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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/850,842	05/21/2004	Lei Pan	R0089-0064

CONFIRMATION NO. 9744

POA ACCEPTANCE LETTER



95508
One LLP
4000 MacArthur Blvd.
West Tower, Suite 1100
Newport Beach, CA 92660

Date Mailed: 04/30/2013

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/06/2013.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/deelliott/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101



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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/850,842	05/21/2004	Lei Pan	703538.4044

91477
Dickstein Shapiro LLP
1633 Broadway
New York, NY 10019

CONFIRMATION NO. 9744
POWER OF ATTORNEY NOTICE



Date Mailed: 04/30/2013

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 04/06/2013.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/deelliott/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

POWER OF ATTORNEY TO PROSECUTE BEFORE THE USPTO
By Assignee

The Regents of the University of California, assignee of the application(s) for United States Letters Patent identified in the attached statement under 37 CFR 3.73(b) and Exhibit A attached hereto, does revoke all powers of attorney previously given and hereby appoints as its attorneys and/or agents, with full power of substitution and revocation, to prosecute this application and transact all business in the United States Patent and Trademark Office, and in countries other than the United States, and to do all things necessary or appropriate therefor before any competent International Authorities in connection with any international patent application(s) corresponding to the above-identified application; all of the registered practitioners identified by Customer Number 95508.

ONE LLP
4000 MacArthur Blvd.,
West Tower, Suite 1100
Newport Beach, CA 92660
(949)-502-2870

The undersigned, also hereby authorizes and empowers all of the registered practitioners associated with Customer Number 95508 to sign statements under 37 CFR 3.73(b) on behalf of the undersigned to establish the undersigned's right to take actions in applications for United States Letters Patent.

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to the address associated with Customer Number 95508.

The individual whose signature is supplied below is authorized to act on behalf of the assignee.

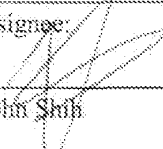
Full Name of Assignee: The Regents of the University of California	
Post Office Address: 1111 Franklin Street, 5th Floor, Oakland, CA 94607-5200	
Signature of Declarant or Assignee: 	Date: 2/21, 2013
Full Name of Declarant: John Shih	
If Other Than Assignee:	
Title of Declarant: Business Development & Director, Patent Prosecution Management	
Address of Declarant: 1111 Franklin Street, 5th Floor, Oakland, CA 94607-5200	

Exhibit A

Application No.	Patent Number	UC Case No.	Attorney Docket No.
60/206,508		UC-2000-442-1	R0089.0006 - PR
09/660,798	6,520,402	UC-2000-442-2	R0089.0227
60/206,507		UC-2000-443-1	R0089.0007 - PR
09/660,803	6,491,737	UC-2000-443-2	R0089.0229
60/206,514		UC-2000-444-1	R0089.0005 - PR
09/660,802	6,562,099	UC-2000-444-2	R0089.0226
10/407,053	7,029,624	UC-2000-444-3	R0089.0034 - A
09/976,990	6,843,902	UC-2000-481-1	R0089.0017
10/661,621	7,220,346	UC-2000-481-2	R0089.0069 - A
11/742,223	8,070,930	UC-2000-481-3	R0089.0151 - A
60/296,629		UC-2001-369-1	R0089.0010 - PR
10/140,316	6,877,978	UC-2001-369-2	R0089.0023
60/306,715		UC-2001-446-1	R0089.0011 - PR
10/160,926	7,196,381	UC-2001-446-2	R0089.0018 - A
11/662,827	7,628,969	UC-2001-446-3	R0089.0145 - A
10/112,002	7,117,488	UC-2002-029-1	R0089.0016
11/504,934		UC-2002-029-2	R0089.0129 - A
09/872,097	6,417,236	UC-2002-352-1	R0089.0224
60/437,209		UC-2002-369-1	R0089.0021 - PR
10/751,131	7,084,724	UC-2002-369-2	R0089.0050
11/428,446	7,834,689	UC-2002-369-3	R0089.0126 - A
60/446,798		UC-2003-210-1	R0089.0031 - PR
10/777,470	7,596,195	UC-2003-210-2	R0089.0056
60/472,612		UC-2003-211-1	R0089.0037 - PR
10/850,842	7,712,080	UC-2003-211-2	R0089.0064
12/752,919		UC-2003-211-3	R0089.0196 - A
60/450,985		UC-2003-289-1	R0089.0033 - PR
12/973,388		UC-2003-289-3	R0089.0209 - A
60/562,906		UC-2003-361-1	R0089.0062 - PR
11/080,112	7,265,647	UC-2003-361-2	R0089.0092
11/849,926	8,074,346	UC-2003-361-3	R0089.0168
11/849,914	7,541,898	UC-2003-361-4	R0089.0169 - A
60/467,492		UC-2003-381-1	R0089.0036 - PR

The Regents of the University of California (R0089)

Application No.	Patent Number	UC Case No.	Attorney Docket No.
10/839,117	7,072,555	UC-2003-381-2	R0089.0061
60/475,014		UC-2003-466-1	R0089.0039 - PR
10/856,616	8,351,891	UC-2003-466-2	R0089.0068
60/475,024		UC-2003-467-1	R0089.0040 - PR
10/857,630	7,057,435	UC-2003-467-2	R0089.0067
11/382,807	7,456,670	UC-2003-467-3	R0089.0124 - A
60/538,568		UC-2004-111-1	R0089.0059 - PR
11/042,909	7,430,190	UC-2004-111-2	R0089.0086
60/512,311		UC-2004-150-1	R0089.0048 - PR
10/967,913	7,811,443	UC-2004-150-2	R0089.0073
60/516,247		UC-2004-188-1	R0089.0052 - PR
10/595,461	7,471,529	UC-2004-188-2	R0089.0078
12/346,465	7,796,411	UC-2004-188-3	R0089.0189 - A
12/882,056	8,279,617	UC-2004-188-4	R0089.0204 - A
11/264,291	7,652,539	UC-2004-232-1	R0089.0091
10/789,779	7,857,956	UC-2004-289-2	R0089.0059
60/554,875		UC-2004-408-1	R0089.0062 - PR-A
11/087,068	7,425,871	UC-2004-408-2	R0089.0090
60/615,882		UC-2004-430-1	R0089.0080 - PR
60/564,529		UC-2004-430-1	R0089.0066 - PR
11/112,407	7,951,580	UC-2004-430-2	R0089.0096
11/243,926	7,695,954	UC-2004-430-3	R0089.0109 - A
60/605,010		UC-2004-547-1	R0089.0071 - PR
11/215,352	7,759,111	UC-2004-547-2	R0089.0103
11/087,080		UC-2004-587-1	R0089.0093
60/576,643		UC-2004-632-1	R0089.0070 - PR
10/599,593		UC-2004-632-2	R0089.0074
60/601,230		UC-2004-693-1	R0089.0072 - PR
11/573,443	8,279,120	UC-2004-693-2	R0089.0099
13/633,827		UC-2004-693-2	R0089.0241
60/609,045		UC-2004-696-1	R0089.0076 - PR
11/223,784	7,533,294	UC-2004-696-2	R0089.0102
60/940,926		UC-2005-089-1	R0089.0155 - PR
12/130,102	8,259,477	UC-2005-089-2	R0089.0161

The Regents of the University of California (R0089)

Application No.	Patent Number	UC Case No.	Attorney Docket No.
60/615,311		UC-2005-115-1	R0089.0079 - PR
11/090,918	7,534,470	UC-2005-115-2	R0089.0089
60/615,051		UC-2005-168-1	R0089.0084 - PR
11/279,229	7,682,659	UC-2005-168-2	R0089.0112
11/117,935	7,279,980	UC-2005-200-1	R0089.0094
11/868,886	7,482,874	UC-2005-200-2	R0089.0166 - A
60/648,319		UC-2005-400-1	R0089.0087 - PR
11/720,592	7,881,570	UC-2005-400-2	R0089.0110
13/019,121		UC-2005-400-2	R0089.0210 - A
60/662,161		UC-2005-514-1	R0089.0095 - PR
11/377,907	7,570,169	UC-2005-514-2	R0089.0117
60/676,119		UC-2005-580-1	R0089.0097 - PR
11/380,867		UC-2005-580-2	R0089.0119
11/911,800	7,602,240	UC-2005-580-2	R0089.0119
60/718,965		UC-2005-613-1	R0089.0105 - PR
11/533,328	7,859,803	UC-2005-613-2	R0089.0130
60/673,955		UC-2005-622-1	R0089.0098 - PR
11/379,759		UC-2005-622-2	R0089.0116
60/821,221		UC-2005-652-1	R0089.0128 - PR
11/832,894	7,892,434	UC-2005-652-2	R0089.0163
11/224,917	7,645,482	UC-2005-778-1	R0089.0101 - A
11/198,902	7,718,224	UC-2005-779-1	R0089.0100
60/718,966		UC-2006-165-1	R0089.0108 - PR
11/533,330	7,773,355	UC-2006-165-2	R0089.0132
60/718,967		UC-2006-166-1	R0089.0106 - PR
11/533,325	7,813,092	UC-2006-166-2	R0089.0131
60/725,219		UC-2006-209-1	R0089.0109 - PR
11/539,695		UC-2006-209-2	R0089.0135
60/828,107		UC-2006-254-1	R0089.0127 - PR
12/442,439	8,194,428	UC-2006-254-2	R0089.0165
13/488,216		UC-2006-254-2	R0089.0236
11/857,696	7,792,513	UC-2006-361-1	R0089.0140
60/951,817		UC-2006-362-1	R0089.0141 - PR
12/180,251	8,112,056	UC-2006-362-2	R0089.0185

The Regents of the University of California (R0089)

Application No.	Patent Number	UC Case No.	Attorney Docket No.
60/745,984		UC-2006-529-1	R0089.0123 - PR
11/742,032	8,343,581	UC-2006-529-2	R0089.0143
60/744,579		UC-2006-547-1	R0089.0121 - PR
11/733,053	7,759,119	UC-2006-547-2	R0089.0147
60/744,577		UC-2006-548-1	R0089.0120 - PR
60/787,876		UC-2006-634-1	R0089.0118 - PR
11/837,286		UC-2006-719-2	R0089.0159
60/823,488		UC-2007-062-1	R0089.0133 - PR
12/376,209	8,142,984	UC-2007-062-2	R0089.0157
60/823,939		UC-2007-097-1	R0089.0134 - PR
11/845,653	7,663,268	UC-2007-097-2	R0089.0160
11/824,967		UC-2007-276-1	R0089.0138
12/955,233		UC-2007-276-2	R0089.0205
60/915,039		UC-2007-320-1	R0089.0149 - PR
12/107,266	7,622,989	UC-2007-320-2	R0089.0182
60/870,354		UC-2007-321-1	R0089.0139 - PR
11/956,756		UC-2007-321-2	R0089.0167
13/340,240		UC-2007-321-3	R0089.0216
60/911,475		UC-2007-410-1	R0089.0153 - PR
60/911,471		UC-2007-410-1	R0089.0153 - PR-A
12/594,927		UC-2007-410-2	R0089.0180
60/894,582		UC-2007-506-1	R0089.0146 - PR
12/041,119	8,265,118	UC-2007-506-2	R0089.0170
61/014,112		UC-2007-540-1	R0089.0172 - PR
12/337,473	8,149,170	UC-2007-540-1	R0089.0187
60/915,310		UC-2007-553-1	R0089.0152 - PR
12/112,925		UC-2007-553-2	R0089.0177 - A
60/941,055		UC-2007-705-1	R0089.0154 - PR
12/131,897		UC-2007-705-2	R0089.0178
13/294,132		UC-2007-705-3	R0089.0220 - A
60/951,899		UC-2007-706-1	R0089.0161 - PR
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12/670,349		UC-2007-706-2	R0089.0186
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The Regents of the University of California (R0089)

Application No.	Patent Number	UC Case No.	Attorney Docket No.
12/670,365		UC-2007-795-2	R0089.0179
61/141,833		UC-2008-500-1	R0089.0188 - PR
12/651,265		UC-2008-500-2	R0089.0203
61/048,415		UC-2008-647-1	R0089.0183 - PR
61/049,051		UC-2008-647-1	R0089.0183 - PR-A
12/429,595		UC-2008-647-2	R0089.0191
61/148,325		UC-2008-430-1	R0089.0190 - PR
12/694,998	8,320,408	UC-2009-430-2	R0089.0194
13/686,803		UC-2009-430-3	R0089.0194 - A
61/172,125		UC-2009-611-1	R0089.0192 - PR
12/766,743		UC-2009-611-2	R0089.0198
13/079,697		UC-2010-158-1	R0089.0212
61/502,695		UC-2010-528-1	R0089.0200 - PR
13/535,296		UC-2010-528-2	R0089.0200
61/333,878		UC-2010-608-1	R0089.0199 - PR
13/106,394		UC-2010-608-2	R0089.0213
61/373,949		UC-2011-079-1	R0089.0201 - PR
13/210,991		UC-2011-079-2	R0089.0215
61/384,092		UC-2011-114-1	R0089.0202 - PR
61/411,529		UC-2011-114-1	R0089.0202 - PR-A
13/236,608		UC-2011-114-2	R0089.0217
61/408,476		UC-2011-151-1	R0089.0206 - PR
13/286,136		UC-2011-151-2	R0089.0218
61/754/461		UC-2011-200-2	R0089.0245 - PR
61/408,440		UC-2011-216-1	R0089.0208 - PR
13/286,120		UC-2011-216-2	R0089.0219
13/485,710		UC-2011-218-1	R0089.0237
61/450,507		UC-2011-571-1	R0089.0211 - PR
13/415,840		UC-2011-571-2	R0089.0221
61/473,976		UC-2011-609-1	R0089.0214 - PR
13/444,753		UC-2011-609-2	R0089.0214
61/655,939		UC-2011-664-1	R0089.0231 - PR
61/624,156		UC-2012-618-1	R0089.0230 - PR
61/643,141		UC-2012-665-1	R0089.0233 - PR

The Regents of the University of California (R0089)

Application No.	Patent Number	UC Case No.	Attorney Docket No.
61/643,146		UC-2012-668-1	R0089.0234 - PR
61/677,994		UC-2012-769-1	R0089.0239 - PR
61/682,663		UC-2013-105-1	R0089.0240 - PR
61/747,147		UC-2013-374-1	R0089.0244 - PR

.....

Electronic Acknowledgement Receipt	
EFS ID:	15451733
Application Number:	10850842
International Application Number:	
Confirmation Number:	9744
Title of Invention:	SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING
First Named Inventor/Applicant Name:	Lei Pan
Customer Number:	91477
Filer:	KENNETH S ROBERTS/Mara Rodriguez
Filer Authorized By:	KENNETH S ROBERTS
Attorney Docket Number:	703538.4044
Receipt Date:	06-APR-2013
Filing Date:	21-MAY-2004
Time Stamp:	18:28:24
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73.	R0089_0064_373_Stmt.pdf	78898 ccd4848553231b790d8e27853aa7b0d7cee0a30a	no	1
Warnings:					
Information:					

2	Power of Attorney	Regents_R0089_POAf.pdf	1245277 475b604906de4dffa81fbcd08b0419acc73c adcf	no	7
Warnings:					
Information:					
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Lei Pan et al.

Application No./Patent No.: 7,712,080

Filed/Issue Date: May 4, 2010

Titled: SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING

The Regent of the University of California, a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)
the patent application/patent identified above, by virtue of either:

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 015945, Frame 0486, or for which a copy therefore is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Kenneth S. Roberts/

Signature

Kenneth S. Roberts (Reg. No. 38,283)

Printed or Typed Name

4/6/2013

Date

Attorney

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

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34313
ORRICK, HERRINGTON & SUTCLIFFE, LLP
IP PROSECUTION DEPARTMENT
2050 Main Street, Suite 1100
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CONFIRMATION NO. 9744
POWER OF ATTORNEY NOTICE



Date Mailed: 06/21/2012

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/sleutchit/

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The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/sleutchit/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

POWER OF ATTORNEY TO PROSECUTE BEFORE THE USPTO
By Assignee

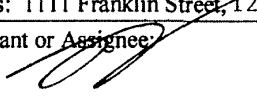
The Regents of the University of California, assignee of the application for United States Letters Patent identified in the attached statement under 37 CFR 3.73(b), does revoke all powers of attorney previously given and hereby appoints as its attorneys and/or agents, with full power of substitution and revocation, to prosecute this application and transact all business in the United States Patent and Trademark Office, and in countries other than the United States, and to do all things necessary or appropriate therefor before any competent International Authorities in connection with any international patent application(s) corresponding to the above-identified application, all of the registered practitioners identified by Customer Number 91477.

DICKSTEIN SHAPIRO LLP
2049 Century Park East,
Suite 700
Los Angeles, CA 90067-3109
(310) 772-8300

The undersigned, also hereby authorizes and empowers all of the registered practitioners associated with Customer Number 91477 to sign statements under 37 CFR 3.73(b) on behalf of the undersigned to establish the undersigned's right to take actions in applications for United States Letters Patent.

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to the address associated with Customer Number 91477.

The individual whose signature is supplied below is authorized to act on behalf of the assignee.

Full Name of Assignee: The Regents of the University of California	
Post Office Address: 1111 Franklin Street, 12 Floor, Oakland, CA 94607	
Signature of Declarant or Assignee: 	Date: August 30, 2010
Full Name of Declarant: John Shih	
If Other Than Assignee:	
Title of Declarant: Business Development & Director, Patent Prosecution Management	
Address of Declarant: 1111 Franklin Street, 5th Floor, Oakland, CA 94607	

Electronic Acknowledgement Receipt	
EFS ID:	13021723
Application Number:	10850842
International Application Number:	
Confirmation Number:	9744
Title of Invention:	SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING
First Named Inventor/Applicant Name:	Lei Pan
Customer Number:	34313
Filer:	KENNETH S ROBERTS/Alice Weaver
Filer Authorized By:	KENNETH S ROBERTS
Attorney Docket Number:	703538.4044
Receipt Date:	15-JUN-2012
Filing Date:	21-MAY-2004
Time Stamp:	06:46:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		R00890064.pdf	131872	yes	2
			2bee8eb24609a676b9aa9ed3f2ff64a84e1640fe		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Assignee showing of ownership per 37 CFR 3.73(b).	1	1
	Power of Attorney	2	2
Warnings:			
Information:			
Total Files Size (in bytes):		131872	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Lei Pan et al.

Application No./Patent No.: 7,712,080 Filed/Issue Date: May 4, 2010

Titled: SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING

The Regent of the University of California, a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)
the patent application/patent identified above, by virtue of either:

A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 015945, Frame 0486, or for which a copy therefore is attached.

OR

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Kenneth S. Roberts/

Signature

Kenneth S. Roberts (Reg. No. 38,283)

Printed or Typed Name

6/15/12
Date

Attorney

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/850,842	05/21/2004	Lei Pan	703538.4044

CONFIRMATION NO. 9744

MISCELLANEOUS NOTICE



OC000000054652907

34313
ORRICK, HERRINGTON & SUTCLIFFE, LLP
IP PROSECUTION DEPARTMENT
2050 Main Street, Suite 1100
IRVINE, CA 92614

Date Mailed: 06/06/2012

A communication which cannot be delivered in electronic form has been mailed to the applicant.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
 United States Patent and Trademark Office
 Address: COMMISSIONER FOR PATENTS
 P.O. Box 1450
 Alexandria, Virginia 22313-1450
 www.uspto.gov

APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
10/850,842	05/21/2004	Lei Pan	703538.4044

CONFIRMATION NO. 9744

34313
 ORRICK, HERRINGTON & SUTCLIFFE, LLP
 IP PROSECUTION DEPARTMENT
 2050 Main Street, Suite 1100
 IRVINE, CA 92614



OC000000054652907

Cc: DICKSTEIN SHAPIRO LLP
 2049 CENTURY PARK EAST
 SUITE 700
 LOS ANGELES, CA 90067

Date Mailed: 06/06/2012

DENIAL OF REQUEST FOR POWER OF ATTORNEY

The request for Power of Attorney filed 05/31/12 is acknowledged. However, the request cannot be granted at this time for the reason stated below.

- ☐ The Power of Attorney you provided did not comply with the new Power of Attorney rules that became effective on June 25, 2004. See 37 CFR 1.32.
- ☐ The revocation is not signed by the applicant, the assignee of the entire interest, or one particular principal attorney having the authority to revoke.
- ☒ The Power of Attorney is from an assignee and the Certificate required by 37 CFR 3.73(b) has not been received.
- ☐ The person signing for the assignee has omitted their empowerment to sign on behalf of the assignee.
- ☐ The inventor(s) is without authority to appoint attorneys since the assignee has intervened as provided by 37 CFR 3.71.
- ☐ The signature(s) of _____, a co-inventor in this application, has been omitted. The Power of Attorney will be entered upon receipt of confirmation signed by said co-inventor(s).
- ☐ The person(s) appointed in the Power of Attorney is not registered to practice before the U.S. Patent and Trademark Office.

Questions relating to this Notice should be directed to the Application Assistance Unit.

A. G. Brown
 Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

POWER OF ATTORNEY TO PROSECUTE BEFORE THE USPTO

By Assignee

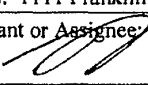
The Regents of the University of California, assignee of the application for United States Letters Patent identified in the attached statement under 37 CFR 3.73(b), does revoke all powers of attorney previously given and hereby appoints as its attorneys and/or agents, with full power of substitution and revocation, to prosecute this application and transact all business in the United States Patent and Trademark Office, and in countries other than the United States, and to do all things necessary or appropriate therefor before any competent International Authorities in connection with any international patent application(s) corresponding to the above-identified application, all of the registered practitioners identified by Customer Number 91477.

DICKSTEIN SHAPIRO LLP
2049 Century Park East,
Suite 700
Los Angeles, CA 90067-3109
(310) 772-8300

The undersigned, also hereby authorizes and empowers all of the registered practitioners associated with Customer Number 91477 to sign statements under 37 CFR 3.73(b) on behalf of the undersigned to establish the undersigned's right to take actions in applications for United States Letters Patent.

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to the address associated with Customer Number 91477.

The individual whose signature is supplied below is authorized to act on behalf of the assignee.

