, determining whether a first user interface element has any associated user interface conditions; and displaying the first user interface element 416 of the current page if and only if all of the associated user interface conditions 414 are met. not required in any other group.

Common Technical Features:

Group I and II share the technical feature of an editor component. However, this shared technical features does not represent a contribution over the prior art:

US 2006/0069995 A1 (Thompson et al.) (hereinafter Thompson) 30 March 2006 (30.03.2006)

Thompson teaches an editor component (e.g. FIGS. 8A and 8B show a screen of the toolset plan inspection Plugin, Component Editor and UML (using the "OMONDO" plugin shown in Eclipse), para [0109]).

Groups I and III share the technical feature of a set of pages. However, this shared technical features does not represent a contribution over the prior art Thompson.

Thompson teaches a set of pages (FIGS. 10A and 10B show the implemented pages for these phases in the service ordering portal application, para [0126]).

Groups I-III share the technical feature of a non-transitory, machine readable storage medium having stored thereon a computer program for knowledge engineering. However, this shared technical features does not represent a contribution over the prior art:

US 4,658,370 A (Erman et al.) (hereinafter Erman) 14 April 1987 (14.04.1987)

Erman teaches a non-transitory, machine readable storage medium having stored thereon a computer program for knowledge engineering, (e.g. the knowledge engineering tool having been loaded in a general purpose digital computer. The knowledge engineering tool itself is a computer program containing a number of modules or subroutines, col. 6, ln 52-56; memory, col. 43, ln 58-61).

Groups II and III share the technical feature of knowledge-based system. However, this shared technical features does not represent a contribution over the prior art Erman.

Erman teaches knowledge-based system (col. 5, ln 64-67).

As the above common features were known in the art at the time of the invention, these cannot be considered a special technical feature that would otherwise unify the groups. Therefore, Groups I - III lack unity under PCT Rule 13 because they do not share a same or corresponding special technical feature.