PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : G06F 17/60 | A3

(11) International Publication Number: **WO 00/04478**

(43) International Publication Date: 27 January 2000 (27.01.00)

(21) International Application Number: PCT/US99/16103

(22) International Filing Date: 16 July 1999 (16.07.99)

(30) Priority Data:
60/093,298 17 July 1998 (17.07.98) US

(71) Applicant: THE FRANKLIN INSTITUTE [US/US]; 222 North 20th Street, Philadelphia, PA 19103 (US).

(72) Inventors: JONSSON, Arne; The Franklin Institute, 222 North 20th Street, Philadelphia, PA 19103 (US). TESTANI, Sandra; The Franklin Institute, 222 North 20th Street, Philadelphia, PA 19103 (US). WAGNER, Edward; The Franklin Institute, 222 North 20th Street, Philadelphia, PA 19103 (US). BURDICK, Josh; The Franklin Institute, 222 North 20th Street, Philadelphia, PA 19103 (US).

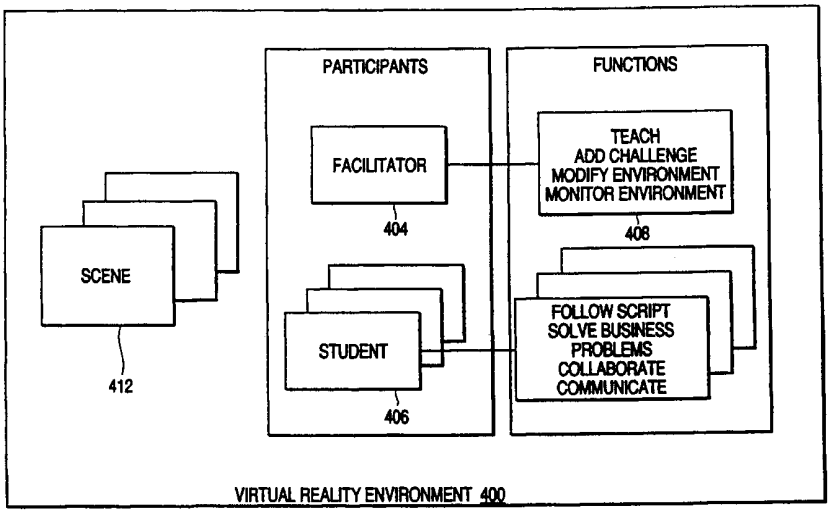
(74) Agent: BAILEY, Matthew, T.; Morgan, Lewis & Bockius LLP, 1800 M Street, N.W., Washington, DC 20036–5869 (US).

(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.

(88) Date of publication of the international search report:
16 November 2000 (16.11.00)