Full Name of Assignee: The Regents of the University of California	
Post Office Address: 1111 Franklin Street, 12 Floor, Oakland, CA 94607	
Signature of Declarant or Assignee: 	Date: August 30, 2010
Full Name of Declarant: John Shih	
If Other Than Assignee:	
Title of Declarant: Business Development & Director, Patent Prosecution Management	
Address of Declarant: 1111 Franklin Street, 5th Floor, Oakland, CA 94607	

Electronic Acknowledgement Receipt	
EFS ID:	12907358
Application Number:	10850842
International Application Number:	
Confirmation Number:	9744
Title of Invention:	SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING
First Named Inventor/Applicant Name:	Lei Pan
Customer Number:	34313
Filer:	KENNETH S ROBERTS/Alice Weaver
Filer Authorized By:	KENNETH S ROBERTS
Attorney Docket Number:	703538.4044
Receipt Date:	31-MAY-2012
Filing Date:	21-MAY-2004
Time Stamp:	18:10:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		R00890064.pdf	124166	yes	2
			b53e1087e63824031408a81fa4c460fc25c a46f		

	Multipart Description/PDF files in .zip description		
	Document Description	Start	End
	Assignee showing of ownership per 37 CFR 3.73(b).	1	1
	Power of Attorney	2	2
Warnings:			
Information:			
Total Files Size (in bytes):		124166	
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.			

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Lei Pan et al.

Application No./Patent No.: 7,712,080

Filed/Issue Date: May 4, 2010

Titled: SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING

The Regent of the University of California, a Corporation

(Name of Assignee)

(Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;
2. ☐ an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or
3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

- A. ☒ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 015945, Frame 0486, or for which a copy therefore is attached.

OR

- B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

- ☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

//Kenneth S. Roberts//

Signature

Kenneth S. Roberts

Printed or Typed Name

5/31/12
Date

Attorney

Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/850,842	05/04/2010	7712080	703538.4044	9744

34313 7590 04/14/2010

ORRICK, HERRINGTON & SUTCLIFFE, LLP
IP PROSECUTION DEPARTMENT
4 PARK PLAZA
SUITE 1600
IRVINE, CA 92614-2558

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment is 1013 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site <http://pair.uspto.gov> for additional applicants):

Lei Pan, Irvine, CA;
Lubomir R. Bic, Irvine, CA;
Michael B. Dillencourt, Irvine, CA;

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

34313 7590 12/14/2009

ORRICK, HERRINGTON & SUTCLIFFE, LLP
 IP PROSECUTION DEPARTMENT
 4 PARK PLAZA
 SUITE 1600
 IRVINE, CA 92614-2558

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

Mary L. Smith	(Depositor's name)
<i>Mary L. Smith</i>	(Signature)
March 15, 2010	(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/850,842	05/21/2004	Lei Pan	703538.4044	9744

TITLE OF INVENTION: SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	03/15/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
WEI, ZHENG	2192	717-119000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively,
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

ORRICK, HERRINGTON &
 2 SUTCLIFFE LLP
 3

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA Oakland, California

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☒ Issue Fee
☒ Publication Fee (No small entity discount permitted)
☒ Advance Order - # of Copies 3

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☒ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 15-0665 (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☒ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature *Kenneth S. Roberts*
 Typed or printed name KENNETH S. ROBERTS

Date March 15, 2010
 Registration No. 38,283

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Electronic Patent Application Fee Transmittal				
Application Number:		10850842		
Filing Date:		21-May-2004		
Title of Invention:		SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING		
First Named Inventor/Applicant Name:		Lei Pan		
Filer:		Kenneth Steven Roberts/Mary L. Smith		
Attorney Docket Number:		703538.4044		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1510	1510
Publ. Fee- early, voluntary, or normal	1504	1	300	300

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Extension-of-Time:				
Miscellaneous:				
Printed copy of patent - no color	8001	3	3	9
Total in USD (\$)				1819

Electronic Acknowledgement Receipt	
EFS ID:	7209405
Application Number:	10850842
International Application Number:	
Confirmation Number:	9744
Title of Invention:	SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING
First Named Inventor/Applicant Name:	Lei Pan
Customer Number:	34313
Filer:	Kenneth Steven Roberts/Mary L. Smith
Filer Authorized By:	Kenneth Steven Roberts
Attorney Docket Number:	703538.4044
Receipt Date:	15-MAR-2010
Filing Date:	21-MAY-2004
Time Stamp:	15:28:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$1819
RAM confirmation Number	2028
Deposit Account	150665
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.20 (Post Issuance fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	703538_4044issuefee.pdf	103915 0aaf2550d399171ae8bacf910068f9e05cb194eae	no	1
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	33618 4e7272107668a1d28f7606340e5222572dc94ed6	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			137533		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					



UNITED STATES PATENT AND TRADEMARK OFFICE

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NOTICE OF ALLOWANCE AND FEE(S) DUE

34313 7590 12/14/2009
ORRICK, HERRINGTON & SUTCLIFFE, LLP
IP PROSECUTION DEPARTMENT
4 PARK PLAZA
SUITE 1600
IRVINE, CA 92614-2558

EXAMINER	
WEI, ZHENG	
ART UNIT	PAPER NUMBER
2192	
DATE MAILED: 12/14/2009	

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/850,842	05/21/2004	Lei Pan	703538.4044	9744

TITLE OF INVENTION: SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	03/15/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: **Mail** Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or **Fax** (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

34313 7590 12/14/2009

ORRICK, HERRINGTON & SUTCLIFFE, LLP
IP PROSECUTION DEPARTMENT
4 PARK PLAZA
SUITE 1600
IRVINE, CA 92614-2558

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/850,842

05/21/2004

Lei Pan

703538.4044

9744

TITLE OF INVENTION: SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	03/15/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
WEL, ZHENG	2192	717-119000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☐ Issue Fee

☐ Publication Fee (No small entity discount permitted)

☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

☐ A check is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____

Date _____

Typed or printed name _____

Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/850,842	05/21/2004	Lei Pan	703538.4044	9744
34313	7590	12/14/2009	EXAMINER	
ORRICK, HERRINGTON & SUTCLIFFE, LLP IP PROSECUTION DEPARTMENT 4 PARK PLAZA SUITE 1600 IRVINE, CA 92614-2558			WEI, ZHENG	
			ART UNIT	PAPER NUMBER
			2192	
DATE MAILED: 12/14/2009				

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 404 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 404 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Examiner-Initiated Interview Summary	Application No.	Applicant(s)	
	10/850,842	PAN ET AL.	
	Examiner	Art Unit	
	ZHENG WEI	2192	

All Participants:

(1) ZHENG WEI.

(2) Kenneth S. Roberts (reg#: 38,358).

Date of Interview: 2 December 2009

Type of Interview:

☒ Telephonic

☐ Video Conference

☐ Personal (Copy given to: ☐ Applicant ☐ Applicant's representative)

Status of Application: pending

(3) _____.

(4) _____.

Time: 2:00PM

Exhibit Shown or Demonstrated: ☐ Yes ☒ No

If Yes, provide a brief description: _____.

Part I.

Rejection(s) discussed:

Claims discussed:

1 and 15

Prior art documents discussed:

Part II.

SUBSTANCE OF INTERVIEW DESCRIBING THE GENERAL NATURE OF WHAT WAS DISCUSSED:

See Continuation Sheet

Part III.

☒ It is not necessary for applicant to provide a separate record of the substance of the interview, since the interview directly resulted in the allowance of the application. The examiner will provide a written summary of the substance of the interview in the Notice of Allowability.

☐ It is not necessary for applicant to provide a separate record of the substance of the interview, since the interview did not result in resolution of all issues. A brief summary by the examiner appears in Part II above.

(Applicant/Applicant's Representative Signature – if appropriate)

Continuation of Substance of Interview including description of the general nature of what was discussed: Discussed the definition and scope of terms "distributed shared variable" and "intermediate condition" as recited in the independent claims 1 and 15. Examiner proposed an amendment to further clarify the definitions of these terms. A copy of proposed amendment was send to Applicant. Applicant's amendment based on Examiner's proposed amendment is received and accepted by examiner, and will be incorporated in Examiner's Amendment to put the claims in condition for allowance.

Notice of Allowability	Application No.	Applicant(s)	
	10/850,842	PAN ET AL.	
	Examiner	Art Unit	
	ZHENG WEI	2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 09/02/2009.

2. ☒ The allowed claim(s) is/are 1-6,9,10,15-22,26 and 27 (re-numbered as 1-18).

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).
 * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892) 2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948) 3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____ 4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material	5. ☐ Notice of Informal Patent Application 6. ☒ Interview Summary (PTO-413), Paper No./Mail Date <u>20091202</u> . 7. ☒ Examiner's Amendment/Comment 8. ☒ Examiner's Statement of Reasons for Allowance 9. ☐ Other _____.
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	/Tuan Q. Dam/ Supervisory Patent Examiner, Art Unit 2192
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DETAILED ACTION

Remarks

1. This office action is in response to the amendment filed on 9/02/2009.
2. Claims 1, 4-6, 9, 15 and 16 have been amended.
3. Claims 26 and 27 have been added.
4. Claims 1-6, 9, 10, 15-22, 26 and 27 remain pending and have been examined

EXAMINER'S AMENDMENT

5. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.
6. Authorization for this examiner's amendment was given in a telephone interview and further email communication with Kenneth S. Roberts(Reg# 38,358) on 12/02/2009 to obviate any potential 35 U.S.C. § 112 issues, and to put the claims in condition for allowance.
7. Applicant's proposed amendment is received via email and accepted by examiner.
8. Claims 1 and 15 are now being further amended based on the received applicant's proposed amendment.
9. The application has been amended as follows:

IN THE CLAIMS

Please amend claims 1 and 15 as follows:

1. (Currently amended) A method of developing a distributed parallel computing program, comprising steps of:

establishing at least one distributed shared variable, wherein the at least one distributed shared variable is a single variable that includes several variables that may be physically distributed across multiple memories;

developing at least one distributed sequential computing program to access the at least one distributed shared variable; and

transforming the at least one distributed sequential computing program into at least one distributed parallel computing program by spawning at least one child distributed sequential computing program from the at least one distributed sequential computing program when at least one intermediate condition occurs within the at least one distributed sequential computing program, wherein the at least one distributed parallel computing program concurrently uses the at least one distributed sequential computing program and the at least one spawned child distributed sequential computing program to perform parallel processing and/or operations, wherein the at least one intermediate condition comprising one intermediate result that will be required by the at least one spawned child distributed sequential computing program to continue computation.

15. (Currently amended) A distributed parallel computing system, having at least one memory area and at least one processor, comprising:

at least one distributed shared variable capable of loading into the at least one memory area, wherein the at least one distributed shared variable is a single variable that includes several variables that may be physically loaded into the at least one memory area; and

at least one distributed sequential computing program, configured to operate in the at least one processor, configured to access the at least one distributed shared variable, and configured to transform into at least one distributed parallel computing program by spawning at least one child distributed sequential computing system program when at least one intermediate condition occurs within the at least one distributed sequential program, wherein the at least one distributed parallel computing program concurrently uses the at least one distributed sequential computing program and the at least one spawned child distributed sequential computing program to perform parallel processing and/or operations, wherein the at least one intermediate condition comprising one intermediate result that will be required by the at least one spawned child distributed sequential computing program to continue computation.

--END OF AMENDMENT--

Allowable Subject Matter

10. **Claims 1-6, 9, 10, 15-22, 26 and 27 are allowed** (re-numbered as claims 1-18).

As the Applicants pointed out under REMAKRS section, page number 5-7, neither Pan, Suzuki, Fukuda, alone or in combination, teach or suggest the claimed invention as claimed in independent claims 1 and 15. Specifically, the combination of Pan, Suzuki and Fukuda fails to teach or suggest the feature about “establishing at least one distributed shared variable, wherein the at least one distributed shared variable is a single variable that includes several variables that may be physically distributed across multiple memories; developing at least one distributed sequential computing program to access the at least one distributed shared variable; and transforming the at least one distributed sequential computing program into at least one distributed parallel computing program by spawning at least one child distributed sequential computing program from the at least one distributed sequential computing program when at least one intermediate condition occurs within the at least one distributed sequential computing program, wherein the at least one distributed parallel computing program concurrently uses the at least one distributed sequential computing program and the at least one spawned child distributed sequential computing program to perform parallel processing and/or operations, wherein the at least one intermediate condition comprising one intermediate result that will be required by the at least one spawned child distributed sequential computing program to continue computation” as further clarified by the Examiner’s Amendment above, and in as such manners as recited in the independent

claims 1 and 15, thus Claims 1, 15 and each of the dependent claims are allowable for at least the same reasons.

11. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zheng Wei whose telephone number is (571) 270-1059 and Fax number is (571) 270-02059. The examiner can normally be reached on Monday-Thursday 8:00-15:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

Application/Control Number: 10/850,842

Page 7

Art Unit: 2192

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Z. W./
Examiner, Art Unit 2192

/Tuan Q. Dam/
Supervisory Patent Examiner, Art Unit 2192

Search Notes 	Application/Control No. 10850842	Applicant(s)/Patent Under Reexamination PAN ET AL.
	Examiner Wei, Zheng	Art Unit 2192

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Inventor Name Search	04/14/07	zw
Double Patenting Search	04/14/07	zw
Plus Search	04/14/07	zw
East Search Combined with Class Search (updated)	04/14/07 (07/15/08)	zw (zw)
NPL Search	04/14/07	zw
NPL Search (updated) (updated)	10/04/07 (07/15/08) (03/27/09)	zw (zw) (zw)
East Search combined with class search	03/27/2009	zw
East Search for classes 717/106-108, 149 and 712/1-11, 23, 32 combined with text search	12/03/2009	zw
NPL Search (google search)	12/03/2009	zw

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner
	Interference PGPub text Search (see search printout)	12/03/2009	zw

/Z. W./ Examiner.Art Unit 2192	
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<i>Index of Claims</i> 	Application/Control No. 10850842	Applicant(s)/Patent Under Reexamination PAN ET AL.
	Examiner ZHENG WEI	Art Unit 2192

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

☐ Claims renumbered in the same order as presented by applicant										☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		DATE													
Final	Original	04/14/2007	10/04/2007	07/15/2008	03/26/2009	12/02/2009									
1	1	✓	✓	✓	✓	=									
2	2	✓	✓	✓	✓	=									
3	3	✓	✓	✓	✓	=									
4	4	✓	✓	✓	✓	=									
5	5	✓	✓	✓	✓	=									
6	6	✓	✓	✓	✓	=									
	7	✓	✓	-	-	-									
	8	✓	✓	-	-	-									
7	9	✓	✓	✓	✓	=									
8	10	✓	✓	✓	✓	=									
	11	✓	✓	-	-	-									
	12	✓	✓	-	-	-									
	13	✓	✓	-	-	-									
	14	✓	✓	-	-	-									
9	15	✓	✓	✓	✓	=									
10	16	✓	✓	✓	✓	=									
11	17	✓	✓	✓	✓	=									
12	18	✓	✓	✓	✓	=									
13	19	✓	✓	✓	✓	=									
14	20	✓	✓	✓	✓	=									
15	21	✓	✓	✓	✓	=									
16	22	✓	✓	✓	✓	=									
	23	✓	✓	-	-	-									
	24	✓	✓	-	-	-									
	25	✓	✓	-	-	-									
17	26					=									
18	27					=									

Issue Classification 	Application/Control No. 10850842	Applicant(s)/Patent Under Reexamination PAN ET AL.
	Examiner ZHENG WEI	Art Unit 2192

ORIGINAL						INTERNATIONAL CLASSIFICATION										
CLASS			SUBCLASS			CLAIMED					NON-CLAIMED					
717			119			G	0	6	F	9 / 44 (2006.01.01)						
CROSS REFERENCE(S)						G	0	6	F	9 / 45 (2006.01.01)						
						G	0	6	F	15 / 00 (2006.01.01)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)															
717	107	108	149													
712	10	23	32													
				</												

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47															
Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	11	17												
2	2	12	18												
3	3	13	19												
4	4	14	20												
5	5	15	21												
6	6	16	22												
	7		23												
	8		24												
7	9		25												
8	10	17	26												
	11	18	27												
	12														
	13														
	14														
9	15														
10	16														

/ZHENG WEI/ Examiner.Art Unit 2192 (Assistant Examiner)	12/03/2009 (Date)	Total Claims Allowed: 18	
/TUAN Q DAM/ Supervisory Patent Examiner.Art Unit 2192 (Primary Examiner)	12/04/2009 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2



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BIB DATA SHEET

CONFIRMATION NO. 9744

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.		
10/850,842	05/21/2004	~~711~~ 717	2192	703538.4044		
APPLICANTS /zw/ 12/03/09 Lei Pan, Irvine, CA; Lubomir R. Bic, Irvine, CA; Michael B. Dillencourt, Irvine, CA; ** CONTINUING DATA ***** This appln claims benefit of 60/472,612 05/21/2003 ** FOREIGN APPLICATIONS ***** ** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 11/09/2004						
Foreign Priority claimed ☐ Yes ☒ No 35 USC 119(a-d) conditions met ☐ Yes ☐ No Verified and /ZHENG WEI/ Acknowledged Examiner's Signature		☐ Met after Allowance Initials	STATE OR COUNTRY CA	SHEETS DRAWINGS 8	TOTAL CLAIMS ~~25~~ 18	INDEPENDENT CLAIMS ~~4~~ 2
ADDRESS /zw/ 12/03/09 /zw/ ORRICK, HERRINGTON & SUTCLIFFE, LLP IP PROSECUTION DEPARTMENT 4 PARK PLAZA SUITE 1600 IRVINE, CA 92614-2558 UNITED STATES 12/03/09						
TITLE Systems and methods for parallel distributed programming						
FILING FEE RECEIVED 538	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:			☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit		

Wei, Zheng

From: Roberts, Kenneth S. [kroberts@orrick.com]
Sent: Wednesday, December 02, 2009 4:33 PM
To: Wei, Zheng
Subject: RE: proposed amendment for application 10/850,842 (Attorney Docket# 703538.4044)
Attachments: proposed amendment for 10850842 (2).doc

Dear Ex. Wei: I have reviewed your proposed amendment and have only two minor adjustments. In the first line of the amended language, I have crossed out (deleted) the term "a logically" as the "logically" is used in the specification at paragraph 23 to mean "it would be logical to conclude" and not as a computational descriptor of a "single variable."

In the second line, I amended the term "physical" to read "physically".

Please do not hesitate to contact me should you have any questions.

Ken


ORRICK
KENNETH S. ROBERTS
Partner, Intellectual Property
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From: Wei, Zheng [mailto:Zheng.Wei@USPTO.GOV]
Sent: Wednesday, December 02, 2009 12:01 PM
To: Roberts, Kenneth S.
Subject: proposed amendment for application 10/850,842 (Attorney Docket# 703538.4044)

Mr. Roberts,

Please check the attached proposal and let me know if you have any comments.

Thanks

Zheng Wei
Patent Examiner
Tel: 571-270-1059
Fax: 571-270-2059

12/3/2009

Email: zheng.wei@uspto.gov
Room 5A-20, Randolph Building

"EMF <orrick.com>" made the following annotations.

=====

IRS Circular 230 disclosure:
To ensure compliance with requirements imposed by the IRS,
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12/3/2009

EAST Search History**EAST Search History (Prior Art)**

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	2757	717/106-109,119,149.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2009/12/03 18:48
L3	134	2 and (parallel adj comput\$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2009/12/03 18:49
L4	7	3 and (shared adj variable)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2009/12/03 18:49
L5	63	2 and spawn\$3 with (program or process or thread)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2009/12/03 18:50
L6	63	2 and ((spawn\$3 or folk\$3) with (program or process or thread))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2009/12/03 18:50
L7	3	6 and (shared adj variable)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2009/12/03 18:50

L8	3060	712/1-11,23,32. ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2009/12/03 18:51
L9	24	8 and ((spawn\$3 or folk\$3) with (program or process or thread))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2009/12/03 18:51
L10	1	9 and (shared adj variable)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2009/12/03 18:51
L14	913	"12" and (shared adj variable)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2009/12/03 18:54

EAST Search History (I nterference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L11	438	(parallel adj comput\$3).clm.	USPAT; UPAD	AND	ON	2009/12/03 18:52
L12	320	((spawn\$3 or folk\$3) with (program or process or thread)).clm.	USPAT; UPAD	AND	ON	2009/12/03 18:53
L13	3	11 and 12	USPAT; UPAD	AND	ON	2009/12/03 18:53
L15	536	"12" and (shared adj variable)	USPAT; UPAD	AND	ON	2009/12/03 18:54
L16	2	L12 and (shared adj variable)	USPAT; UPAD	AND	ON	2009/12/03 18:54
L17	7	L11 and (shared adj variable)	USPAT; UPAD	AND	ON	2009/12/03 18:54

12/ 3/ 2009 6:55:27 PM

C:\ Documents and Settings\ zwei\ My Documents\ EAST\ Workspaces\ 10850842.wsp

1. (Currently amended) A method of developing a distributed parallel computing program, comprising steps of:

establishing at least one distributed shared variable, wherein the at least one distributed shared variable is ~~a logically~~ a single variable that includes several variables that may be physically distributed across multiple memories; (see specification paragraph [0023] about “DSV”)

developing at least one distributed sequential computing program to access the at least one distributed shared variable; and

transforming the at least one distributed sequential computing program into at least one distributed parallel computing program by spawning at least one child distributed sequential computing program from the at least one distributed sequential computing program when at least one intermediate condition occurs within the at least one distributed sequential computing program, wherein the at least one distributed parallel computing program concurrently uses the at least one distributed sequential computing program and the at least one spawned child distributed sequential computing program to perform parallel processing and/or operations, wherein the at least one intermediate condition comprising one intermediate result that will be required by the at least one spawned child distributed sequential computing program to continue computation. (see specification, paragraph [0040-0042] about “intermediate result”)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/850,842 Confirmation No. 9744
Applicant : Pan et al.
Filing Date : May 21, 2004
Title : SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED
PROGRAMMING
Group Art Unit : 2192
Examiner : Zheng Wei
Docket No. : 703538.4044

AMENDMENT

Mail Stop Amendment

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This paper is filed in response to the Office Action mailed on April 2, 2009.

Please amend the subject application as follows.

Amendment to the claims appear in a listing of the claims beginning on page 2.

The remarks begin on page 5.

Listing of the claims:

1. (Currently amended) A method of developing a ~~parallel~~ distributed parallel application-computing program, comprising steps of:
 - establishing at least one distributed shared variable;
 - developing at least one distributed sequential computing program to access the at least one distributed shared variable; and
 - transforming the at least one distributed sequential computing program into at least one distributed parallel computing program by spawning at least one child distributed sequential computing program from the at least one distributed sequential computing program when at least one intermediate condition occurs within the at least one distributed sequential computing program, wherein the at least one distributed parallel computing program concurrently uses the at least one distributed sequential computing program and the at least one child distributed sequential computing program to perform parallel processing and/or operations.
2. (Previously presented) The method of claim 1, wherein each of the at least one distributed sequential computing program includes at least one self-migrating thread, capable of migrating among at least one processor and capable of accessing the at least one distributed shared variable.
3. (Previously presented) The method of claim 1, wherein the at least one distributed shared variable is configured to be located among a plurality of memories.
4. (Currently amended) The method of claim 1, wherein the ~~parallel~~ distributed parallel-application computing program is configured to operate across multiple processors.

5. (Currently amended) The method of claim 1, wherein the ~~parallel~~ distributed parallel application computing program is configured to operate using multiple threads.

6. (Currently amended) The method of claim 1, wherein the ~~parallel~~ distributed parallel application computing program is configured to operate across multiple nodes.

7. – 8. (Cancelled)

9. (Currently amended) The method of claim 1, further comprising the step of configuring the at least one distributed sequential computing program to include at least one mobile agent.

10. (Previously presented) The method of claim 9, wherein the at least one mobile agent is implemented using self-migrating threads.

11. – 14. (Cancelled)

15. (Currently Amended) A distributed parallel computing system, having at least one memory area and at least one processor, comprising:

at least one distributed shared variable capable of loading into the at least one memory area; and

at least one distributed sequential computing ~~system~~ program, configured to operate in the at least one processor, configured to access the at least one distributed shared variable, and configured to transform into at least one distributed parallel computing ~~system~~ program by spawning at least one child distributed sequential computing ~~system~~ program when at least one intermediate condition occurs within the at least one distributed sequential ~~system~~ program, wherein the at least one distributed parallel computing program concurrently uses the at least one distributed sequential

computing program and the at least one child distributed sequential computing program to perform parallel processing and/or operations.

16. (Currently amended) The system of claim 15, wherein the at least one distributed sequential computing system program comprises at least one mobile agent.

17. (Previously presented) The system of claim 16, wherein the at least one mobile agent is implemented using self-migrating threads.

18. (Previously presented) The system of claim 16, wherein the at least one mobile agent is an explicit-navigation mobile agent.

19. (Previously presented) The system of claim 16, wherein the at least one mobile agent is an implicit-navigation mobile agent.

20. (Previously presented) The system of claim 16, wherein the at least one mobile agent is configured to move from one processor to another processor.

21. (Previously presented) The system of claim 16, wherein the at least one mobile agent operates within a distributed shared memory system.

22. (Previously presented) The system of claim 15, wherein the at least one processor is located across a physical network.

23. – 25. (Cancelled)

26. (New) The method of claim 1, wherein the distributed parallel computing program is configured to operate across a distributed shared memory system.

27. (New) The method of claim 15, wherein the distributed parallel computing program is configured to operate across a distributed shared memory system.

REMARKS

Claims 1-6, 9-10, 15-22 and 26-27 are pending in the application. Claims 26 and 27 are newly amended. In the office action mailed April 2, 2009, the Examiner rejected claims 1-6, 9-10, and 15-22 under 35 U.S.C. § 103(a) as being unpatentable over Pan et al ("Distributed Sequential Computing Using Mobile Code: Moving Computation to Data," hereinafter "Pan") in view of Suzuki et al. ("Self-Migrating Threads for Multi-Agent Applications" hereinafter "Suzuki"), and further in view of Fukuda et al. ("Message Versus Messengers in Distributed Programming," hereinafter "Fukuda").

Neither Pan, Suzuki or Fukuda, alone or in combination, teach or suggest the claimed invention as claimed in independent claims 1 and 15. Specifically, the combination of Pan, Suzuki and Fukuda fails to teach or suggest

transforming the at least one distributed sequential computing program into at least one distributed parallel computing program by spawning at least one child distributed sequential computing program from the at least one distributed sequential computing program when at least one intermediate condition occurs within the at least one distributed sequential computing program, wherein the at least one distributed parallel computing program concurrently uses the at least one distributed sequential computing program and the at least one child distributed sequential computing program to perform parallel processing and/or operations

as claimed in claim; or

at least one distributed sequential computing program, configured to operate in the at least one processor, configured to access the at least one distributed shared variable, and configured to transform into at least one distributed parallel computing program by spawning at least one child distributed sequential computing program when at least one intermediate condition occurs within the at least one distributed sequential program, wherein the at least one distributed parallel computing program concurrently uses the at least one distributed sequential computing program and the at least one child distributed sequential computing program to perform processing and/or operations

as claimed in claim 15. Pan, Suzuki and Fukuda simply do not teach or suggest transforming a distributed sequential computing (DSC) program into a distributed parallel computing program (DPC) program or a DSC program configured to transform into a DPC program wherein the DPC concurrently uses the DSC and child DSC to perform parallel and/or pipeline processing. Although Pan may describe the concept of DSC programs, which is computing using a single locus of computation over distributed data (Application [0024]), Pan does not disclose or suggest transforming the DSC into a DPC by spawning a child DSC or a DSC configured to transform into a DPC by spawning a child DSC. Similarly, Suzuki describes the use of a collection of self-migrating threads. Although, as Applicants acknowledge at paragraph 0024 of the application, a self-migrating thread may be utilized to perform DSC, a description of the use of a collection of self-migrating threads does not disclose or suggest transforming a DSC into a DPC by spawning a child DSC or a DSC configured to transform into a DPC

by spawning a child DSC.

As Pan notes at page 78, column 1, "Our implementations use MESSENGERS, a system for agent-based distributed computing developed in Information and Computer Science at the University of California, Irvine ([1, 5])." Reference 5 in Pan is Fukuda. Thus the combined teaching of Pan and Fukuda is effectively Pan, i.e., distributed sequential computing using MESSENGERS. Moreover, in light of Pan's discussion of implementation of DSCs using MESSENGERS, the fact that Fukuda describes replication does not teach or suggest transforming a DSC into a DPC by spawning a child DSC or a DSC configured to transform into a DPC by spawning a child DSC wherein the DPC concurrently uses the DSC and child DSC to perform parallel processing and/or operations, but rather only suggests to one skilled in the art the replication of a MESSENGER within an individual DSC program. Thus, Fukuda does not cure the deficiency of Pan and Suzuki noted above, and, as a result, Pan, Suzuki and Fukuda can not establish a prima facie case of obviousness. Accordingly, Applicants submit that independent claims 1 and 15, and claims 2-6, 9-10 and 16-22 by virtue of their dependence on claims 1 and 15, meet the requirements for patentability under 35 USC 103, and respectfully request that the rejections of such claims be withdrawn.

CONCLUSION

In view of the foregoing, Applicants respectfully submit that claims 1-6, 9-10, and 15-22 are in condition for allowance. Prompt and favorable action on the merits of the

Atty Docket No. 703538.4044
Serial No. 10/850,842

claims is earnestly solicited. Should the Examiner have any questions or comments,
the Examiner is invited to call the undersigned at (949) 567-6700.

The Commissioner is authorized to charge any fee that may be required in connection with this Amendment to deposit account no. 15-0665.

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE LLP

Dated: September 2, 2009

By: Kenneth S. Roberts/
Kenneth S. Roberts
Reg. No. 38,358

4 Park Plaza, Suite 1600
Irvine, CA 92614-2558
Tel. 949-567-6700
Fax: 949-567-6710

Electronic Patent Application Fee Transmittal				
Application Number:		10850842		
Filing Date:		21-May-2004		
Title of Invention:		Systems and methods for parallel distributed programming		
First Named Inventor/Applicant Name:		Lei Pan		
Filer:		Kenneth Steven Roberts/Mary L. Smith		
Attorney Docket Number:		703538.4044		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 2 months with \$0 paid	1252	1	490	490

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				490

Electronic Acknowledgement Receipt	
EFS ID:	6001331
Application Number:	10850842
International Application Number:	
Confirmation Number:	9744
Title of Invention:	Systems and methods for parallel distributed programming
First Named Inventor/Applicant Name:	Lei Pan
Customer Number:	34313
Filer:	Kenneth Steven Roberts/Mary L. Smith
Filer Authorized By:	Kenneth Steven Roberts
Attorney Docket Number:	703538.4044
Receipt Date:	02-SEP-2009
Filing Date:	21-MAY-2004
Time Stamp:	14:26:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$490
RAM confirmation Number	587
Deposit Account	150665
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment/Req. Reconsideration-After Non-Final Reject	703538_4044amend.pdf	80821 c214904835e62c679604b6383f73f1a7ccbf eab6	no	9
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	29993 52bd7c2b1db4fcfc2c4d0a229650c044db2 db22f	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			110814		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 10/850,842		Filing Date 05/21/2004		☐ To be Mailed	
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APPLICATION AS FILED – PART I						OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)		SMALL ENTITY ☐		OR		SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$	=		X \$	=		X \$	=
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=		X \$	=
☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).										
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II						OTHER THAN SMALL ENTITY					
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	09/02/2009	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 18	Minus	** 25	= 0	X \$	=		X \$52=	0	
	Independent (37 CFR 1.16(h))	* 2	Minus	***4	= 0	X \$	=		X \$220=	0	
☐ Application Size Fee (37 CFR 1.16(s))											
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
						TOTAL ADD'L FEE			TOTAL ADD'L FEE	0	

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$	=		X \$	=	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$	=		X \$	=	
☐ Application Size Fee (37 CFR 1.16(s))											
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
						TOTAL ADD'L FEE		TOTAL ADD'L FEE			

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/DORIS m. BURNS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/850,842 Confirmation No. 9744
Applicant : Pan et al.
Filing Date : May 21, 2004
Title : SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED
PROGRAMMING
Group Art Unit : 2192
Examiner : Zheng Wei
Docket No. : 703538.4044 (Formerly 708493.4044)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

**NOTIFICATION OF LOSS OF ENTITLEMENT TO SMALL ENTITY STATUS
(37 C.F.R. § 1.28(c))**

Sir:

Applicant hereby notifies the U.S. Patent & Trademark Office that it is not entitled to status as a small entity, and that the claim for small entity status is hereby withdrawn.

Consequently, the basic filing fee and 37 CFR 1.16(e) surcharge authorized to be charged to the Deposit Account of Orrick, Herrington & Sutcliffe LLP were deficient.

The Commissioner is authorized to charge Orrick, Herrington & Sutcliffe's Deposit Account No. **15-0665**, to cover the following deficient payments:

Basic Filing Fee	464.00
Surcharge (37 CFR §1.16(e))	65.00
Total:	\$529.00

Applicant:: Lei Pan et al.
Appl No.: 10/850842
Examiner Zheng Wui
Docket No.: 703538.4044

Additionally, the Commissioner is authorized to charge Orrick, Herrington & Sutcliffe's Deposit Account No. **15-0665** for any additional fees.

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE LLP

Dated: July 29, 20099

/Kenneth S. Roberts/

By: _____

Kenneth S. Roberts
Reg. No. 38283

Orrick, Herrington & Sutcliffe LLP
4 Park Plaza, Suite 1600
Irvine, CA 92614-2558
t. 949-567-6700
f. 949-567-6710
Customer Number: 34313

Electronic Acknowledgement Receipt	
EFS ID:	5852491
Application Number:	10850842
International Application Number:	
Confirmation Number:	9744
Title of Invention:	Systems and methods for parallel distributed programming
First Named Inventor/Applicant Name:	Lei Pan
Customer Number:	34313
Filer:	Kenneth Steven Roberts/Mary L. Smith
Filer Authorized By:	Kenneth Steven Roberts
Attorney Docket Number:	703538.4044
Receipt Date:	07-AUG-2009
Filing Date:	21-MAY-2004
Time Stamp:	17:57:02
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment		no			
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Miscellaneous Incoming Letter	703538_4044losssmallentity.pdf	40480 3ecfc483251947a210823defc3af0b94682103ff	no	2
Warnings:					
Information:					

Total Files Size (in bytes):	40480
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.	



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/850,842	05/21/2004	Lei Pan	703538.4044	9744
34313 7590 04/02/2009 ORRICK, HERRINGTON & SUTCLIFFE, LLP IP PROSECUTION DEPARTMENT 4 PARK PLAZA SUITE 1600 IRVINE, CA 92614-2558			EXAMINER WEI, ZHENG	
			ART UNIT 2192	PAPER NUMBER
			MAIL DATE 04/02/2009	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.		Applicant(s)	
	10/850,842		PAN ET AL.	
	Examiner		Art Unit	
ZHENG WEI		2192		

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 21 January 2009.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-6,9,10 and 15-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-6,9,10 and 15-22 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

 a) ☐ All b) ☐ Some * c) ☐ None of:

 1. ☐ Certified copies of the priority documents have been received.

 2. ☐ Certified copies of the priority documents have been received in Application No. _____.

 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892) 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.	4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____. 5) ☐ Notice of Informal Patent Application 6) ☐ Other: _____.
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Detailed Action

Remarks

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/21/2009 has been entered.
2. This office action is in response to the amendment filed on 01/21/2009.
3. Claims 1-6, 9-10 and 15-22 remain pending and have been examined.

Response to Arguments

4. Applicants' arguments filed on 01/21/2009, in particular on pages 5-6, have been fully considered but they are not persuasive. For example:
 - At page 5, first paragraph, Applicants submit that "Pending independent claims 1 and 15, and the respective dependent claims, however, are patentably distinguished over the cited references because claims 1 and 15 claim parallel distributed operations, which are not disclosed or suggested by Pan, Fukuda, nor Suzuki references either alone or in combination" [emphasis added]. Moreover, at page 6, second paragraph, Applicants further point out that "Nothing in Suzuki discloses a parallel system. One of ordinary skill in the art would readily recognize that parallel processing enables many calculations

to be carried out simultaneously, i.e., without terminating and resuming thread processes.” [emphasis added].

In response, first of all, Examiner would like to thank Applicants for providing information about parallel distributed operations and/or parallel processing concepts. However, it should be noted that claim language as recited in claims 1 and 15 merely relays on the limitation “a parallel distributed application” [emphasis added] without addressing any operations and/or processing of the parallel distributed application as recited in the claims’ preamble. Therefore, such parallel distributed application can be reasonable interpreted as any types application[s] that exist in parallel and distributed forms including the parallel distributed programs or threads or nodes as disclosed by Suzuki (see for example, p.3, right column, section “Thread Navigation”, “The thread propagates along links and/or jumps directly to nodes using its member function hop()”; also see Fig.3 at page 4).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-6 and 9-10, and 15-22 are rejected under 35 U.S.C. 102(a) as being unpatentable over Pan (Pan et al., Distributed Sequential Computing Using Mobile Code: Moving Computation to Data) in view of Suzuki (Suzuki et al., "Self-Migrating Threads for multi-Agent applications", is made of record.) further in view of Fukuda (Fukuda et al., Message versus Messengers in Distributed Programming).

Claim 1:

Pan discloses a method/system of developing a distributed application, comprising steps of:

- establishing one or more distributed shared variables (see for example, p.77, right column, second paragraph, "distributed sequential computing"; also see "The data is distributed in essence...the code follows the data (an agent-based approach)"); and
- developing one or more distributed sequential computing programs to access the one or more distributed shared variables (see for example, p.77, right column, first paragraph, "distributing the sequential algorithm", "re-programming") and
- transforming the one or more distributed sequential computing programs into one or more distributed parallel programs (see for example, p.79 section "Sequential matrix multiplication implemented using MESSENGERS; also see Figure 2 Matrix decomposition, Figure 3, Logical network used for matrix multiplication and related text)

but does not explicitly disclose the distributed application is a parallel distributed application and transforming by spawning. However, Suzuki in the same analogous art of distributed computing, discloses a same parallel distributed approach using self-migrating threads that autonomously navigate over networks and resume their native -mode executions at each destination (see for example, p.1, right column, third paragraph, “These threads can behave as autonomous light-weight agents roaming over and changing their synthetic world”) and also discloses coding multi-Agent Applications with Self-migrating Threads (see for example, p.3, section 2.3 Coding Multi-Agent Application with Self-Migrating Threads”). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Pan’s sequential computing algorithm with Suzuki’s detail programming implementation for multi-agent applications with self migrating threads in a parallel distributed system. One would have been motivated to do so to improve performance sequential computation as disclosed by Pan (see for example, p.77, ABSTRACT, “Sequential computations can benefit from a distributed environment consisting of a network of workstations through the use of a mobile agent system.”). Fukuda discloses transforming/migrating the program by spawning a child program (replica of the Messenger to be created) (see for example, page 4, right column, last paragraph, “This also causes a replica of the messenger to be created...”; also see, page 3, left column, third paragraph, “Messenger programs” and related text). Therefore, it would have been obvious to one having ordinary

skill in the art at the time the invention was made to combine Pan, Suzuki and Fukuda, because they all disclose the same MESSENGER system.

Claim 2:

Suzuki further discloses wherein each of the one or more distributed sequential computing programs includes one or more self-migrating threads, capable of migrating among one or more processors and capable of accessing the one or more distributed shared variables (see for example, p.3, section 2.3 Coding Multi-Agent Application with Self-Migrating Threads”).

Claim 3:

Suzuki further discloses wherein the one or more distributed shared variables are configured to be located among a plurality of memories (see for example, p.2, section 2.1 Computational Network and Objects, “daemon node information”).

Claim 4:

Suzuki further discloses wherein the parallel distributed application is configured to operate across multiple processors (see for example, p.3, right column, second paragraph “Thread Navigation” The thread propagates along links and/or jumps directly to nodes”)

Claim 5:

Suzuki further discloses wherein the parallel distributed application is configured to operate using multiple threads (see for example, p.1, right column third paragraph “threads”)).

Claim 6:

Suzuki further discloses wherein the parallel distributed application is configured to operate across multiple nodes (see for example, Figure 1. Computational network, Logical Network, nodes).

Claim 9:

Pan also discloses the method comprising the step of configuring the one or more distributed sequential programs to include one or more mobile agents (see for example, p.77, right column, forth paragraph “Moreover, the agent doing the computation can send out additional agents to other machines to pre-fetch data needed for subsequent computation”)).

Claim 10:

Pan further discloses wherein the one or more mobile agents are implemented using self-migrating threads (see for example, p.78, right column, third paragraph, “self-migrating computations”)

Claims 15-17 and 20-22:

Claims 15-17 and 20-22 are system version for performing the claimed method as in claims 1-6, 9 and 10 addressed above, wherein all claimed limitation functions have been addressed and/or set forth above. Thus, they also would have been obvious.

Claims 18 and 19:

Pan further discloses wherein the one or more mobile agents are explicit-navigation/implicit-navigation mobile agents (see for example, p.78, right column second paragraph "the programs are carried by agents as they navigate through space"; also see p.77, forth paragraph, "Moreover, the agent doing the computation can send out additional agents to other machines to pre-fetch data needed for subsequent computation")

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zheng Wei whose telephone number is (571) 270-1059 and Fax number is (571) 270-2059. The examiner can normally be reached on Monday-Thursday 8:00-15:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the TC 2100 Group receptionist whose telephone number is 571- 272-1000.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Z. W./
Examiner, Art Unit 2192

/Tuan Q. Dam/
Supervisory Patent Examiner, Art Unit 2192

<i>Index of Claims</i> 	Application/Control No. 10850842	Applicant(s)/Patent Under Reexamination PAN ET AL.
	Examiner Wei, Zheng	Art Unit 2192

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

☐ Claims renumbered in the same order as presented by applicant		☐ CPA		☐ T.D.		☐ R.1.47			
CLAIM		DATE							
Final	Original	04/14/2007	10/04/2007	07/15/2008	03/26/2009				
	1	✓	✓	✓	✓				
	2	✓	✓	✓	✓				
	3	✓	✓	✓	✓				
	4	✓	✓	✓	✓				
	5	✓	✓	✓	✓				
	6	✓	✓	✓	✓				
	7	✓	✓	-	-				
	8	✓	✓	-	-				
	9	✓	✓	✓	✓				
	10	✓	✓	✓	✓				
	11	✓	✓	-	-				
	12	✓	✓	-	-				
	13	✓	✓	-	-				
	14	✓	✓	-	-				
	15	✓	✓	✓	✓				
	16	✓	✓	✓	✓				
	17	✓	✓	✓	✓				
	18	✓	✓	✓	✓				
	19	✓	✓	✓	✓				
	20	✓	✓	✓	✓				
	21	✓	✓	✓	✓				
	22	✓	✓	✓	✓				
	23	✓	✓	-	-				
	24	✓	✓	-	-				
	25	✓	✓	-	-				

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/850,842 Confirmation No.: 9744
Applicant : Pan et al.
Filing Date : May 21, 2004
Title : SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED
PROGRAMMING
Group Art Unit : 2192
Examiner : Zheng Wei
Docket No. 703538.4044
Customer No. : 34313

REQUEST FOR CONTINUED EXAMINATION (RCE) TRANSMITTAL

Submission required under 37 CFR § 1.114

- ☐ Previously submitted
☐ Consider the amendment(s)/reply under 37 CFR § 1.116 previously filed
on _____
☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed
on _____
☐ Other _____
- ☒ Enclosed
☒ Amendment
☐ Affidavit(s)/Declarations(s)
☐ Information Disclosure Statement (IDS)
☐ Other _____

Miscellaneous

- ☐ Suspension of action on the above-identified application is requested under 37
CFR § 1.103(c) for a period of _____ months. (Period of suspension shall not
exceed 3 months; fee under 37 CFR § 1.17(i) required.)
☐ Other _____

Applicant : Pan et al.
 Appl. No. : 10/850,842
 Examiner : Zheng Wei
 Docket No. : 703538.4044

Fees

☒ The Commissioner is hereby authorized to charge the following fees, or credit any overpayments, to Deposit Account No. 15-0665

☒ RCE fees (37 CFR §1.17(e):

RCE Fee						\$810.00
	Claims filed or remaining after amendment	Highest number previously paid for				
Total Claims	18	39	= 0	x	\$50.00	\$ 0.00
Independent Claims	3	-	3	= 0	x	\$200.00
☐ Reduction by ½ for Filing by Small Entity. Note 37 CFR §§ 1.9, 1.27, 1.28.						
TOTAL OF ABOVE CALCULATIONS						\$810.00

☒ Extension of time fee (37 CFR §§ 1.136 and 1.17)

EXTENSION (months)	FEE FOR SMALL ENTITY	FEE FOR OTHER THAN SMALL ENTITY
☐ one month	\$65.00	\$130.00
☐ two months	\$245.00	\$490.00
☒ three months	\$555.00	\$1,110.00
☐ four months	\$865.00	\$1,730.00
☐ five months	\$1,175.00	\$2,350.00
TOTAL OF ABOVE CALCULATIONS		\$1,920.00

☐ Other _____
☐ Check in the amount of \$ _____ is enclosed.