(54) Title: A SYSTEM CONTAINING A MULTI-USER VIRTUAL LEARNING ENVIRONMENT



(57) Abstract

A virtual environment (400) for solving business-oriented problems by interactive-collaborative learning involving one or more participants (406) that are monitored by a facilitator (404). The virtual environment for facilitating collaborative decision-making is implemented on an interactive distributed network. Upon "entering" the virtual environment, each participant chooses a virtual persona or "avatar" and each participant may navigate through the virtual environment individually or with other participants. The facilitator guides and monitors participants' navigation through the virtual environment and the facilitator may prompt the participants to negotiate complex problems presented by a software application to reach collaborative decisions. Additionally, the facilitator may interact one-to-one with each participant or with a selective group of participants or with all of the participants. Each participant utilizes a three-dimensional application that is executed on a client computer system and the facilitator's functions and other functions relating to the virtual environment may be stored on a server computer.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	**ES**	Spain	**LS**	Lesotho	**SI**	Slovenia
AM	Armenia	**FI**	Finland	**LT**	Lithuania	**SK**	Slovakia
AT	Austria	**FR**	France	**LU**	Luxembourg	**SN**	Senegal
AU	Australia	**GA**	Gabon	**LV**	Latvia	**SZ**	Swaziland
AZ	Azerbaijan	**GB**	United Kingdom	**MC**	Monaco	**TD**	Chad
BA	Bosnia and Herzegovina	**GE**	Georgia	**MD**	Republic of Moldova	**TG**	Togo
BB	Barbados	**GH**	Ghana	**MG**	Madagascar	**TJ**	Tajikistan
BE	Belgium	**GN**	Guinea	**MK**	The former Yugoslav Republic of Macedonia	**TM**	Turkmenistan
BF	Burkina Faso	**GR**	Greece			**TR**	Turkey
BG	Bulgaria	**HU**	Hungary	**ML**	Mali	**TT**	Trinidad and Tobago
BJ	Benin	**IE**	Ireland	**MN**	Mongolia	**UA**	Ukraine
BR	Brazil	**IL**	Israel	**MR**	Mauritania	**UG**	Uganda
BY	Belarus	**IS**	Iceland	**MW**	Malawi	**US**	United States of America
CA	Canada	**IT**	Italy	**MX**	Mexico	**UZ**	Uzbekistan
CF	Central African Republic	**JP**	Japan	**NE**	Niger	**VN**	Viet Nam
CG	Congo	**KE**	Kenya	**NL**	Netherlands	**YU**	Yugoslavia
CH	Switzerland	**KG**	Kyrgyzstan	**NO**	Norway	**ZW**	Zimbabwe
CI	Côte d'Ivoire	**KP**	Democratic People's Republic of Korea	**NZ**	New Zealand		
CM	Cameroon			**PL**	Poland		
CN	China	**KR**	Republic of Korea	**PT**	Portugal		
CU	Cuba	**KZ**	Kazakstan	**RO**	Romania		
CZ	Czech Republic	**LC**	Saint Lucia	**RU**	Russian Federation		
DE	Germany	**LI**	Liechtenstein	**SD**	Sudan		
DK	Denmark	**LK**	Sri Lanka	**SE**	Sweden		
EE	Estonia	**LR**	Liberia	**SG**	Singapore		

INTERNATIONAL SEARCH REPORT

Inter ional Application No
PCI/US 99/16103

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F17/60

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)
IPC 7 G06F

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 practical, search terms used)
INSPEC, EPO-Internal, COMPENDEX, IBM-TDB, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	TESTANI S ET AL: "CIMBLE: experiential training in a VRML environment" PROCEEDINGS OF THE VIRTUAL WORLDS AND SIMULATION CONFERENCE (VMSIM'98), PROCEEDINGS OF VIRTUAL WORLDS AND SIMULATION CONFERENCE (VWSIM'98), SAN DIEGO, CA, USA, 11-14 JAN. 1998, pages 67-71, XP002124034 1998, San Diego, CA, USA, Society for Computer Simulation International, USA abstract page 67, right-hand column, line 5-21 page 68, left-hand column, line 23-32 page 69, left-hand column, line 9-41 page 69, right-hand column, line 32-62 figure 1 --- -/--	1-26

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in 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 document 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
14 July 2000	31.07.00

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	König, W

7

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Inte ional Application No
PCT/US 99/16103

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	MCKAY D P ET AL: "An architecture for a training virtual world environment" PROCEEDINGS OF THE VIRTUAL WORLDS AND SIMULATION CONFERENCE (VMSIM'98), PROCEEDINGS OF VIRTUAL WORLDS AND SIMULATION CONFERENCE (VWSIM'98), SAN DIEGO, CA, USA, 11-14 JAN. 1998, pages 125-130, XP002124035 1998, San Diego, CA, USA, Society for Computer Simulation International, USA abstract page 125, right-hand column, line 16-33 page 126, right-hand column, line 1-25 page 129, right-hand column, line 30 -page 130, left-hand column, line 28 figures 1,2 ---	1-26
A	TAYLOR S L ET AL: "Virtual communities of interest for education and training" PROCEEDINGS OF THE VIRTUAL WORLDS AND SIMULATION CONFERENCE (VMSIM'98), PROCEEDINGS OF VIRTUAL WORLDS AND SIMULATION CONFERENCE (VWSIM'98), SAN DIEGO, CA, USA, 11-14 JAN. 1998, pages 172-177, XP002124036 1998, San Diego, CA, USA, Society for Computer Simulation International, USA abstract page 174, left-hand column, line 25-50 page 175, right-hand column, line 11 -page 176, left-hand column, line 14 figure 2 ---	1-26
X	LANDAUER C ET AL: "What is cyberspace?" PROCEEDINGS OF THE VIRTUAL WORLDS AND SIMULATION CONFERENCE (VMSIM'98), PROCEEDINGS OF VIRTUAL WORLDS AND SIMULATION CONFERENCE (VWSIM'98), SAN DIEGO, CA, USA, 11-14 JAN. 1998, pages 16-21, XP002142552 1998, San Diego, CA, USA, Society for Computer Simulation International, USA abstract page 17, left-hand column, paragraph 2 -page 17, right-hand column, paragraph 8 page 18, left-hand column, paragraph 4 page 18, left-hand column, paragraph 8 --- -/--	27-65