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE LLP

Dated: January 21, 2009

By: /s/ Kenneth S. Roberts/
 Kenneth S. Roberts
 Reg. No. 38,283

Orrick, Herrington & Sutcliffe LLP
 4 Park Plaza, Suite 1600
 Irvine, CA 92614-2558
 Tel. 949-567-6700
 Fax: 949-567-6710

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/850,842 Confirmation No. 9744
Applicant : Pan et al.
Filing Date : May 21, 2004
Title : SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED
PROGRAMMING
Group Art Unit : 2192
Examiner : Zheng Wei
Docket No. : 703538.4044

AMENDMENT

Mail Stop Amendment

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This paper is filed in response to the Office Action mailed on July 22, 2008.

A listing of the claims begins on page 2.

The remarks begin on page 5.

Listing of the claims:

1. (Previously presented) A method of developing a parallel distributed application, comprising steps of:

establishing at least one distributed shared variable;

developing at least one distributed sequential computing program to access the at least one distributed shared variable; and

transforming the at least one distributed sequential computing program into at least one distributed parallel program by spawning at least one child distributed sequential computing program from the at least one distributed sequential program when at least one intermediate condition occurs within the at least one distributed sequential program.

2. (Previously presented) The method of claim 1, wherein each of the at least one distributed sequential computing program includes at least one self-migrating thread, capable of migrating among at least one processor and capable of accessing the at least one distributed shared variable.

3. (Previously presented) The method of claim 1, wherein the at least one distributed shared variable is configured to be located among a plurality of memories.

4. (Original) The method of claim 1, wherein the parallel distributed application is configured to operate across multiple processors.

5. (Original) The method of claim 1, wherein the parallel distributed application is configured to operate using multiple threads.

6. (Original) The method of claim 1, wherein the parallel distributed application is configured to operate across multiple nodes.

7. – 8. (Cancelled)

9. (Previously presented) The method of claim 1, further comprising the step of configuring the at least one distributed sequential program to include at least one mobile agent.
10. (Previously presented) The method of claim 9, wherein the at least one mobile agent is implemented using self-migrating threads.
11. – 14. (Cancelled)
15. (Previously presented) A distributed parallel computing system, having at least one memory area and at least one processor, comprising:
- at least one distributed shared variable capable of loading into the at least one memory area; and
 - at least one distributed sequential computing system, configured to operate in the at least one processor, configured to access the at least one distributed shared variable, and configured to transform into at least one distributed parallel computing system by spawning at least one child distributed sequential computing system when at least one intermediate condition occurs within the at least one distributed sequential system.
16. (Previously presented) The system of claim 15, wherein the at least one distributed sequential computing system comprises at least one mobile agent.
17. (Previously presented) The system of claim 16, wherein the at least one mobile agent is implemented using self-migrating threads.
18. (Previously presented) The system of claim 16, wherein the at least one mobile agent is an explicit-navigation mobile agent.
19. (Previously presented) The system of claim 16, wherein the at least one mobile agent is an implicit-navigation mobile agent.

20. (Previously presented) The system of claim 16, wherein the at least one mobile agent is configured to move from one processor to another processor.
21. (Previously presented) The system of claim 16, wherein the at least one mobile agent operates within a distributed shared memory system.
22. (Previously presented) The system of claim 15, wherein the at least one processor is located across a physical network.
23. – 25. (Cancelled)

REMARKS

Claims 1-6, 9-10, and 15-22 are pending in the application. In the office action dated July 22, 2008, the Examiner rejected claims 1-6, 9-10, and 15-22 under 35 U.S.C. § 103(a) as being unpatentable over Pan et al ("Distributed Sequential Computing Using Mobile Code: Moving Computation to Data," hereinafter "Pan") in view of Suzuki et al. ("Self-Migrating Threads for Multi-Agent Applications" hereinafter "Suzuki"), and further in view of Fukuda et al. ("Message Versus Messengers in Distributed Programming," hereinafter "Fukuda"). Pending independent claims 1 and 15, and there respective dependent claims, however, are patentably distinguished over the cited references because claims 1 and 15 claim *parallel* distributed operations, which are not disclosed or suggested by Pan, Fukuda, nor Suzuki references either alone or in combination.

The Examiner concedes that Pan does not disclose the distributed application is a parallel distributed application. The Examiner then asserts that Suzuki discloses the "same parallel distributed approach using self-migrating threads that autonomously navigate over networks and resume their native-mode executions at each destination" and cites page 1, right column, third paragraph of Pan in support of this contention. The Examiner's assertion makes clear that Suzuki discloses a computing paradigm comprising a set of autonomous self-migrating threads that operates in a sequential sense and not in the parallel sense as claimed by Applicants. Notably, in order for a thread to recommence, i.e., resume, it must have been terminated prior to migration. Suzuki simply does not disclose a system that can handle multiple threads concurrently. Moreover, Suzuki explicitly discloses that the *hop()* function used in creating self-migrating threads carries out the following steps in the course of execution: network

navigation (via link/node), context switch, and *termination*. Suzuki, p.3 (“As shown above, . . .”). One of ordinary skill in the art would readily recognize this to describes a sequential operation.

Nothing in Suzuki discloses a parallel system. One of ordinary skill in the art would readily recognize that parallel processing enables many calculations to be carried out simultaneously, i.e., without terminating and resuming thread processes. Due to the wholesale absence of an express limitation of independent claim 1, Suzuki is incapable of curing the deficiency of Pan and thus the combination of Pan, Suzuki and Fukuda can not establish a prima facie case of obviousness..

Thus, for at least the reasons given above, Applicants submit that independent claim 1 is in condition for allowance, and respectfully request that the rejection of claim 1 be withdrawn. Independent claim 15 is also patentable for at least the same reasons given above for claim 1.

The remaining claims depend from either claim 1 or 15, and are therefore also patentable for at least the reasons given for claim 1.

CONCLUSION

In view of the foregoing, Applicants respectfully submit that claims 1-6, 9-10, and 15-22 are in condition for allowance. Prompt and favorable action on the merits of the claims is earnestly solicited. Should the Examiner have any questions or comments, the Examiner is invited to call the undersigned at (949) 567-6700.

The Commissioner is authorized to charge any fee that may be required in
connection with this Amendment to deposit account no. 15-0665.

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE LLP

Dated: January 21, 2009

By: 
Kenneth S. Roberts
Reg. No. 38,358

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Electronic Patent Application Fee Transmittal				
Application Number:		10850842		
Filing Date:		21-May-2004		
Title of Invention:		Systems and methods for parallel distributed programming		
First Named Inventor/Applicant Name:		Lei Pan		
Filer:		Kenneth Steven Roberts/Mary L. Smith		
Attorney Docket Number:		703538.4044		
Filed as Large Entity				
Utility under 35 USC 111(a) Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with \$0 paid	1253	1	1110	1110

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Request for continued examination	1801	1	810	810
Total in USD (\$)				1920

Electronic Acknowledgement Receipt	
EFS ID:	4651757
Application Number:	10850842
International Application Number:	
Confirmation Number:	9744
Title of Invention:	Systems and methods for parallel distributed programming
First Named Inventor/Applicant Name:	Lei Pan
Customer Number:	34313
Filer:	Kenneth Steven Roberts/Mary L. Smith
Filer Authorized By:	Kenneth Steven Roberts
Attorney Docket Number:	703538.4044
Receipt Date:	21-JAN-2009
Filing Date:	21-MAY-2004
Time Stamp:	17:58:37
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$1920
RAM confirmation Number	4150
Deposit Account	150665
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)					
Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)					
File Listing:					
Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		703538_4044.pdf	252932 da3bfb124a25536017a1b8a592c968fef6b8fb08	yes	9
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Request for Continued Examination (RCE)		1	2	
	Amendment Submitted/Entered with Filing of CPA/RCE		3	9	
Warnings:					
Information:					
2	Fee Worksheet (PTO-06)	fee-info.pdf	31644 5f1723b04953e7c59046387da284127bde481bf	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			284576		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 10/850,842		Filing Date 05/21/2004		☐ To be Mailed	
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APPLICATION AS FILED – PART I					OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)		SMALL ENTITY ☒		OR		SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)	RATE (\$)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A		N/A		N/A		N/A
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A		N/A		N/A		N/A
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A		N/A		N/A		N/A
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$	=	OR	X \$	=	X \$	=
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=	OR	X \$	=	X \$	=
☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).									
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL		TOTAL				

APPLICATION AS AMENDED – PART II					OTHER THAN SMALL ENTITY						
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	01/21/2009	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(j))	* 16	Minus	** 25	=	0	OR	X \$	=	X \$	
	Independent (37 CFR 1.16(h))	* 2	Minus	***4	=	0	OR	X \$	=	X \$	
	☐ Application Size Fee (37 CFR 1.16(s))										
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE			

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(j))	*	Minus	**	=	X \$	=	OR	X \$		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$	=	OR	X \$		
	☐ Application Size Fee (37 CFR 1.16(s))										
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))										
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE			

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/KELLY D. HARRIS/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/850,842	05/21/2004	Lei Pan	703538.4044	9744
34313 7590 07/22/2008 ORRICK, HERRINGTON & SUTCLIFFE, LLP IP PROSECUTION DEPARTMENT 4 PARK PLAZA SUITE 1600 IRVINE, CA 92614-2558			EXAMINER WEI, ZHENG	
			ART UNIT 2192	PAPER NUMBER
			MAIL DATE 07/22/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.		Applicant(s)	
	10/850,842		PAN ET AL.	
	Examiner		Art Unit	
ZHENG WEI		2192		

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 18 April 2008.

2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-6,9,10 and 15-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-6,9,10 and 15-22 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 21 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892) 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.	4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____. 5) ☐ Notice of Informal Patent Application 6) ☐ Other: _____.
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DETAILED ACTION

Remarks

1. This office action is in response to the amendment filed on 04/18/2008.
2. Claims 7, 8, 11-14 and 23-25 have been canceled.
3. Claims 1-3, 9, 10, and 15-22 have been amended.
4. The objection to claim 1-10 is withdrawn in view of Applicants' amendment
5. Claims 1-6, 9-10, and 15-22 remain pending and have been examined.

Response to Arguments

6. Applicants' arguments filed on 04/18/2008, in particular on pages 6-7, have been fully considered but they are not persuasive. For example:
 - At page 7, the Applicants argue that Fukuda does not teaching performing the step of message-passing in Messengers. However, Fukuda also discloses the spawn operation in message-passing method is comparable to the "create" operation in Messengers (see for example, page 5, right column, second paragraph, "Specifically, our create is comparable to a spawn operation in PVM while a hop is similar to a send/receive operation" [emphasis added]). Moreover, Fukuda discloses the "create" operation to create new logical nodes and/or lines (see for example, Figure 1 and related text) and further transforming code by spawning a child program (see for example, page 4, right column, last paragraph, "This also causes a replica of the messenger to be

created...” [emphasis added]). Furthermore, Suzuki (with co-author Fukuda) also discloses detailed implementation of using Threads to migrate program to other nodes (code execution) (see for example, p.2, section 2.2 Principles of Operations, figure 2. Network objects defined in C++ and related text). Therefore, Pan and Suzuki’s reference combines with Fukuda do disclose said limitation as the Applicants argued.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.
 8. Claims 1-6 and 9-10, and 15-22 are rejected under 35 U.S.C. 102(a) as being unpatentable over Pan (Pan et al., Distributed Sequential Computing Using Mobile Code: Moving Computation to Data) in view of Suzuki (Suzuki et al., “Self-Migrating Threads for multi-Agent applications”, is made of record.) further in view of Fukuda (Fukuda et al., Message versus Messengers in Distributed Programming).
- Claim 1:
- Pan discloses a method/system of developing a distributed application, comprising steps of:

- establishing one or more distributed shared variables (see for example, p.77, right column, second paragraph, “distributed sequential computing”; also see “The data is distributed in essence...the code follows the data (an agent-based approach)”; and
- developing one or more distributed sequential computing programs to access the one or more distributed shared variables (see for example, p.77, right column, first paragraph, “distributing the sequential algorithm”, “re-programming”) and
- transforming the one or more distributed sequential computing programs into one or more distributed parallel programs (see for example, p.79 section “Sequential matrix multiplication implemented using MESSENGERS; also see Figure 2 Matrix decomposition, Figure 3, Logical network used for matrix multiplication and related text)

but does not explicitly disclose the distributed application is a parallel distributed application and transforming by spawning. However, Suzuki in the same analogous art of distributed computing, discloses a same parallel distributed approach using self-migrating threads that autonomously navigate over networks and resume their native -mode executions at each destination (see for example, p.1, right column, third paragraph, “These threads can behave as autonomous light-weight agents roaming over and changing their synthetic world”) and also discloses coding multi-Agent Applications with Self-migrating Threads (see for example, p.3, section 2.3 Coding Multi-Agent Application with Self-Migrating

Threads”). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Pan’s sequential computing algorithm with Suzuki’s detail programming implementation for multi-agent applications with self migrating threads in a parallel distributed system. One would have been motivated to do so to improve performance sequential computation as disclosed by Pan (see for example, p.77, ABSTRACT, “Sequential computations can benefit from a distributed environment consisting of a network of workstations through the use of a mobile agent system.”). Fukuda discloses transforming/migrating the program by spawning a child program (replica of the Messenger to be created) (see for example, page 4, right column, last paragraph, “This also causes a replica of the messenger to be created...”; also see, page 3, left column, third paragraph, “Messenger programs” and related text). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Pan, Suzuki and Fukuda, because they all disclose the same MESSENGER system.

Claim 2:

Suzuki further discloses wherein each of the one or more distributed sequential computing programs includes one or more self-migrating threads, capable of migrating among one or more processors and capable of accessing the one or more distributed shared variables (see for example, p.3, section 2.3 Coding Multi-Agent Application with Self-Migrating Threads”).

Claim 3:

Suzuki further discloses wherein the one or more distributed shared variables are configured to be located among a plurality of memories (see for example, p.2, section 2.1 Computational Network and Objects, “daemon node information”).

Claim 4:

Suzuki further discloses wherein the parallel distributed application is configured to operate across multiple processors (see for example, p.3, right column, second paragraph “Thread Navigation” The thread propagates along links and/or jumps directly to nodes”)

Claim 5:

Suzuki further discloses wherein the parallel distributed application is configured to operate using multiple threads (see for example, p.1, right column third paragraph “threads”)).

Claim 6:

Suzuki further discloses wherein the parallel distributed application is configured to operate across multiple nodes (see for example, Figure 1. Computational network, Logical Network, nodes).

Claim 9:

Pan also discloses the method comprising the step of configuring the one or more distributed sequential programs to include one or more mobile agents (see for example, p.77, right column, forth paragraph “Moreover, the agent doing the computation can send out additional agents to other machines to pre-fetch data needed for subsequent computation”)).

Claim 10:

Pan further discloses wherein the one or more mobile agents are implemented using self-migrating threads (see for example, p.78, right column, third paragraph, “self-migrating computations”)

Claims 15-17 and 20-22:

Claims 15-17 and 20-22 are system version for performing the claimed method as in claims 1-6, 9 and 10 addressed above, wherein all claimed limitation functions have been addressed and/or set forth above. Thus, they also would have been obvious.

Claims 18 and 19:

Pan further discloses wherein the one or more mobile agents are explicit-navigation/implicit-navigation mobile agents (see for example, p.78, right column second paragraph “the programs are carried by agents as they navigate through space”; also see p.77, forth paragraph, “Moreover, the agent doing the computation can send out additional agents to other machines to pre-fetch data needed for subsequent computation”)

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Applicant's arguments with respect to claims rejection have been considered but are not persuasive, Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will

the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zheng Wei whose telephone number is (571) 270-1059 and Fax number is (571) 270-2059. The examiner can normally be reached on Monday-Thursday 8:00-15:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the TC 2100 Group receptionist whose telephone number is 571- 272-1000.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Z. W./

Examiner, Art Unit 2192

/Tuan Q. Dam/

Supervisory Patent Examiner, Art Unit 2192

Notice of References Cited	Application/Control No. 10/850,842	Applicant(s)/Patent Under Reexamination PAN ET AL.	
	Examiner ZHENG WEI	Art Unit 2192	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Fukuda t al., Messages versus Messengers in Distributed Programming, published by Hournal of Parallel and Distributed Computing Vol.57, Issue 2 May 1999, pages 1-8
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Index of Claims</i> 	Application/Control No. 10850842	Applicant(s)/Patent Under Reexamination PAN ET AL.
	Examiner Wei, Zheng	Art Unit 2192

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

☐ Claims renumbered in the same order as presented by applicant										☐ CPA										☐ T.D.										☐ R.1.47									
CLAIM		DATE																																					
Final	Original	04/14/2007	10/04/2007	07/15/2008																																			
	1	✓	✓	✓																																			
	2	✓	✓	✓																																			
	3	✓	✓	✓																																			
	4	✓	✓	✓																																			
	5	✓	✓	✓																																			
	6	✓	✓	✓																																			
	7	✓	✓	-																																			
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	25	✓	✓	-																																			

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/850,842 Confirmation No. 9744
Applicant : Pan et al.
Filing Date : May 21, 2004
Title : SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED
PROGRAMMING
Group Art Unit : 2192
Examiner : Zheng Wei
Docket No. : 703538.4044 (Formerly 708493.4044)

AMENDMENT

Mail Stop Amendment

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This paper is filed in response to the Office Action mailed on October 18, 2007.

A listing of the claims begins on page 2.

The remarks begins on page 6.

Listing of the claims:

1. (Currently Amended) A method of developing a parallel distributed application, comprising the steps of:

 establishing ~~one or more~~ at least one distributed shared variables; ~~and~~

 developing ~~one or more~~ at least one distributed sequential computing programs to access the ~~one or more~~ at least one distributed shared variables; ~~and~~

 transforming the at least one distributed sequential computing program into at least one distributed parallel program by spawning at least one child distributed sequential computing program from the at least one distributed sequential program when at least one intermediate condition occurs within the at least one distributed sequential program.
2. (Currently Amended) The method of claim 1, wherein each of the ~~one or more~~ at least one distributed sequential computing programs includes ~~one or more~~ at least one self-migrating threads, capable of migrating among ~~one or more~~ at least one processors and capable of accessing the ~~one or more~~ at least one distributed shared variables.
3. (Currently Amended) The method of claim 1, wherein the ~~one or more~~ at least one distributed shared variables is ~~are~~ configured to be located among a plurality of memories.
4. (Original) The method of claim 1, wherein the parallel distributed application is configured to operate across multiple processors.

5. (Original) The method of claim 1, wherein the parallel distributed application is configured to operate using multiple threads.
6. (Original) The method of claim 1, wherein the parallel distributed application is configured to operate across multiple nodes.
7. – 8. (Cancelled)
9. (Currently Amended) The method of claim 1, further comprising the step of configuring the ~~one or more~~ at least one distributed sequential programs to include ~~one or more~~ at least one mobile agents.
10. (Currently Amended) The method of claim 9, wherein the ~~one or more~~ at least one mobile agents ~~are~~ is implemented using self-migrating threads.
11. – 14. (Cancelled)
15. (Currently Amended) A distributed parallel computing system, having ~~one or more~~ at least one memory areas and at least one processors, comprising:
- ~~one or more~~ at least one distributed shared variables capable of loading into the ~~one or more~~ at least one memory areas; and
- ~~one or more~~ at least one distributed sequential computing systems, configured to operate in the ~~one or more~~ at least one processors, ~~and~~ configured to access the ~~one or more~~ at least one distributed shared variables, and configured to transform into at least one distributed parallel

computing system by spawning at least one child distributed sequential computing system when at least one intermediate condition occurs within the at least one distributed sequential system.

16. (Currently Amended) The system of claim 15, wherein the ~~one or more~~ at least one distributed sequential computing systems comprise ~~one or more~~ at least one mobile agents.

17. (Currently Amended) The system of claim 16, wherein the ~~one or more~~ at least one mobile agents are implemented using self-migrating threads.

18. (Currently Amended) The system of claim 16, wherein the ~~one or more~~ at least one mobile agents is an ~~are~~ explicit-navigation mobile agents.

19. (Currently Amended) The system of claim 16, wherein the ~~one or more~~ at least one mobile agents is ~~are~~ implicit-navigation mobile agents.

20. (Currently Amended) The system of claim 16, wherein the ~~one or more~~ at least one mobile agents is ~~are~~ configured to move from one processor to another processor.

21. (Currently Amended) The system of claim 16, wherein the ~~one or more~~ at least one mobile agents operates within a distributed shared memory system.

22. (Currently Amended) The system of claim 15, wherein the ~~one or more~~ at least one processors is ~~are~~ located across a physical network.

23. – 25. (Cancelled)

REMARKS

Claims 1-3, 9, 10, and 15-22 have been amended, and claims 7, 8, 11-14, and 23-25 have been cancelled without prejudice. Claims 1-6, 9-10, and 15-22 are pending in the application. The Applicants respectfully request reconsideration.

More particularly, claims 1 and 15 have each been amended to include the subject matter of cancelled claims 7 and 8.

In the office action dated October 18, 2007, the examiner objected to claims 1-10 for informalities. The Applicants have amended claim 1 to adopt the correction provided by the examiner. Therefore, the Applicants submit that the objection has been overcome.

The examiner rejected claims 1-7 and 9-25 under 35 U.S.C. § 103(a)¹ as being unpatentable over Pan et al ("Distributed Sequential Computing Using Mobile Code: Moving Computation to Data", hereinafter "Pan") in view of Suzuki et al. "Self-Migrating Threads for Multi-Agent Applications", herein after "Suzuki"), and claim 8 under 35 U.S.C. § 103(a) as being unpatentable over Pan in view of Suzuki and further in view of Fukuda et al. ("Message Versus Messengers in Distributed Programming", herein after "Fukuda"). In view of the remarks presented herein, the Applicants respectfully request reconsideration and withdrawal of the examiner's rejections and allowance of the subject application.

Claims 1 is patentable because none of the cited references, taken either alone or in combination, teaches or suggests:

transforming the at least one distributed sequential
computing program into at least one distributed parallel program
by spawning at least one child distributed sequential computing
program from the at least one distributed sequential program when
at least one intermediate condition occurs within the at least one
distributed sequential program

¹ The office action dated October 18, 2007 states that claims 1-7 and 9-25 were rejected under 35 U.S.C. 102(a). The Applicants assume the examiner meant 35 U.S.C. 103(a).

Contrary to the office action, Fukuda does not teach performing this step in Messengers. In figure 1(a), Fukuda shows the creation of tasks in a system using message-passing, not Messengers. The purpose of figure 1(a) is to contrast message-passing with Messengers (shown in figure 1(b)), which is based on a different philosophy from message-passing. Further, Fukuda highlights the development of programs f and g in the example of message-passing shown in figure 1(a) as one of the fundamental differences between message-passing and Messengers. Therefore, claim 1 is not rendered obvious by Fukuda in combination with Pan and Suzuki.

For at least the reasons given above, the Applicants submit that claim 1 is in condition for allowance, and respectfully request that the rejection of claim 1 be withdrawn.

Claims 15 is also patentable for at least the same reasons given above for claim 1.

The remaining claims depend from either claim 1 or 15, and are therefore also patentable for at least the reasons given for claim 1.

CONCLUSION

The Applicant's respectfully submit that claims 1-6, 9-10, and 15-22 are in condition for allowance. Accordingly, reconsideration and allowance of the application is requested. Prompt and favorable action on the merits of the claims is earnestly solicited. Should the Examiner have any questions or comments, the Examiner is invited to call the undersigned at (949) 567-6700.

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE LLP



Dated: April 18, 2008

By: _____
Kenneth S. Roberts
Reg. No. 38,358

4 Park Plaza, Suite 1600
Irvine, CA 92614-2558
Tel. 949-567-6700
Fax: 949-567-6710

Electronic Patent Application Fee Transmittal				
Application Number:		10850842		
Filing Date:		21-May-2004		
Title of Invention:		Systems and methods for parallel distributed programming		
First Named Inventor/Applicant Name:		Lei Pan		
Filer:		David Edward Wang/Karen Johnson		
Attorney Docket Number:		703538.4044		
Filed as Large Entity				
Utility Filing Fees				
Description		Fee Code	Quantity	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with \$0 paid		1253	1	1050

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				1050

Electronic Acknowledgement Receipt	
EFS ID:	3178508
Application Number:	10850842
International Application Number:	
Confirmation Number:	9744
Title of Invention:	Systems and methods for parallel distributed programming
First Named Inventor/Applicant Name:	Lei Pan
Customer Number:	34313
Filer:	David Edward Wang/Karen Johnson
Filer Authorized By:	David Edward Wang
Attorney Docket Number:	703538.4044
Receipt Date:	18-APR-2008
Filing Date:	21-MAY-2004
Time Stamp:	18:14:53
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	\$ 1050
RAM confirmation Number	4277
Deposit Account	150665
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 (National application filing, search, and examination fees) Charge any Additional Fees required under 37 C.F.R. Section 1.17 (Patent application and reexamination processing fees)	

Charge any Additional Fees required under 37 C.F.R. Section 1.19 (Document supply fees)

Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment - After Non-Final Rejection	703538_4044_AMD.pdf	215370	no	8
			06572ed7c1eba2d8a851e321656afb48d1f6794d		

Warnings:

Information:

2	Fee Worksheet (PTO-06)	fee-info.pdf	8153	no	2
			d97b7e0b9a3dfc6258e6a14781845037c5949967		

Warnings:

Information:

Total Files Size (in bytes):			223523
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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875					Application or Docket Number 10/850,842		Filing Date 05/21/2004		☐ To be Mailed	
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APPLICATION AS FILED – PART I						OTHER THAN SMALL ENTITY				
(Column 1)		(Column 2)		SMALL ENTITY ☒		OR		SMALL ENTITY		
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)	OR	RATE (\$)	FEE (\$)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (l), or (m))	N/A	N/A	N/A			N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X \$	=		X \$	=		X \$	=
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X \$	=		X \$	=		X \$	=
☐ APPLICATION SIZE FEE (37 CFR 1.16(s)) If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).										
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))										
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL				

APPLICATION AS AMENDED – PART II						OTHER THAN SMALL ENTITY					
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	04/18/2008	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	* 16	Minus	** 25	= 0	X \$25 =	0		X \$ =		
	Independent (37 CFR 1.16(h))	* 2	Minus	***4	= 0	X \$105 =	0		X \$ =		
☐ Application Size Fee (37 CFR 1.16(s))											
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
						TOTAL ADD'L FEE	0		TOTAL ADD'L FEE		

(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR		SMALL ENTITY	
AMENDMENT	Total (37 CFR 1.16(i))	CLAIMS REMAINING AFTER AMENDMENT	MINUS	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	OR	RATE (\$)	ADDITIONAL FEE (\$)	
	Total (37 CFR 1.16(i))	*	Minus	**	=	X \$ =			X \$ =		
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X \$ =			X \$ =		
☐ Application Size Fee (37 CFR 1.16(s))											
☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))											
						TOTAL ADD'L FEE			TOTAL ADD'L FEE		

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/EFREM WARREN/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/850,842	05/21/2004	Lei Pan	703538.4044	9744
34313 7590 10/18/2007 ORRICK, HERRINGTON & SUTCLIFFE, LLP IP PROSECUTION DEPARTMENT 4 PARK PLAZA SUITE 1600 IRVINE, CA 92614-2558			EXAMINER WEI, ZHENG	
			ART UNIT 2192	PAPER NUMBER
			MAIL DATE 10/18/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/850,842	PAN ET AL.	
	Examiner	Art Unit	
	Zheng Wei	2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 02 August 2007.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-25 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-25 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 21 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892) 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>08/02/2007</u>	4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ 5) ☐ Notice of Informal Patent Application 6) ☐ Other: _____
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DETAILED ACTION

Remarks

1. This office action is in response to the argument filed on 08/02/2007.
2. The rejection to claims 1-25 is withdrawn in view of applicant's argument and affidavit filed on 08/02/2007.
3. Claims 1-25 remain pending and have been examined.

Claim Objections

4. Claims 1-10 are objected to because of the following informalities:

Claim 1:

Claim 1 recites the limitation "the steps" in lines 1-2. It should be changed to – steps--.

Claims 2-10:

Claims 2-10 are dependent claims of claim 1. Therefore, they are also objected for the same reason.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-7 and 9-25 are rejected under 35 U.S.C. 102(a) as being unpatentable over Pan (Pan et al., Distributed Sequential Computing Using Mobile Code: Moving Computation to Data) in view of Suzuki (Suzuki et al., "Self-Migrating Threads for multi-Agent applications", is made of record.)

Claim 1:

Pan discloses a method/system of developing a distributed application, comprising steps of:

- establishing one or more distributed shared variables (see for example, p.77, right column, second paragraph, "distributed sequential computing"; also see "The data is distributed in essence...the code follows the data (an agent-based approach)"); and
- developing one or more distributed sequential computing programs to access the one or more distributed shared variables (see for example, p.77, right column, first paragraph, "distributing the sequential algorithm", "re-programming").

Suzuki further discloses the same parallel distributed approach using self-migrating threads that autonomously navigate over networks and resume their

native -mode executions at each destination (see for example, p.1, right column, third paragraph, "These threads can behave as autonomous light-weight agents roaming over and changing their synthetic world") and also discloses coding multi-Agent Applications with Self-migrating Threads (see for example, p.3, section 2.3 Coding Multi-Agent Application with Self-Migrating Threads"). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine Pan's sequential computing algorithm with Suzuki's detail programming implementation for multi-agent applications with self migrating threads in a parallel distributed system. One would have been motivated to do so to improve performance sequential computation as disclosed by Pan (see for example, p.77, ABSTRACT, "Sequential computations can benefit from a distributed environment consisting of a network of workstations through the use of a mobile agent system.")

Claim 2:

Pan and Suzuki disclose the method/system of claim 1, Suzuki further discloses wherein each of the one or more distributed sequential computing programs includes one or more self-migrating threads, capable of migrating among one or more processors and capable of accessing the one or more distributed shared variables (see for example, p.3, section 2.3 Coding Multi-Agent Application with Self-Migrating Threads").

Claim 3:

Pan and Suzuki disclose the method/system of claim 1, Suzuki further discloses wherein the one or more distributed shared variables are configured to be located among a plurality of memories (see for example, p.2, section 2.1 Computational Network and Objects, "daemon node information").

Claim 4:

Pan and Suzuki disclose the method/system of claim 1, Suzuki further discloses wherein the parallel distributed application is configured to operate across multiple processors (see for example, p.3, right column, second paragraph "Thread Navigation" The thread propagates along links and/or jumps directly to nodes")

Claim 5:

Pan and Suzuki disclose the method/system of claim 1, Suzuki further discloses wherein the parallel distributed application is configured to operate using multiple threads (see for example, p.1, right column third paragraph "threads").

Claim 6:

Pan and Suzuki disclose the method/system of claim 1, Suzuki further discloses wherein the parallel distributed application is configured to operate across

multiple nodes (see for example, Figure 1. Computational network, Logical Network, nodes).

Claim 7:

Pan and Suzuki disclose the method/system of claim 1, Pan further discloses the method comprising the step of transforming the one or more distributed sequential computing programs into one or more distributed parallel programs (see for example, p.79 section "Sequential matrix multiplication implemented using MESSENGERS; also see Figure Matrix decomposition and related text).

Claim 9:

Pan and Suzuki disclose the method/system of claim 1, Pan further discloses the method comprising the step of configuring the one or more distributed sequential programs to include one or more mobile agents (see for example, p.77, right column, forth paragraph "Moreover, the agent doing the computation can send out additional agents to other machines to pre-fetch data needed for subsequent computation"))).

Claim 10:

Pan and Suzuki disclose the method/system of claim 9, Pan further discloses wherein the one or more mobile agents are implemented using self-migrating

threads (see for example, p.78, right column, third paragraph, "self-migrating computations")

Claims 11-14:

Claims 11-14 are system version for performing the claimed method as in claims 1-7, 9 and 10 addressed above, wherein all claimed limitation functions have been addressed and/or set forth above. Thus, they would have been obvious.

Claims 15-17 and 20-22:

Claims 15-17 and 20-22 are system version for performing the claimed method as in claims 1-7, 9 and 10 addressed above, wherein all claimed limitation functions have been addressed and/or set forth above. Thus, they also would have been obvious.

Claims 18 and 19:

Pan and Suzuki disclose the system of claim 16, Pan further discloses wherein the one or more mobile agents are explicit-navigation/implicit-navigation mobile agents (see for example, p.78, right column second paragraph "the programs are carried by agents as they navigate through space"; also see p.77, forth paragraph, "Moreover, the agent doing the computation can send out additional agents to other machines to pre-fetch data needed for subsequent computation")

Claim 23:

Claim 23 is another system version for performing the claimed method as in claim 1 addressed above, wherein all claimed limitation functions have been addressed and/or set forth above. Thus, it is also would have been obvious.

Claims 24 and 25;

Pan and Suzuki disclose the system of claim 23, Pan further discloses wherein the mobile agent system supports compile-time explicit/implicit strong mobility (see for example, p.78, section 2. The MESSENGERS mobile agent system, "strong mobility")

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (Pan et al., Distributed Sequential Computing Using Mobile Code: Moving Computation to Data) in view of Suzuki (Suzuki, Self-Migrating Threads for multi-Agent applications) and further in view of Fukuda (Fukuda et al., Message versus Messengers in Distributed Programming).

Claim 8:

Pan and Suzuki disclose the method of claim 7, but does not explicitly disclose wherein the step of transforming the one or more distributed sequential computing programs into one or more distributed parallel programs comprises the step of: spawning one or more child distributed sequential computing programs from the one or more distributed sequential programs when one or

more intermediate conditions occur within the one or more distributed sequential programs.

However, Fukuda, discloses the same system and method in Messengers about spawning of new activities. (see for example, Figure 1, step 1, "Spawn g send recv" and related text"). Because both Fukuda and Pan disclose the same Messenger system and those features discussed above have been included in Messenger, the claim 8 would have been obvious.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zheng Wei whose telephone number is (571) 270-1059 and Fax number is (571) 270-2059. The examiner can normally be reached on Monday-Thursday 8:00-15:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the TC 2100 Group receptionist whose telephone number is 571- 272-1000.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ZW



TUAN DAM
SUPERVISORY PATENT EXAMINER

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				Complete if Known	
				Application Number	10/850842
				Filing Date	May 21, 2004
				First Named Inventor	Lei Pan
				Art Unit	2192
				Examiner Name	Zheng Wei
Sheet	1	of	1	Attorney Docket Number	703538.4044

U.S. PATENT DOCUMENTS				
Examiner Initials	Cite No. ¹	U.S. Patent Document Number-Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
	AA			
	AB			
	AC			
	AD			
	AE			

FOREIGN PATENT DOCUMENTS				
Examiner Initials	Cite No. ¹	Foreign Patent Document Country ³ Number ⁴ Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document T ⁶
	BA			
	BB			

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS				
Examiner Initials	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.		T ²
/ZW/	CA	Lei Pan, "Navigational Programming", Abstract of the Dissertation, University of California, Irvine (2005), pp. xvii-xx		
	CB			
	CC			
	CD			
	CE			

Examiner Signature	OHS West:260278894.1 703538-4044	/Zheng Wei/	Date Considered	10/04/2007
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹Applicants unique citation designation number (optional). ²See Kinds of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you are required to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS, SEND TO: Commissioner for Patents, Mail Stop Amendment, P.O. Box 1450, Alexandria, VA 22313-1450

Notice of References Cited	Application/Control No. 10/850,842	Applicant(s)/Patent Under Reexamination PAN ET AL.	
	Examiner Zheng Wei	Art Unit 2192	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Suzuki et al., Self-Migrating Threads for Multi-Agent Applications, publication data: 1999, published by 1st IEEE computer socitiei international workshop, pages 1-8
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

<i>Index of Claims</i> 	Application/Control No. 10850842	Applicant(s)/Patent Under Reexamination PAN ET AL.
	Examiner Wei, Zheng	Art Unit 2192

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant
 ☐ CPA
 ☐ T.D.
 ☐ R.1.47

CLAIM		DATE							
Final	Original	04/14/2007	10/04/2007						
	1	✓	✓						
	2	✓	✓						
	3	✓	✓						
	4	✓	✓						
	5	✓	✓						
	6	✓	✓						
	7	✓	✓						
	8	✓	✓						
	9	✓	✓						
	10	✓	✓						
	11	✓	✓						
	12	✓	✓						
	13	✓	✓						
	14	✓	✓						
	15	✓	✓						
	16	✓	✓						
	17	✓	✓						
	18	✓	✓						
	19	✓	✓						
	20	✓	✓						
	21	✓	✓						
	22	✓	✓						
	23	✓	✓						
	24	✓	✓						
	25	✓	✓						

Search Notes 	Application/Control No. 10850842	Applicant(s)/Patent Under Reexamination PAN ET AL.
	Examiner Wei, Zheng	Art Unit 2192

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Inventor Name Search	04/14/07	ZW
Double Patenting Search	04/14/07	ZW
Plus Search	04/14/07	ZW
East Search Combined with Class Search	04/14/07	ZW
NPL Search	04/14/07	ZW
NPL Search	10/04/07	ZW

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

Atty Docket No. 703538.4044
Serial No. 10/850,842

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/850,842 Confirmation No. 9744
Applicant : Pan et al.
Filing Date : May 21, 2004
Title : SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED
PROGRAMMING
Group Art Unit : 2192
Examiner : Zheng Wei

Docket No. : 703538.4044 (Formerly 708493.4044)

RESPONSE
SUBMISSION UNDER 37 C.F.R. §1.111

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This paper is filed in response to the Office Action mailed on May 21, 2007.

A listing of the claims begins on page 2.

The remarks begins on page 7.

OHS West:260277913.1
703538-4044

Listing of the claims:

1. (Original) A method of developing a parallel distributed application, comprising the steps of:

 establishing one or more distributed shared variables; and

 developing one or more distributed sequential computing programs to access the one or more distributed shared variables.
2. (Original) The method of claim 1, wherein each of the one or more distributed sequential computing programs includes one or more self-migrating threads, capable of migrating among one or more processors and capable of accessing the one or more distributed shared variables.
3. (Original) The method of claim 1, wherein the one or more distributed shared variables are configured to be located among a plurality of memories.
4. (Original) The method of claim 1, wherein the parallel distributed application is configured to operate across multiple processors.
5. (Original) The method of claim 1, wherein the parallel distributed application is configured to operate using multiple threads.
6. (Original) The method of claim 1, wherein the parallel distributed application is configured to operate across multiple nodes.

7. (Original) The method of claim 1, further comprising the step of transforming the one or more distributed sequential computing programs into one or more distributed parallel programs.

8. (Original) The method of claim 7, wherein the step of transforming the one or more distributed sequential computing programs into one or more distributed parallel programs comprises the step of:

spawning one or more child distributed sequential computing programs from the one or more distributed sequential programs when one or more intermediate conditions occur within the one or more distributed sequential programs.

9. (Original) The method of claim 1, further comprising the step of configuring the one or more distributed sequential programs to include one or more mobile agents.

10. (Original) The method of claim 9, wherein the one or more mobile agents are implemented using self-migrating threads.

11. (Original) A distributed sequential computing system, having one or more memory areas and one or more processors, comprising:

one or more distributed shared variables located in the one or more memory areas; and

one or more mobile agents, configured to migrate among the one or more processors, that access the one or more distributed shared variables.

12. (Original) The system of claim 11, wherein the one or more mobile agents are implemented using one or more self-migrating threads.
13. (Original) The system of claim 12, wherein the one or more self-migrating threads are configured to move from one processor to another processor.
14. (Original) The system of claim 12, wherein the one or more mobile agents are configured to operate within a distributed shared memory system.
15. (Original) A distributed parallel computing system, having one or more memory areas and one or more processors, comprising:
- one or more distributed shared variables capable of loading into the one or more memory areas; and
 - one or more distributed sequential computing systems, configured to operate in the one or more processors and configured to access the one or more distributed shared variables.
16. (Original) The system of claim 15, wherein the one or more distributed sequential computing systems comprise one or more mobile agents.
17. (Original) The system of claim 16, wherein the one or more mobile agents are implemented using self-migrating threads.

18. (Original) The system of claim 16, wherein the one or more mobile agents are explicit-navigation mobile agents.
19. (Original) The system of claim 16, wherein the one or more mobile agents are implicit-navigation mobile agents.
20. (Original) The system of claim 16, wherein the one or more mobile agents are configured to move from one processor to another processor.
21. (Original) The system of claim 16, wherein the one or more mobile agents operate within a distributed shared memory system.
22. (Original) The system of claim 15, wherein the one or more processors are located across a physical network.
23. (Original) A distributed shared memory based system, comprising:
a physical network;
a distributed shared memory system configured to access the physical network; and
a mobile agent system coupled to the distributed shared memory system.
24. (Original) The system of claim 23, wherein the mobile agent system supports compile-time explicit strong mobility.

25. (Original) The system of claim 23, wherein the mobile agent system supports compile-time implicit strong mobility.

REMARKS

In the office action dated May 21, 2007, the examiner rejected claims 1-7, 9-17, and 20-23 under 35 U.S.C. §102(a) as being anticipated by Pan et al. ("Distributed Parallel Computing Using Navigational Programming: Orchestrating Computations Around Data", hereinafter "Pan"), and claim 8 under 35 U.S.C. §103 as being unpatentable over Pan in view of Fukuda et al. ("Message versus Messengers in Distributed Programming", hereinafter "Fukuda"), and claims 18, 19, 24, and 25 under 35 U.S.C. §103 as being unpatentable over Pan in view of Pan et al. ("Mobile Agent - The Right Vehicle for Distributed Sequential Computing", hereinafter "Pan2"). In view of the remarks presented herein, the Applicants respectfully request reconsideration and withdrawal of the examiner's rejections and allowance of the subject application.

In regards to claims 1-7, 9-17, and 20-23, Applicants respectfully submit that Pan is not prior art under 35 U.S.C. 102(a) as it is a publication by the inventors/applicants less than one year prior to the filing date of the subject application. The affidavit filed herewith shows the derivation of Pan's subject matter from the Applicants' own work less than one year before the filing of subject application. The Applicants coauthored the reference, a research paper, with Javid J. Huseynov and Ming Kin Lai. Huseynov and Lai were not named as co-inventors, however, because they were students carrying out assignments under the direction and supervision of the Applicants during the preparation of the research paper. As such, Huseynov and Lai did not contribute to the conception of the invention claimed in subject application. Moreover, there is no evidence that Huseynov and Lai have refused to disclaim inventorship, or that they believe themselves to be the inventors.

In light of the Applicants' declarations about how the portions of Pan's disclosure relevant to the invention in subject application originated exclusively with the Applicants, Pan should be removed as a reference for unpatentability made out under 35 U.S.C. §102(a) rebutted. Accordingly, claims 1-7, 9-17, and 20-23 meet the requirements for patentability under 35 U.S.C. §102(a).