7

INTERNATIONAL SEARCH REPORT

Inte `ional Application No
PCT/US 99/16103

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JOHNSON W L ET AL: "Pedagogical agents in virtual team training" PROCEEDINGS OF THE VIRTUAL WORLDS AND SIMULATION CONFERENCE (VMSIM'98), PROCEEDINGS OF VIRTUAL WORLDS AND SIMULATION CONFERENCE (VWSIM'98), SAN DIEGO, CA, USA, 11-14 JAN. 1998, pages 72-77, XP002142553 1998, San Diego, CA, USA, Society for Computer Simulation International, USA abstract page 72, left-hand column, paragraph 2 -page 72, right-hand column, paragraph 3 page 73, right-hand column, paragraph 5 -page 74, left-hand column, paragraph 4; figure 1 page 76, left-hand column, paragraph 2 -page 76, left-hand column, paragraph 3 ---	27-65, 82-113
X	JACOBSTEIN N ET AL: "A multi-agent associate system guide for a virtual collaboration center" PROCEEDINGS OF THE VIRTUAL WORLDS AND SIMULATION CONFERENCE (VMSIM'98), PROCEEDINGS OF VIRTUAL WORLDS AND SIMULATION CONFERENCE (VWSIM'98), SAN DIEGO, CA, USA, 11-14 JAN. 1998, pages 215-220, XP002142554 1998, San Diego, CA, USA, Society for Computer Simulation International, USA abstract page 216, left-hand column, paragraph 3 -page 216, left-hand column, paragraph 4 page 217, left-hand column, paragraph 4 -page 217, right-hand column, paragraph 3; figures 1,2 ---	27-81
X	KIRSH D: "Virtual collaboration and adaptive rooms" PROCEEDINGS OF THE VIRTUAL WORLDS AND SIMULATION CONFERENCE (VMSIM'98), PROCEEDINGS OF VIRTUAL WORLDS AND SIMULATION CONFERENCE (VWSIM'98), SAN DIEGO, CA, USA, 11-14 JAN. 1998, pages 10-15, XP002142555 1998, San Diego, CA, USA, Society for Computer Simulation International, USA abstract page 10, left-hand column, paragraph 2 -page 10, right-hand column, paragraph 2 page 11, left-hand column, last paragraph -page 13, right-hand column, paragraph 3 --- -/--	52-113

7

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Inter ional Application No
PCT/US 99/16103

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 0 753 834 A (SONY CORP) 15 January 1997 (1997-01-15) abstract column 2, line 54 -column 8, line 18 ---	1,14,27, 40,52, 59,66, 74,82,98
A	US 5 727 950 A (PADWA DAVID J ET AL) 17 March 1998 (1998-03-17) abstract column 5, line 12 -column 8, line 15 -----	1,14,27, 40,52, 59,66, 74,82,98

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter ional Application No
PCI/US 99/16103

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0753834 A	15-01-1997	CA 2180904 A	12-01-1997
		JP 9081495 A	28-03-1997
		US 6020885 A	01-02-2000
US 5727950 A	17-03-1998	AU 3138397 A	09-12-1997
		AU 3209697 A	09-12-1997
		EP 0902935 A	24-03-1999
		WO 9744766 A	27-11-1997
		WO 9744767 A	27-11-1997