In regard to claims 8, 18, 19, 24, and 25 as indicated above, Pan is not prior art under 35 U.S.C. 102(a) and thus cannot be used to form a prima facie case of obviousness. Accordingly, these claims meet the requirements for patentability under 35 U.S.C. §103.

CONCLUSION

The Applicant's respectfully submit that claims 1-25 are in condition for allowance. Accordingly, reconsideration and allowance of the application is requested. Prompt and favorable action on the merits of the claims is earnestly solicited. Should the Examiner have any questions or comments, the Examiner is invited to call the undersigned at (949) 567-6700.

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE LLP

Dated: Aug 2, 2007

By: Kenneth S. Roberts
Kenneth S. Roberts
Reg. No. 38,358

4 Park Plaza, Suite 1600
Irvine, CA 92614-2558
Tel. 949-567-6700
Fax: 949-567-6710

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/850842 Confirmation No.: 9744
Applicant : Lei Pan et al.
Filing Date : May 21, 2004
Title : SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED
PROGRAMMING
Group Art Unit : 2192
Examiner : Zheng Wei
Docket No. : 703538.4044
Customer No. : 34313

Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Sir:

In accordance with 37 CFR §§ 1.97 and 1.98, the items identified in this Information Disclosure Statement ("IDS") are brought to the attention of the Office. The items are listed on the attached form PTO-1449 and a copy of the non-patent literature is enclosed for the convenience of the Examiner.

The items identified in this IDS may or may not be "material" pursuant to 37 CFR § 1.56. The submission thereof by Applicant is not to be construed as an admission that any such patent, publication or other information referred to therein is material or considered to be material (37 CFR § 1.97(h)), or even qualifies as "prior art" under 35 USC § 102 with respect to this invention unless specifically designated by Applicant as such.

OHS West:260278911.1
703538-4044

Applicant : Lei Pan
Appl. No. : 10/850,842
Examiner : Zheng Wei
Docket No. : 703538.4044

INFORMATION DISCLOSURE STATEMENT FILING PROVISION:

☐ This IDS is believed to be timely in that it is being submitted under 37 CFR § 1.97(b), that is (1) within three months of the filing date of the application, which is not a continued prosecution application filed under § 1.53(d); or (2) within three months of entry of the national stage as set forth in 37 CFR § 1.491; or (3) before the mailing of a first Office action on the merits; or (4) before the mailing of a first Office action after filing a request for continued examination under § 1.114. Thus, no fee is required.

☐ However, if the undersigned is in error in this regard, Applicant respectfully requests that the Office consider this IDS as filed under 37 CFR § 1.97(c), if applicable, and charge the fee due under 37 CFR § 1.17(p) to the deposit account referenced below.

☐ However, if the undersigned is in error in this regard, Applicant respectfully requests that the Office consider this IDS as filed under 37 CFR § 1.97(c), if applicable, and a statement under 37 CFR § 1.97(e) is included below, thus no fee is required.

☒ This IDS is being submitted under 37 CFR § 1.97(c), that is after mailing of a first Office action on the merits, but before a Final Action under 37 CFR § 1.113 or a Notice of Allowance under 37 CFR § 1.311.

☒ The fee due under 37 CFR § 1.17(p) is submitted herewith.

☐ A statement under 37 CFR § 1.97(e) is included below, thus no fee is required. In the event that this IDS is not received before a Final Action or a Notice of Allowance, then Applicant respectfully requests that the Office consider the filing of these papers to be submitted under 37 CFR § 1.97(d) and charge the fee due under 37 CFR § 1.17(p) to the deposit account below.

☐ This IDS is being submitted under 37 CFR § 1.97(d), that is after a Final Action under 37 CFR § 1.113 or a Notice of Allowance under 37 CFR § 1.311, but before payment of the issue fee. A statement under 37 CFR § 1.97(e) is included below. The fee due under 37 CFR § 1.17(p) is submitted herewith.

Applicant : Lei Pan
Appl. No. : 10/850,842
Examiner : Zheng Wei
Docket No. : 703538.4044

STATEMENT UNDER 37 CFR § 1.97(e):

☐ Each item contained in this IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS.

☐ No item contained in this IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing this statement after making reasonable inquiry, no item of information contained in this IDS was known to any individual designated in 37 CFR § 1.56(c) more than three months prior to the filing of this IDS.

PAYMENT AND/OR AUTHORIZATION TO CHARGE FEES:

☐ A check in the amount of _____ is enclosed for the above fee(s).

☐ Please charge _____ to Deposit Account No. **15-0665** for the above fee(s).

☒ The Commissioner is authorized to charge any fees required by the filing of these papers, and to credit any overpayment to Orrick, Herrington & Sutcliffe's Deposit Account No. **15-0665**.

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE LLP

Dated: August 2, 2007

By:


Kenneth S. Roberts
Reg. No. 38,283

ORRICK, HERRINGTON & SUTCLIFFE LLP
4 Park Plaza, Suite 1600
Irvine, CA 92614
949/567-6700 Telephone
949/567-6710 Facsimile

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT <i>(use as many sheets as necessary)</i>				Complete if Known	
				Application Number	10/850842
				Filing Date	May 21, 2004
				First Named Inventor	Lei Pan
				Art Unit	2192
Examiner Name	Zheng Wei				
Sheet	1	of	1	Attorney Docket Number	703538.4044

U.S. PATENT DOCUMENTS				
Examiner Initials	Cite No. ¹	U.S. Patent Document Number-Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
	AA			
	AB			
	AC			
	AD			
	AE			
FOREIGN PATENT DOCUMENTS				
Examiner Initials	Cite No. ¹	Foreign Patent Document Country ³ Number ⁴ Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document T ⁶
	BA			
	BB			
OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS				
Examiner Initials	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.		T ²
	CA	Lei Pan, "Navigational Programming", Abstract of the Dissertation, University of California, Irvine (2005), pp. xvii-xx		
	CB			
	CC			
	CD			
	CE			

Examiner Signature	OHS West:260278894.1 703538-4044	Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹Applicants unique citation designation number (optional). ²See Kinds of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you are required to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS, SEND TO: Commissioner for Patents, Mail Stop Amendment, P.O. Box 1450, Alexandria, VA 22313-1450

Electronic Patent Application Fee Transmittal				
Application Number:		10850842		
Filing Date:		21-May-2004		
Title of Invention:		Systems and methods for parallel distributed programming		
First Named Inventor/Applicant Name:		Lei Pan		
Filer:		Kenneth Steven Roberts/Mary L. Smith		
Attorney Docket Number:		708493.4044		
Filed as Small Entity				
Utility Filing Fees				
Description		Fee Code	Quantity	Sub-Total in USD(\$)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Submission- Information Disclosure Stmt	1806	1	180	180
Total in USD (\$)				180

Electronic Acknowledgement Receipt	
EFS ID:	2042230
Application Number:	10850842
International Application Number:	
Confirmation Number:	9744
Title of Invention:	Systems and methods for parallel distributed programming
First Named Inventor/Applicant Name:	Lei Pan
Customer Number:	34313
Filer:	Kenneth Steven Roberts/Mary L. Smith
Filer Authorized By:	Kenneth Steven Roberts
Attorney Docket Number:	708493.4044
Receipt Date:	02-AUG-2007
Filing Date:	21-MAY-2004
Time Stamp:	16:58:08
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	\$ 180
RAM confirmation Number	1786
Deposit Account	150665
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 and 1.17	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Amendment - After Non-Final Rejection	703538_4044.pdf	218467 f2fc27c58b4165e3a1e89c435adda54831d04cdd	no	8
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Filed	4044_ids.pdf	165605 bc32d746c923b6bd647fa95927457#7268e76e0	no	4
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	NPL Documents	4044_npl.pdf	150015 3f0b005239f426c4b5d6860de52286bc7b92342	no	4
Warnings:					
Information:					
4	Fee Worksheet (PTO-06)	fee-info.pdf	8180 a4339ea6db13ff9ff5a0d5c2216ca32cdeb4e898f	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			542267		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/850,842 Confirmation No. 9744
Applicant : Pan et al.
Filing Date : May 21, 2004
Title : SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED
PROGRAMMING
Group Art Unit : 2192
Examiner : Zheng Wei

Docket No. : 703538.4044 (Formerly 708493.4044)

RULE 132 DECLARATION
SUBMISSION UNDER 37 C.R.F. §1.132

Mail Stop Amendments
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

1. We, Lei Pan, Lubomir F. Bic, and Michael B. Dillencourt, are the solely named co-inventors of the above referenced application.
2. The work described in the research paper, "Distributed Parallel Computing Using Navigational Programming: Orchestrating Computations Around Data", was published less than a year before the date of filing of the application.
3. This research paper was derived from our work, and co-authored by us.
4. The University of California (Irvine) graduate students Javid J. Huseynov and Ming Kin Lai worked under our direction and supervision during the preparation of the research paper.
5. In the preparation of this research paper, these two student co-authors did not contribute to the conception of the invention disclosed in subject application and, thus, are not co-inventors.

6. We certify under penalty of perjury that the information submitted in this declaration is all true and correct.

Respectfully Submitted,

Dated: 7/23/07

By: 
Lei Pan

Dated: _____

By: _____
Lubomir F. Bic

Dated: _____

By: _____
Michael B. Dillencourt

6. We certify under penalty of perjury that the information submitted in this declaration is all true and correct.

Respectfully Submitted,

Dated: _____

By: _____

Lei Pan

Dated: 7-30-07

By:  _____

Lubomir F. Bic

Dated: 7/30/07

By:  _____

Michael B. Dillencourt

Electronic Acknowledgement Receipt	
EFS ID:	2042301
Application Number:	10850842
International Application Number:	
Confirmation Number:	9744
Title of Invention:	Systems and methods for parallel distributed programming
First Named Inventor/Applicant Name:	Lei Pan
Customer Number:	34313
Filer:	Kenneth Steven Roberts/Mary L. Smith
Filer Authorized By:	Kenneth Steven Roberts
Attorney Docket Number:	708493.4044
Receipt Date:	02-AUG-2007
Filing Date:	21-MAY-2004
Time Stamp:	17:04:39
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1	Rule 130, 131 or 132 Affidavits	4044_decl.pdf	49059 c6551d0dcb9abe1e92031795781173fe25992ca4	no	3

Warnings:

Information:	
Total Files Size (in bytes):	49059
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD						Application or Docket Number 10/650842			
Substitute for Form PTO-875									
APPLICATION AS FILED – PART I									
(Column 1)		(Column 2)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY			
FOR	NUMBER FILED	NUMBER EXTRA	RATE (\$)	FEE (\$)	RATE (\$)	FEE (\$)			
BASIC FEE (37 CFR 1.16(a), (b), or (c))									
SEARCH FEE (37 CFR 1.16(k), (l), or (m))									
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))									
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	•	X	=	X	=			
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	•	X	=	X	=			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).								
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))									
			TOTAL		TOTAL				
* If the difference in column 1 is less than zero, enter "0" in column 2.									
APPLICATION AS AMENDED – PART II									
(Column 1)		(Column 2)		(Column 3)		SMALL ENTITY		OR OTHER THAN SMALL ENTITY	
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	Minus	**	=	X	=	X	=	
	Independent (37 CFR 1.16(i))	Minus	***	=	X	=	X	=	
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
		TOTAL ADD'L FEE		TOTAL ADD'L FEE					
(Column 1) (Column 2) (Column 3)									
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE (\$)	ADDITIONAL FEE (\$)	RATE (\$)	ADDITIONAL FEE (\$)		
	Total (37 CFR 1.16(i))	Minus	**	=	X	=	X	=	
	Independent (37 CFR 1.16(i))	Minus	***	=	X	=	X	=	
	Application Size Fee (37 CFR 1.16(s))								
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))								
		TOTAL ADD'L FEE		TOTAL ADD'L FEE					
* If the entry in column 1 is less than the entry in column 2, write "0" in column 3. ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20". *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3". The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.									

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/850,842	05/21/2004	Lei Pan	708493.4044	9744
34313 7590 05/21/2007 ORRICK, HERRINGTON & SUTCLIFFE, LLP IP PROSECUTION DEPARTMENT 4 PARK PLAZA SUITE 1600 IRVINE, CA 92614-2558			EXAMINER WEI, ZHENG	
			ART UNIT 2192	PAPER NUMBER
			MAIL DATE 05/21/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.		Applicant(s)	
	10/850,842		PAN ET AL.	
	Examiner		Art Unit	
	Zheng Wei		2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on 21 May 2004.

2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) 1-25 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-25 is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on 21 May 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date 01/07/2005.

4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____

DETAILED ACTION

1. This office action is in response to the application filed on 05/21/2004.
2. Claims 1-25 are pending and have been examined.

Oath/Declaration

3. The Office acknowledges receipt of a properly signed oath/declaration filed on November 01, 2005.

Priority

4. This application claims benefit of provisional application 60/472,612 filed on 05/21/2003. Therefore, the priority date considered for this application is May 21, 2003.

Information Disclosure Statement

5. The information disclosure statements filed 01/07/2005 has been placed in the application file and the information referred to therein has been considered.

Drawings

6. The drawings filed on May 21, 2003 are accepted by the Examiner.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

8. Claims 1-7, 9-17 and 20-23 are rejected under 35 U.S.C. 102(a) as being anticipated by Pan (Pan et al., Distributed Parallel Computing Using Navigational Programming: Orchestrating Computations Around Data).

Claim 1:

Pan discloses a method/system of developing a parallel distributed application, comprising the steps of:

- establishing one or more distributed shared variables (see for example, p.1, section 1, Introduction, "Navigational Programming uses shared variable(SV) programming for communication..."); and
- developing one or more distributed sequential computing programs (Navigational Programming) to access the one or more distributed shared variables (see for example, p.1, section 1, Introduction, "Navigational Programming uses shared variable(SV) programming for communication and synchronization as DSM does, and hence the code is easy to develop and maintain...").

Claim 2:

Pan further discloses the method/system of claim 1, wherein each of the one or more distributed sequential computing programs includes one or more self-migrating threads, capable of migrating among one or more processors and capable of accessing the one or more distributed shared variables (see for example, p.4, left column, first paragraph, lines 4-7, "In addition to the event related lines, tow hops and one load statement are inserted to tell the agents where to migrate and what to carry for later sharing and computing") .

Claim 3:

Pan also discloses the method/system of claim 1, wherein the one or more distributed shared variables are configured to be located among a plurality of memories (see for example, p.5, left column, second paragraph, lines 20-24, "Because shared variables stored across distributed memories...").

Claim 4:

Pan further discloses the method/system of claim 1, wherein the parallel distributed application is configured to operate across multiple processors (see for example, p.2, right column, second paragraph, lines 19-21, "In parallel, these p agents update the A columns for which they are responsible on all p processors, suing the G column stored in agent variables...").

Claim 5:

Pan also discloses the method/system of claim 1, wherein the parallel distributed application is configured to operate using multiple threads (see for example, p.4, left column, first paragraph, lines 18-21, "...and orchestrates the execution of the parallel portion of the computation by injecting multiple agents that hop to the appropriate processors and perform their work independently.").

Claim 6:

Pan further discloses the method/system of claim 1, wherein the parallel distributed application is configured to operate across multiple nodes (see for example, p.6, section 4, Final Remarks, lines 10-11, "When the locus of computation migrates, only the program state is moved across the network.").

Claim 7:

Pan also discloses the method/system of claim 1, further comprising the step of transforming the one or more distributed sequential computing programs into one or more distributed parallel programs (see for example, p.1, right column, first paragraph, lines 5-7, "To gain more form distributed computing, the next logical step is to develop programs that employ multiple concurrent agents working in parallel.").

Claim 9:

Pan also discloses the method/system of claim 1, further comprising the step of configuring the one or more distributed sequential programs to include one or more mobile agents (see for example, p.4, left column, first paragraph, lines 18-21, "...and orchestrates the execution of the parallel portion of the computation by injecting multiple agents that hop to the appropriate processors and perform their work independently.").

Claim 10:

Pan further discloses the method/system of claim 9, wherein the one or more mobile agents are implemented using self-migrating threads (see for example, p.4, left column, first paragraph, lines 4-7, "In addition to the event related lines, tow hops and one load statement are inserted to tell the agents where to migrate and what to carry for later sharing and computing"; also see lines 18-21, "...and orchestrates the execution of the parallel portion of the computation by injecting multiple agents that hop to the appropriate processors and perform their work independently.").

Claims 11-14:

Claims 11-14 are system version for performing the claimed method as in claims 1-7, 9 and 10 addressed above, wherein all claimed limitation functions have been addressed and/or set forth above (see for example, p.4, right column,

section 3, "Comparison of the Solutions" system configuration: "Sun Ultra Sparc 1 model 170", "workstation", "Ethernet connection"...). Thus, they are also anticipated by Pan.

Claims 15-17 and 20-22:

Claims 15-17 and 20-22 are system version for performing the claimed method as in claims 1-7, 9 and 10 addressed above, wherein all claimed limitation functions have been addressed and/or set forth above (see for example, p.4, right column, section 3, "Comparison of the Solutions" system configuration: "Sun Ultra Sparc 1 model 170", "workstation", "Ethernet connection"...). Thus, they are also anticipated by Pan.

Claim 23:

Claim 23 is another system version for performing the claimed method as in claim 1 addressed above, wherein all claimed limitation functions have been addressed and/or set forth above (see for example, p.4, right column, section 3, "Comparison of the Solutions" system configuration: "Sun Ultra Sparc 1 model 170", "workstation", "Ethernet connection"...). Thus, it is also anticipated by Pan.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (Pan et al., Distributed Parallel Computing Using Navigational Programming: Orchestrating Computations Around Data) in view of Fukuda (Fukuda et al., Message versus Messengers in Distributed Programming).

Claim 8:

Pan discloses the method of claim 7, but does not explicitly disclose wherein the step of transforming the one or more distributed sequential computing programs into one or more distributed parallel programs comprises the step of: spawning one or more child distributed sequential computing programs from the one or more distributed sequential programs when one or more intermediate conditions occur within the one or more distributed sequential programs.

However, Fukuda, discloses the same system and method in Messengers about spawning of new activities. (see for example, Figure 1, step 1, "Spawning send recv" and related text"). Because both Fukuda and Pan disclose the same Messenger system and those features discussed above have been included in Messenger, the claim 8 would have been obvious.

11. Claims 18, 19, 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pan (Pan et al., Distributed Parallel Computing Using Navigational Programming: Orchestrating Computations Around Data) in view of Pan2 (Pan et al., Mobile Agent – The right vehicle for distributed sequential computing)

Claims 18 and 19:

Pan discloses the system of claim 16, but does not explicitly disclose wherein the one or more mobile agents are explicit-navigation/implicit-navigation mobile agents. However, Pan2 discloses the same Messengers system that the mobile agents can be either explicitly or implicitly through data distribution (see for example, p.576, last paragraph, lines 8-10). Therefore, claims 18 and 19 are also would have been obvious by the Messengers which are disclosed by Pan and Pan2.

Claims 24 and 25:

Pan discloses the system of claim 23, but does not explicitly disclose wherein the mobile agent system supports compile-time explicit/implicit strong mobility. However, Pan2 discloses the same Messengers system explicit/implicit mobile agents are strong nobilities (see for example, p.577, lines 6-7, "Strong mobility in our mobile agent system means that execution state but not always code is allowed to migrate"). Therefore, claim 24 and 25 are also would have been

obvious by the Messengers which are disclosed by Pan and Pan2.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
 - Fukuda et al., (Messengers: Distributed Programming Using Mobile Agents, Transactions of the SDPS, December 2001, Vol.5, No.4, page 95-112) discloses Messengers system using mobile agents.
 - Stanislaw Chrobot, (Sharing Variables in Distributed Memory, Fundamenta Informaticae 44 (2000) 63-81, IOS Press, pages 63-81) discloses shared variables in distributed system.
 - Itzkovitz et al., (Thread migration and its applications in distributed shared memory, The journal of systems and software 42 (1998) 71-97) discloses thread migration.
 - Wicke et al., (Compiling for Fast State Capture of Mobile Agents, Parallel Computing: Fundamentals & Applications, Proceedings of the International Conference ParCo'99, 17-20 August 1999, pages 1-8) discloses compiler for compiling mobile agent.
 - Pan et al., (Distributed Sequential computing using mobile code: Moving Computation to Data, IEEE 2001, pages 77-84) discloses distributed sequential computing using mobile code for moving computation to data.
13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zheng Wei whose telephone number is (571)

270-1059 and Fax number is (571) 270-2059. The examiner can normally be reached on Monday-Thursday 8:00-15:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

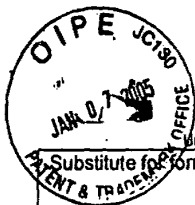
Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the TC 2100 Group receptionist whose telephone number is 571- 272-1000.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ZW



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SUPERVISORY PATENT EXAMINER



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**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet 1 of 2

Complete if Known

Application Number	10/850842
Filing Date	May 21, 2004
First Named Inventor	Lei Pan
Art Unit	2186
Examiner Name	Unassigned
Attorney Docket Number	703538.4044

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No. ¹	U.S. Patent Document Number-Kind Code ² (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
	AA			
	AB			
	AC			
	AD			
	AE			

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No. ¹	Foreign Patent Document Country ³ Number ⁴ Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	T ⁶
	BA				
	BB				

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
/ZW/	CA	Lei Pan, et al., <u>Distributed Sequential Computing</u> (pp. 223-239), <u>Applied Parallel and Distributed Computing (Advances in Computation: Theory and Practice, Volume 16)</u> , (Y. Pan and L.T. Yang, Eds.), Nova Science Publishers, Inc., New York, 2004	
/ZW/	CB	Lei Pan, et al., <u>Facilitating Agent Navigation Using DSM - High Level Designs</u> (11 pages), The 7th Int'l Conf. on Integrated Design & Process Technology (IDPT03), Austin, Texas, December 2003	
/ZW/	CC	Lei Pan et al., <u>From Distributed Sequential Computing to Distributed Parallel Computing</u> (8 pages), The 5th Workshop on High Performance Scientific and Engineering Computing with Applications (HPSECA-03, in conjunction with ICPP-03), Kaohsiung, Taiwan, October 2003	
/ZW/	CD	Lei Pan et al., <u>NavP Versus SPMD: Two Views of Distributed Computation</u> (8 pages), Int'l. Conf. on Parallel and Distributed Computing and Systems (PDCS 2003), Marina del Rey, CA, November 2003	
/ZW/	CE	Lei Pan et al., <u>Distributed Computing Using Navigational Programming</u> (37 pages), International Journal of Parallel Programming (IJPP), Vol. 32, No. 1, pp. 1-37, February 2004, 2004 Plenum Publishing Corporation	

Examiner Signature	/Zheng Wei/	Date Considered	04/14/2007
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹Applicant's unique citation designation number (optional). ²See Kinds of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached.

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Notice of References Cited	Application/Control No. 10/850,842	Applicant(s)/Patent Under Reexamination PAN ET AL.	
	Examiner Zheng Wei	Art Unit 2192	Page 1 of 2

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Pan et al., Distributed Parallel Computing using Navigatinal programming: Orchestrating Computations Around Data, , IASTED PDCS 2002, pages 1-6
	V	Pan et al., Mobile Agents -The Right Vehicle for Distributed Sequential Computing, Springer-Verlag Berlin Jeidelberg 2002, pages 575-584
	W	Fukuda et al., Messengers: Distributed Programming Using Mobile Agents, Transactions of the SDPS, December 2001, Vol.5, No.4, page 95-112
	X	Stanislaw Chrobot, Sharing Varaibles in Distributed Memory, Fundamenta Infomaticae 44 (2000) 63-81, IOS Press, pages 63-81

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Notice of References Cited	Application/Control No. 10/850,842	Applicant(s)/Patent Under Reexamination PAN ET AL.	
	Examiner Zheng Wei	Art Unit 2192	Page 1 of 2

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*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Pan et al., Distributed Parallel Computing using Navigatinal programming: Orchestrating Computations Around Data, , IASTED PDCS 2002, pages 1-6
	V	Pan et al., Mobile Agents -The Right Vehicle for Distributed Sequential Computing, Springer-Verlag Berlin Jeidelberg 2002, pages 575-584
	W	Fukuda et al., Messengers: Distributed Programming Using Mobile Agents, Transactions of the SDPS, December 2001, Vol.5, No.4, page 95-112
	X	Stanislaw Chrobot, Sharing Varaibles in Distributed Memory, Fundamenta Infomaticae 44 (2000) 63-81, IOS Press, pages 63-81

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CONFIRMATION NO. 9744

SERIAL NUMBER 10/850,842	FILING OR 371(c) DATE 05/21/2004 RULE	CLASS 717	GROUP ART UNIT 2192	ATTORNEY DOCKET NO. 708493.4044
APPLICANTS Lei Pan, Irvine, CA; Lubomir R. Bic, Irvine, CA; Michael B. Dillencourt, Irvine, CA;				
** CONTINUING DATA ***** This appln claims benefit of 60/472,612 05/21/2003 <i>ok jw</i> ** FOREIGN APPLICATIONS ***** <i>None jw</i>				
IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** SMALL ENTITY ** ** 11/09/2004				
Foreign Priority claimed ☐ yes ☒ no 35 USC 119 (a-d) conditions ☐ yes ☐ no ☐ Met after met Allowance Verified and Acknowledged <i>3/11/04</i> Examiner's Signature Initials		STATE OR COUNTRY CA	SHEETS DRAWING 8	TOTAL CLAIMS 25
				INDEPENDENT CLAIMS 4
ADDRESS 34313				
TITLE Systems and methods for parallel distributed programming				
FILING FEE RECEIVED 538	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit	

<i>Index of Claims</i> 	Application/Control No. 10850842	Applicant(s)/Patent Under Reexamination PAN ET AL.
	Examiner Wei, Zheng	Art Unit 2192

✓	Rejected
=	Allowed

-	Cancelled
÷	Restricted

N	Non-Elected
I	Interference

A	Appeal
O	Objected

☐ Claims renumbered in the same order as presented by applicant
 ☐ CPA
 ☐ T.D.
 ☐ R.1.47

CLAIM		DATE									
Final	Original	04/14/2007									
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Search Notes 	Application/Control No. 10850842	Applicant(s)/Patent Under Reexamination PAN ET AL.
	Examiner Wei, Zheng	Art Unit 2192

SEARCHED			
Class	Subclass	Date	Examiner

SEARCH NOTES		
Search Notes	Date	Examiner
Inventor Name Search	04/14/07	ZW
Double Patenting Search	04/14/07	ZW
Plus Search	04/14/07	ZW
East Search Combined with Class Search	04/14/07	ZW
NPL Search	04/14/07	ZW

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	1210	mobile adj agent	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2007/04/17 06:57
L2	168	1 and thread	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2007/04/17 06:57
L3	60784	shared adj variable or SV or DSV or distributed adj shared adj variable	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2007/04/17 06:58
L4	2	2 and 3	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2007/04/17 06:59
S1	98	((("20010051971") or ("20040205718") or ("20050039159") or ("20060143350") or ("4413319") or ("4414624") or ("4855903") or ("4942517") or ("4970658") or ("4992933") or ("5179530") or ("5179702") or ("5197130") or ("5218709") or ("5251097") or ("5253359") or ("5384773") or ("5428803") or ("5446856") or ("5471622") or ("5488703") or ("5561784") or ("5625831") or ("5630063") or ("5675736") or ("5682537") or ("5701396") or ("5701482") or ("5712971") or ("5758343") or ("5784697") or ("5799149") or ("5819021") or ("5857204") or ("5897638") or ("5922063") or ("5938765") or ("5950228") or ("5966072") or ("5966143") or ("5991866") or ("5999987") or ("6016397") or ("6067604") or ("6083278") or ("6138123") or ("6195676") or ("6219692") or ("6219692") or ("6243762"))).PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	OFF	2007/04/16 08:02

EAST Search History

S2	50	((("20010051971") or ("20040205718") or ("20050039159") or ("20060143350") or ("4413319") or ("4414624") or ("4855903") or ("4942517") or ("4970658") or ("4992933") or ("5179530") or ("5179702") or ("5197130") or ("5218709") or ("5251097") or ("5253359") or ("5384773") or ("5428803") or ("5446856") or ("5471622") or ("5488703") or ("5561784") or ("5625831") or ("5630063") or ("5675736") or ("5682537") or ("5701396") or ("5701482") or ("5712971") or ("5758343") or ("5784697") or ("5799149") or ("5819021") or ("5857204") or ("5897638") or ("5922063") or ("5938765") or ("5950228") or ("5966072") or ("5966143") or ("5991866") or ("5999987") or ("6016397") or ("6067604") or ("6083278") or ("6138123") or ("6195676") or ("6219692") or ("6219692") or ("6243762"))).PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; IBM_TDB	OR	OFF	2007/04/16 12:56
S3	0	distributed adj3 variable and distributed ajd3 program and thread and memrory	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2007/04/16 12:58
S4	0	distributed adj3 variable and distributed ajd3 program and thread and memory	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2007/04/16 12:58
S5	0	distributed adj3 variable and distributed ajd3 program	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2007/04/16 12:58
S6	23	distributed adj3 variable and distributed adj3 program	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2007/04/16 12:59
S7	7	S6 and thread	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2007/04/16 12:59

EAST Search History

S8	1161245	"7" and memory	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2007/04/16 12:59
S9	7	S7 and memory	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	AND	ON	2007/04/16 12:59

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lei pan

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Lei Pan. List of publications from the DBLP Bibliography Server - FAQ ... 8 · EE, Lei Pan, Lynn Margaret Batten: Reproducibility of Digital Evidence in ...
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Turin 2006 Winter Olympics, Lei Pan - - Yahoo! Sports

Lei Pan. Snowboarding. China. China. Birthdate:: October 26, 1988; Height:: 5' 5"; Weight:: 106 pounds; Age:: 18. Snowboarding ...
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ASP Today Author

Lei Pan is a software engineer working in Sydney, he can be reached at ... Lei Pan Almost every aspect of Windows 2000 uses Active Directory in one way or ...
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Distributed parallel computing using navigational programming

1 Lei Pan, Lubomir Bic, Michael B. Dillencourt, Distributed Sequential Numerical Computing Using Mobile Agents: Moving Code to Data, Proceedings of the ...
portal.acm.org/citation.cfm?coll=GUIDE&dl=GUIDE&id=1008508 - [Similar pages](#)

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Lei Pan. Doctor of Philosophy in Information and Computer Sciences. University of California, Irvine, 2005. Professor Lubomir F. Bic, Co-Chair ...
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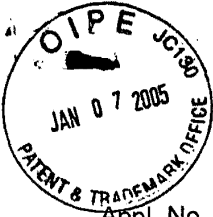
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IFW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/850842 Confirmation No.:
Applicant : Lei Pan et al.
Filing Date : May 21, 2004
Title : SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED
PROGRAMMING
Group Art Unit : 2186
Examiner : Unassigned
Docket No. : 703538.4044
Customer No. : 34313

Commissioner for Patents
Mail Stop Amendment
PO Box 1450
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

Sir:

In accordance with 37 CFR §§ 1.97 and 1.98, the items identified in this Information Disclosure Statement ("IDS") are brought to the attention of the Office. The items are listed on the attached form PTO-1449 and copies are enclosed for the convenience of the Examiner.

The items identified in this IDS may or may not be "material" pursuant to 37 CFR § 1.56. The submission thereof by Applicant is not to be construed as an admission that any such patent, publication or other information referred to therein is material or considered to be material (37 CFR § 1.97(h)), or even qualifies as "prior art" under 35 USC § 102 with respect to this invention unless specifically designated by Applicant as such.

CERTIFICATE OF MAILING (37 CFR §1.8)

I hereby certify, pursuant to 37 CFR §1.8, that I have reasonable basis to expect that that this paper or fee (along with any referred to as being attached or enclosed) would be mailed or transmitted on or before the date indicated with the United States Postal Service with sufficient postage as first class mail on the date shown below in an envelope addressed to Mail Stop Amendment, Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450.

Dated: January 5, 2005

DOCSOC1:158511.1
703538-4044 K2R


Mary L. Smith

Applicant : 10/859842
Appl. No. : 703538.4044
Examiner : Unassigned
Docket No. : 703538.4044

INFORMATION DISCLOSURE STATEMENT FILING PROVISION:

☒ This IDS is believed to be timely in that it is being submitted under 37 CFR § 1.97(b), that is (1) within three months of the filing date of the application, which is not a continued prosecution application filed under § 1.53(d); or (2) within three months of entry of the national stage as set forth in 37 CFR § 1.491; or (3) before the mailing of a first Office action on the merits; or (4) before the mailing of a first Office action after filing a request for continued examination under § 1.114. Thus, no fee is required.

☐ However, if the undersigned is in error in this regard, Applicant respectfully requests that the Office consider this IDS as filed under 37 CFR § 1.97(c), if applicable, and charge the fee due under 37 CFR § 1.17(p) to the deposit account referenced below.

☐ However, if the undersigned is in error in this regard, Applicant respectfully requests that the Office consider this IDS as filed under 37 CFR § 1.97(c), if applicable, and a statement under 37 CFR § 1.97(e) is included below, thus no fee is required.

☐ This IDS is being submitted under 37 CFR § 1.97(c), that is after mailing of a first Office action on the merits, but before a Final Action under 37 CFR § 1.113 or a Notice of Allowance under 37 CFR § 1.311.

☐ The fee due under 37 CFR § 1.17(p) is submitted herewith.

☐ A statement under 37 CFR § 1.97(e) is included below, thus no fee is required. In the event that this IDS is not received before a Final Action or a Notice of Allowance, then Applicant respectfully requests that the Office consider the filing of these papers to be submitted under 37 CFR § 1.97(d) and charge the fee due under 37 CFR § 1.17(p) to the deposit account below.

☐ This IDS is being submitted under 37 CFR § 1.97(d), that is after a Final Action under 37 CFR § 1.113 or a Notice of Allowance under 37 CFR § 1.311, but before payment of the issue fee. A statement under 37 CFR § 1.97(e) is included below. The fee due under 37 CFR § 1.17(p) is submitted herewith.

Applicant : 10/859842
Appl. No. : 703538.4044
Examiner : Unassigned
Docket No. : 703538.4044

STATEMENT UNDER 37 CFR § 1.97(e):

- ☐ Each item contained in this IDS was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this IDS.
- ☐ No item contained in this IDS was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing this statement after making reasonable inquiry, no item of information contained in this IDS was known to any individual designated in 37 CFR § 1.56(c) more than three months prior to the filing of this IDS.

PAYMENT AND/OR AUTHORIZATION TO CHARGE FEES:

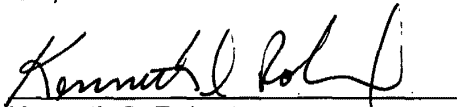
- ☐ A check in the amount of _____ is enclosed for the above fee(s).
- ☐ Please charge _____ to Deposit Account No. **15-0665** for the above fee(s).
- ☐ The Commissioner is authorized to charge any fees required by the filing of these papers, and to credit any overpayment to Orrick, Herrington & Sutcliffe's Deposit Account No. **15-0665**.

Respectfully submitted,

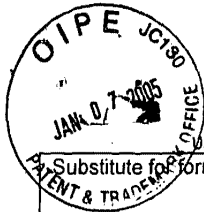
ORRICK, HERRINGTON & SUTCLIFFE LLP

Dated: January 5, 2005

By:


Kenneth S. Roberts
Reg. No. 38,283

ORRICK, HERRINGTON & SUTCLIFFE LLP
4 Park Plaza, Suite 1600
Irvine, CA 92614
949/567-6700 Telephone
949/567-6710 Facsimile



PTO/SB/08a (08-03)

Approved for use through 7/31/06. OMB 0651-0031

Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

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Substitute for Form 1449A/PTO

**INFORMATION DISCLOSURE
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet	1	of	2	Attorney Docket Number	703538.4044
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Complete if Known

Application Number	10/850842
Filing Date	May 21, 2004
First Named Inventor	Lei Pan
Art Unit	2186
Examiner Name	Unassigned
Attorney Docket Number	703538.4044

U.S. PATENT DOCUMENTS

Examiner Initials	Cite No. ¹	U.S. Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
		Number-Kind Code ² (if known)		
	AA			
	AB			
	AC			
	AD			
	AE			

FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No. ¹	Foreign Patent Document	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	T ⁶
		Country ³ Number ⁴ Kind Code ⁵ (if known)			
	BA				
	BB				

OTHER PRIOR ART - NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ²
	CA	Lei Pan, et al., <u>Distributed Sequential Computing</u> (pp. 223-239), <u>Applied Parallel and Distributed Computing</u> (Advances in Computation: Theory and Practice, Volume 16), (Y. Pan and L.T. Yang, Eds.), Nova Science Publishers, Inc., New York, 2004	
	CB	Lei Pan, et al., <u>Facilitating Agent Navigation Using DSM - High Level Designs</u> (11 pages), The 7th Int'l Conf. on Integrated Design & Process Technology (IDPT03), Austin, Texas, December 2003	
	CC	Lei Pan et al., <u>From Distributed Sequential Computing to Distributed Parallel Computing</u> (8 pages), The 5th Workshop on High Performance Scientific and Engineering Computing with Applications (HPSECA-03, in conjunction with ICPP-03), Kaohsiung, Taiwan, October 2003	
	CD	Lei Pan et al., <u>NavP Versus SPMD: Two Views of Distributed Computation</u> (8 pages), Int'l. Conf. on Parallel and Distributed Computing and Systems (PDCS 2003), Marina del Rey, CA, November 2003	
	CE	Lei Pan et al., <u>Distributed Computing Using Navigational Programming</u> (37 pages), International Journal of Parallel Programming (IJPP), Vol. 32, No. 1, pp. 1-37, February 2004, 2004 Plenum Publishing Corporation	

Examiner Signature		Date Considered	
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*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. ¹Applicants unique citation designation number (optional). ²See Kinds of U.S. Patent Documents at www.uspto.gov or MPEP 901.04. ³Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. ⁵Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 USC 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you are required to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS, SEND TO: Commissioner for Patents, Mail Stop Amendment, P.O. Box 1450, Alexandria, VA 22313-1450

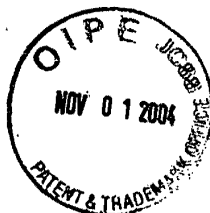


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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/850,842	05/21/2004	Lei Pan	703538.4044

34313
 ORRICK, HERRINGTON & SUTCLIFFE, LLP
 4 PARK PLAZA
 SUITE 1600
 IRVINE, CA 92614-2558



CONFIRMATION NO. 9744

FORMALITIES LETTER



OC000000013676888

Date Mailed: 08/31/2004

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

*Filing Date Granted***Items Required To Avoid Abandonment:**

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.

SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is \$65 for a Small Entity

- \$65 Late oath or declaration Surcharge.

Replies should be mailed to: Mail Stop Missing Parts
 Commissioner for Patents
 P.O. Box 1450
 Alexandria VA 22313-1450

*A copy of this notice **MUST** be returned with the reply.*

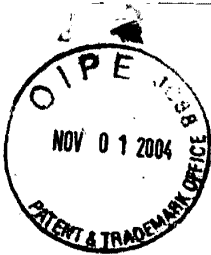
11/02/2004 SSESHE1 00000080 150665 10850842
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Initial Patent Examination Division (703) 308-1202

PART 1 - ATTORNEY/APPLICANT COPY



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No. : 10/850842 Confirmation No.: 9744
Applicant : Lei Pan et al.
Filing Date : May 21, 2004
Title : SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED
PROGRAMMING
Group Art Unit : To be assigned
Examiner : To be assigned
Docket No. : 708493.4044
Customer No. : 34313

Mail Stop Missing Parts

Commissioner For Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF MISSING PARTS

Sir:

1. DOCUMENTS ENCLOSED:

In response to the **NOTICE TO FILE MISSING PARTS OF APPLICATION**

UNDER 37 CFR § 1.53(f), which was mailed by the Patent Office on August 31, 2004,
enclosed are:

- ☒ Declaration
- ☒ Power of Attorney: ☒ Separate or ☐ Combined with Declaration
- ☒ Assignment of the invention to The Regents of the University of California
(together with PTO Form 1595)
- ☐ Formal Drawings (____ pgs)

CERTIFICATE OF MAILING
37 CFR §1.8

I hereby certify, pursuant to 37 CFR §1.8, that I have reasonable basis to expect that that this paper or fee (along with any referred to as being attached or enclosed) would be mailed or transmitted on or before the date indicated with the United States Postal Service with sufficient postage as first class mail on the date shown below in an envelope addressed to Mail Stop Missing Parts, Commissioner For Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

October 28, 2004

DOCSOC1:156523.1


Mary L. Smith

Applicant : Lei Pan et al.
 Appl. No. : 10/850842
 Examiner : To be assigned
 Docket No. : 703538.4044

☒ A copy of the Notice to File Missing Parts of Application under 37 CFR § 1.53(f)

2. REQUEST FOR EXTENSION OF TIME:

The proceedings herein are for a patent application and the provisions of 37 CFR

§ 1.136 apply.

☐ Applicant(s) petitions for an extension of time under 37 CFR § 1.136 [fees: 37 CFR § 1.17(a)(1)-(5)] for the total number of months checked below:

EXTENSION (months)	FEE FOR SMALL ENTITY	FEE FOR OTHER THAN SMALL ENTITY
☐ one month	\$55.00	\$110.00
☐ two months	\$215.00	\$430.00
☐ three months	\$490.00	\$980.00
☐ four months	\$765.00	\$1,530.00
☐ five months	\$1,040.00	\$2,080.00

Fee

☒ If any extension fee is required, please consider this a petition therefor.

3. FILING FEES

☒ Applicant claims small entity status pursuant to 37 CFR 1.27.

BASIC FILING FEE:				\$790.00
Total Claims	-	20	=	x \$18.00 \$0.00
Independent Claims	-	3	=	x \$88.00 \$0.00
Multiple Dependent Claims	\$290	(if applicable)	☐	\$0.00
Surcharge 37 CFR § 1.16(e)	\$130	(if applicable)	☒	\$130.00
TOTAL OF ABOVE CALCULATIONS				\$130.00
Reduction by ½ for Filing by Small Entity. Note 37 CFR §§ 1.9, 1.27, 1.28. ☒				\$65.00
Extension of Time (from above)				0.00
Assignment -- \$40 (if applicable) ☒				40.00
TOTAL FEES SUBMITTED HEREWITH				\$105.00

Applicant : Lei Pan et al.
Appl. No. : 10/850842
Examiner : To be assigned
Docket No. : 703538.4044

4. Method of Payment of fees:

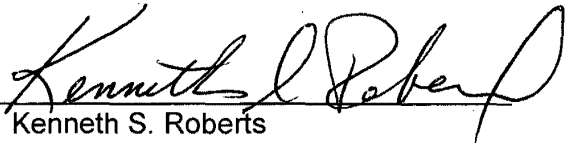
- ☐ A check in the amount of \$_____ is enclosed to cover the above fee(s).
☒ Charge Orrick's Deposit Account No. **15-0665** in the amount of **\$105.00**
☒ The Commissioner is authorized to charge Orrick's Deposit Account No. **15-0665** for any fees required under 37 CFR §§ 1.16, 1.17 and 1.445 that are not covered, in whole or in part, by a check enclosed herewith and to credit any overpayments to said Deposit Account No. **15-0665**.

Respectfully submitted,

ORRICK, HERRINGTON & SUTCLIFFE LLP

Dated: October 28, 2004

By:


Kenneth S. Roberts
Reg. No. 38,283

Orrick, Herrington & Sutcliffe LLP
4 Park Plaza, Suite 1600
Irvine, CA 92614-2558
Tel. 949-567-6700
Fax: 949-567-6710
Customer Number: 34313



Attorney Docket No.: 703538.4044

POWER OF ATTORNEY BY ASSIGNEE

The Regents of the University of California, assignee of the application for United States and International Letters Patent for an improvement in:

SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING

the specification of which was filed on **May 21, 2004** as United States Provisional Application Serial No. **10/850842**, does hereby appoint as its attorneys and/or agents, with full power of substitution and revocation, to prosecute this application and transact all business in the United States Patent and Trademark Office, and in countries other than the United States, and to do all things necessary or appropriate therefore before any competent International Authorities in connection with any international patent application(s) corresponding to the above-identified application, all of the registered practitioners identified by Customer Number 34313.

Direct all correspondence to :

**34313**

PATENT TRADEMARK OFFICE

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 Irvine, CA 2614-2558
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I, the undersigned, declare that I have reviewed copies of the documentary evidence establishing chain of title to the patent application identified above from the inventor(s) to the assignee(s), which:

- ☒ is filed for recordation herewith; or
☐ was recorded at Reel _____, Frame _____; or
☐ has been sent for recordation under separate cover, copy attached herewith.

The undersigned, whose title is supplied below, is empowered to act on behalf of the assignee.

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001, Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Full Name of Assignee: The Regents of the University of California	
Post Office Address: 1111 Franklin Street, 12th Floor, Oakland, California 94607-7700	
Signature of Declarant or Assignee: <i>Linda S. Stevenson</i>	Date: 10/28/04
Full Name of Declarant	
If Other Than Assignee: Linda S. Stevenson	
Title of Declarant: Manager, Patent Prosecution	
Address of Declarant: The Regents of the University of California 1111 Franklin Street, 5th Floor, Oakland, California 94607-7700	

Ue case No. 2003-211-2

DOCSOC1:154744.1

DECLARATION

As a below named inventor, I hereby declare that:



This declaration is of the following type:

- | | |
|--|---|
| ☒ original | ☐ divisional |
| ☐ design | ☐ continuation |
| ☐ supplemental | ☐ continuation-in-part |
| ☐ national stage of PCT | |

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled **SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING**, the specification of which

- (a) ☐ is attached hereto OR
- (b) ☒ was filed on May 21, 2004 as United States Application Serial No. 10/850842 and was amended on _____ if applicable
- (c) ☐ was described and claimed in PCT International Application No. _____, filed on _____ and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above.

I acknowledge the duty to disclose information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, § 1.56, including for continuation-in-parts applications, material information which became available between the filing date of the prior application and the filing date of the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 USC 119 (a) – (d), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by check the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s) or any PCT international application having a filing date before that of the application of which priority is claimed.

- (d) ☒ no such applications have been filed
- (e) ☐ such application have been filed as follows:

Prior Foreign Application Number(s)	Country	Date of Filing	Priority Claimed	
			Yes	No

I hereby claim the benefit under Title 35, United States Code §119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date
60/472,612	May 21, 2003

I hereby claims the benefit under 35 USC § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of 35 USC § 112, I acknowledge the duty to disclose material information as defined in 37 CFR § 1.56(a), regarding events which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

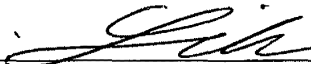
Application Serial No.	Filing Date	Status-patented, pending, abandoned

Direct all correspondence to :

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I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

201	FULL NAME OF INVENTOR	FIRST Name Lei	MIDDLE Initial	LAST Name Pan	
	RESIDENCE & CITIZENSHIP	City Irvine	State or Foreign Country CA	Country of Citizenship P.R. China	
	POST OFFICE ADDRESS	5315 Verano Place	City Irvine	State or Country CA	Zip Code 92612
INVENTOR'S SIGNATURE 			Date: 9/14/04		

202	FULL NAME OF INVENTOR	FIRST Name Lubomir	MIDDLE Initial R.	LAST Name Bic	
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INVENTOR'S SIGNATURE			Date:		

203	FULL NAME OF INVENTOR	FIRST Name Michael	MIDDLE Initial B.	LAST Name Dillencourt	
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	POST OFFICE ADDRESS	7 Virgil Court	City Irvine	State or Country CA	Zip Code 92612
INVENTOR'S SIGNATURE			Date:		

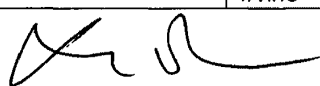
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201	FULL NAME OF INVENTOR	FIRST Name Lei	MIDDLE Initial	LAST Name Pan	
	RESIDENCE & CITIZENSHIP	City Irvine	State or Foreign Country CA	Country of Citizenship P.R. China	
	POST OFFICE ADDRESS	5315 Verano Place	City Irvine	State or Country CA	Zip Code 92612
INVENTOR'S SIGNATURE			Date:		

202	FULL NAME OF INVENTOR	FIRST Name Lubomir	MIDDLE Initial R.	LAST Name Bic	
	RESIDENCE & CITIZENSHIP	City Irvine	State or Foreign Country CA	Country of Citizenship Germany	
	POST OFFICE ADDRESS	24 Los Trancos	City Irvine	State or Country CA	Zip Code 92612
INVENTOR'S SIGNATURE 			Date: 9/16/04		

203	FULL NAME OF INVENTOR	FIRST Name Michael	MIDDLE Initial B.	LAST Name Dillencourt	
	RESIDENCE & CITIZENSHIP	City Irvine	State or Foreign Country California	Country of Citizenship USA	
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INVENTOR'S SIGNATURE			Date:		

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I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, § 1001 and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

201	FULL NAME OF INVENTOR	FIRST Name Lei	MIDDLE Initial	LAST Name Pan	
	RESIDENCE & CITIZENSHIP	City Irvine	State or Foreign Country CA	Country of Citizenship P.R. China	
	POST OFFICE ADDRESS	5315 Verano Place	City Irvine	State or Country CA	Zip Code 92612
INVENTOR'S SIGNATURE			Date:		

202	FULL NAME OF INVENTOR	FIRST Name Lubomir	MIDDLE Initial R.	LAST Name Bic	
	RESIDENCE & CITIZENSHIP	City Irvine	State or Foreign Country CA	Country of Citizenship Germany	
	POST OFFICE ADDRESS	24 Los Trancos	City Irvine	State or Country CA	Zip Code 92612
INVENTOR'S SIGNATURE			Date:		

203	FULL NAME OF INVENTOR	FIRST Name Michael	MIDDLE Initial B.	LAST Name Dillencourt	
	RESIDENCE & CITIZENSHIP	City Irvine	State or Foreign Country California	Country of Citizenship USA	
	POST OFFICE ADDRESS	7 Virgil Court	City Irvine	State or Country CA	Zip Code 92612
INVENTOR'S SIGNATURE <i>Michael B. Dillencourt</i>			Date: 10/27/04		



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APPLICATION NUMBER	FILING OR 371 (c) DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
10/850,842	05/21/2004	Lei Pan	703538.4044

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 ORRICK, HERRINGTON & SUTCLIFFE, LLP
 4 PARK PLAZA
 SUITE 1600
 IRVINE, CA 92614-2558

CONFIRMATION NO. 9744

FORMALITIES LETTER



OC000000013676888

Date Mailed: 08/31/2004

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

*Filing Date Granted***Items Required To Avoid Abandonment:**

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items and pay any fees required below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The oath or declaration is missing.
A properly signed oath or declaration in compliance with 37 CFR 1.63, identifying the application by the above Application Number and Filing Date, is required.
- To avoid abandonment, a late filing fee or oath or declaration surcharge as set forth in 37 CFR 1.16(e) of \$65 for a small entity in compliance with 37 CFR 1.27, must be submitted with the missing items identified in this letter.

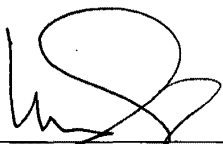
SUMMARY OF FEES DUE:

Total additional fee(s) required for this application is **\$65** for a Small Entity

- **\$65** Late oath or declaration Surcharge.

Replies should be mailed to: Mail Stop Missing Parts
 Commissioner for Patents
 P.O. Box 1450
 Alexandria VA 22313-1450

*A copy of this notice **MUST** be returned with the reply.*

A handwritten signature in black ink, consisting of a large, stylized 'S' or 'Q' shape with a horizontal line extending to the left and a small loop at the bottom.

Customer Service Center
Initial Patent Examination Division (703) 308-1202

PART 3 - OFFICE COPY



052104

16805 U.S. PTO

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Lei Pan, Lubomir F. Bic and Michael B. Dillencourt
Title : Systems and Methods for Parallel Distributed Programming
Docket No. : 703538.4044
Customer No. : 34313

17302 U.S. PTO
10/850842

052104

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

UTILITY PATENT APPLICATION TRANSMITTAL

1. Type of Application
This new application is for a(n)
☒ Utility (non provisional)
☐ Design
☐ Plant
2. ☒ Applicant claims small entity status. See 37 CFR 1.27
3. ☒ Specification, including Description, Claims and Abstract (Total Page: 26)
4. ☒ Drawing(s) (35 USC 113) (Total sheets 8)
5. Oath or Declaration
 - a. ☐ Newly executed (original or copy)
 - b. ☐ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 18 completed)
 - i. ☐ Deletion of Inventors (Signed statement attached deleting inventors(s) named in the prior application.) See 37 CFR 1.63(d)(2) and 1.33(b).
6. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)

CERTIFICATE OF MAILING
37 CFR §1.10

Date: May 21, 2004
Express Mailing Label No.: EV 314509508 US

I hereby certify that on the dated listed above, this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service in accordance with 37 C.F.R. § 1.10 as "Express Mail Post Office to Addressee," with sufficient postage in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Sally Hartwell

OC-130280.1

Applicant : Lei Pan et al.
Docket No. : 703538.4044

7. ☐ Nucleotide and/or Amino Acid Sequence Submission (if application, all necessary)
a. ☐ Computer Readable Form (CRF)
b. Specification Sequence Listing on:
i. ☐ CD-ROM or CD-R (2 copies); or
ii. ☐ Paper
c. ☐ Statement verifying identity of above copies
8. ☐ An assignment of the invention to _____
☐ is attached. A separate ☐ "COVERSHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.
☐ will follow.
9. ☐ Power of Attorney
10. ☐ 37 CFR 3.73(b) Statement (when there is an assignee) (Power of Attorney by Assignee)
11. ☐ English Translation Document (if applicable)
12. ☐ Information Disclosure Statement/PTO 1449 (or PTO/SB/08a)
☐ Copies of citations
13. ☐ Preliminary Amendment
14. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☐ Non-publication Request under 35 USC 122 (b)(2)(B)(i) (Applicant must attach form PTO/SB/35 or its equivalent)
17. ☐ Other

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application no. _____, filed _____.

Prior application information:

Examiner: _____ Group Art Unit: _____

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. This incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

052104

16805 U.S. PTO

Applicant : Lei Pan et al.
 Docket No. : 703538.4044

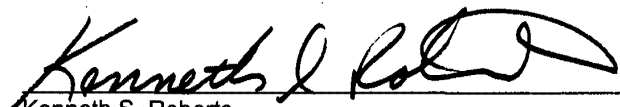
19. Fee Calculation: TOTAL AMOUNT OF PAYMENT: **\$464.00**
- A. ☒ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to Deposit Account No. 15-0665.
☒ Charge any additional fee required under 37 CFR 1.16 and 1.17 to Deposit Account No. 15-0665.
- B. ☐ Payment Enclosed
☐ Check ☐ Credit Card ☐ Money Order ☐ Other

BASIC FILING FEE:						\$770.00
Total Claims	25	-	20	=	4 x \$18.00	\$72.00
Independent Claims	4	-	3	=	1 x \$86.00	\$86.00
Multiple Dependent Claims	\$290	(if applicable)			☐	\$0.00
TOTAL OF ABOVE CALCULATIONS						\$928.00
Reduction by 1/2 for Filing by Small Entity. Note 37 CFR §§ 1.9, 1.27, 1.28. ☒						\$464.00
Extension of Time (from above)						\$0.00
Assignment -- \$40 (if applicable) ☐						\$0.00
TOTAL FEES SUBMITTED HERewith						\$464.00

- C. ☐ This application is being filed without fee or Declaration under 37 CFR §1.53.

20. Correspondence Address
☒ Customer Number. 34313

Respectfully submitted,


 Kenneth S. Roberts
 Registration No. 38,283

Dated: May 21, 2004

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DOCSOC1:130280.1

SPECIFICATION

SYSTEMS AND METHODS FOR PARALLEL DISTRIBUTED PROGRAMMING

Cross-Reference to Related Applications

- 5 [0001] This application claims priority to U.S. Application No. 60/472,612 filed on May 21, 2003, which is incorporated herein by reference.

FIELD OF THE INVENTION

[0002] The present invention relates generally to computer programming, and more particularly to systems and methods for parallel distributed programming.

10

BACKGROUND OF THE INVENTION

[0003] Developing a software application for a system with a single processor and a single memory can be straight forward. When viewing the source code for such an application, the source code is often very similar to its original algorithm that describes the computable
15 operations needed to be executed, and thus is generally not too burdensome to follow or analyze given the original algorithm. On the other hand, a software application for operation on multiple processors that uses multiple memory areas may be more complex. Such applications are often referred to as “parallel distributed programs,” and there are generally two approaches to developing such programs.

20 [0004] One approach to developing a parallel distributed program is often referred to as “message passing” (“MP”), which is illustrated in Fig. 1a. With this approach, the system is programmed as multiple tasks or threads, X and Y, that operate or execute on multiple processors, Processors 1 and 2, and handle data residing in multiple memories (not shown). The

tasks or threads, X and Y, communicate and cooperate with each other by sending and receiving “messages”. This approach allows for the different tasks and threads to operate in parallel and communicate with each other when necessary, which may result in an efficient and high-performing system. However, the source code for such a system may be burdensome to develop because programming the multiple tasks and threads and having them send and receive messages to each other may dramatically change the code structure and data structure of the original algorithm, and hence may be complicated, tedious, and error-prone. The code structure and data structure of the MP-based programs may lose much of their original characteristics. The abilities to preserve these original characteristics are referred to as algorithmic integrity and data structure integrity. MP programs typically do not preserve algorithmic integrity and data structure integrity.

[0005] Another approach is often referred to as “distributed shared memory” (“DSM”), which is illustrated in Fig. 1b. In this approach, a memory space, which may span across multiple memories in different processors, Processors 1 and 2, is dedicated for multiple threads or tasks to access, i.e., it is a globally accessible memory space built on distributed memories. Thus, a thread, X, on one processor, Processor 1, can access data in a memory on another processor, Processor 2, without having to establish another thread. Developing parallel distributed programs using this approach is often easier than using the MP approach, because DSM alleviates the need for major changes in code structure and data structure. However, this approach is generally not as efficient, because it may require a transfer of large amounts of data from the memory on the other processor, Processor 2, to the processor having thread X, Processor 1 and thus may not satisfy the need for high performance parallel computing.

[0006] Accordingly, improved systems and methods for parallel distributed programming are desirable.

SUMMARY OF THE INVENTION

[0007] The present invention is generally directed to parallel distributed programs. Generally,
5 a parallel distributed program is configured to operate across multiple processors/nodes and multiple memories. In one aspect of the invention, a parallel distributed program includes at least one distributed shared variable located across the multiple memories and one or more distributed programs configured to operate across multiple processors.

[0008] In another aspect of the invention, the one or more distributed programs include one or
10 more self-migrating threads configured to migrate from one processor to another.

[0009] Other systems, methods, features and advantages of the invention will be or will become apparent to one with skill in the art upon examination of the following figures and detailed description. It is intended that all such additional systems, methods, features and advantages be included within this description, be within the scope of the invention, and be
15 protected by the accompanying claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] A description of the present invention will be rendered by reference to specific embodiments thereof, which are illustrated in the accompanying drawings. It should be noted
20 that the components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating the principles of the invention. Moreover, in the figures, like reference numerals designate corresponding parts throughout the different views. However, like parts do not always have like reference numerals. Moreover, all illustrations are intended to convey

concepts, where relative sizes, shapes and other detailed attributes may be illustrated schematically rather than literally or precisely.

[0011] Fig. 1a is an illustration of the prior art operation of message passing.

[0012] Fig. 1b is an illustration of the prior art operation of distributed share memory.

5 [0013] Fig. 2 is an illustration of the operation of a self-migrating thread in accordance with a preferred embodiment of the present invention.

[0014] Figs. 3(a)-(b) is an illustration of one approach to transform a DSC program to a DPC program in accordance with a preferred embodiment of the present invention.

[0015] Figs. 4(a)-(b) is an illustration of another approach to transform a DSC program to a
10 DPC program in accordance with a preferred embodiment of the present invention.

[0016] Figs. 5(a)-(b) is an illustration of another approach to transform a DSC program to a DPC program in accordance with a preferred embodiment of the present invention.

[0017] Fig. 6 is an illustration of a Messenger in accordance with a preferred embodiment of the present invention.

15 [0018] Fig. 7 is an illustration of an explicit-navigation mobile agent system in accordance with a preferred embodiment of the present invention.

[0019] Fig. 8 is an illustration of an implicit navigation mobile agent system in accordance with a preferred embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0020] Methods and systems for developing sequential or parallel applications, such as high performance numerical computing, bioinformatics, database, transaction-based, and Internet applications, on distributed memory systems, shared memory systems, and systems that

5 incorporate both distributed and shared memory systems, will now be described. Some examples of the systems are multi-processor supercomputers, clusters, networks of workstations ("NOW"), the Grid, and the Internet.

[0021] An approach to developing sequential or parallel applications in accordance with a preferred embodiment of the present invention, referred to as "navigational programming,"

10 includes the programming and use of self-migrating threads or tasks, which are threads or tasks that can migrate from one processor to another. These self-migrating threads or tasks may be in the form of mobile agents with strong mobility. The approach is illustrated in Fig. 2. These self-migrating threads may be programmed explicitly, e.g., with "migration statements" or implicitly, e.g., driven by data distribution. With this approach, a thread, M, may perform its computations
15 on one processor, Processor 1, and if the thread M needs to access memory belonging to another processor, e.g., Processor 2, it may suspend its computations, migrate, or move, to the other processor, Processor 2, and then resume its computations.

[0022] The source code to handle the explicit migration of threads may be in the form of the hop() command. The hop() commands may be used as annotations in conventional programming
20 languages such as C.

[0023] In one aspect of navigational programming, a distributed shared variable ("DSV") may be used. DSVs and self-migration make shared variable programming possible beyond shared memory that provides single-address memory space. A DSV is logically a single variable that

includes several variables that may be physically distributed across multiple memories. An example of a DSV is a global array. A global array, $A[\cdot]$, may include $x + 1$ members, i.e., $A[0]$ to $A[x]$. These members may be variables that are physically distributed across memories of multiple processors, e.g., members $A[0]$ to $A[x/2]$ may be located in the memory of Processor 1 and $A[(x/2) + 1]$ to $A[x]$ may be located in the memory of Processor 2. In accordance with navigational programming, a self-migrating thread may access all the entries within the DSV. For example, if thread M is located in Processor 1 and needed to access members $A[(x/2) + 1]$ to $A[x]$, thread M would migrate to Processor 2.

- [0024] Another aspect of navigational programming is distributed sequential computing (“DSC”), which is computing using a single locus of computation over distributed data, possibly stored in a DSV. A self-migrating thread may be utilized to perform DSC. For example, for an algorithm that performs computations on a DSV, e.g., $A[\cdot]$, if the algorithm operates on Processor 1 and needs to access data on Processor 2, a single thread, M, can migrate to Processor 2 to access the data in the memory of Processor 2 and then continue the computations.
- [0025] DSC allows a programmer to develop threads that efficiently access multiple memories spanning across multiple processors without having to implement the complicated, tedious, time consuming, and error-prone low-level tasks of message handling in distributed programming. Further, it maintains the original code structure and data structure, i.e., it preserves algorithmic integrity and data structure integrity, in the resulting source code. Moreover, the programmer may follow the principle of pivot-computes, which is defined as the principle under which a computation takes place on the node that owns the large-sized data. Thus, if the data is distributed over a plurality of nodes, e.g., multiple memory areas associated with separate processors, wherein the distribution is disproportionate, e.g., a large portion of the data resides in

one area and a smaller portion resides in a separate area, the computation will take place on the node with the larger portion of data, i.e., the pivot node, instead of having the larger portion of data moved, which may affect performance. If the programmer follows the principle of pivot-computes, as an MP programmer usually would, then an application utilizing DSC may be as efficient and scalable as an application utilizing the MP approach.

[0026] To illustrate this feature, consider a program that sets each member of an array, $A[i]$, to the value of the previous member, and then increments that member by one, wherein i is the number of members of $A[.]$. For a single processor, single memory system, the pseudo-code may be implemented as follows:

10 [0027] (1) for $i = 2$ to x

[0028] (2) $A[i] = A[i-1] + 1$

[0029] (3) end for

[0030] This program will (1) count from 2 to x , i.e., the number of members of array A , and (2) assign each member i the value of the previous member, $i-1$, and increment that member by

15 1. These three code lines may be viewed as a code building block, which may be represented by the following notation $B_T(D)$, where B represents the block of code, T represents the type of computation performed by the block of code (T is *for* in the above code), and D represents the data that the block of code B operates on (D is the loop index i and the array $A[.]$ in the above code). The block may include any type of basic programming constructs, such as a loop, an if statement, a multi-way conditional statement, or a sequence of assignments. In the above code, $A[.]$ resides in a single memory area.

[0031] In parallel distributed computing, the array $A[.]$ is distributed, e.g., the array $A[.]$ spans across multiple memory areas on different processors, $P1$ and $P2$, where the first half of the

array, $A[1 \text{ to } x/2]$ is on one processor, P1, and the other half the array, $A[(x/2) + 1 \text{ to } x]$ is on the other processor, P2. A code block required to handle distributed data may be referred to as distributed code building blocks ("DBlocks"). DBlocks cannot be directly taken as implementations in non-shared-memory environments. The essence of implementing distributed memory programs is turning DBlocks into non-DBlocks, defined as "DBlock resolution."

[0032] If the prior art Message Passing approach is used to "resolve" the DBlock, then the pseudo-code may be written as follows:

[0033] (1) if $\mu == P1$
[0034] (2) for $i = 2$ to $x/2$
10 [0035] (3) $A[i] = A[i - 1] + 1$
[0036] (4) end for
[0037] (5) $t = A[x/2]$
[0038] (6) Send (t, P2)
[0039] (7) else if $\mu == P2$
15 [0040] (8) Recv (t, P1)
[0041] (9) $A[1] = t + 1$
[0042] (10) for $i = 2$ to $x/2$
[0043] (11) $A[i] = A[i - 1] + 1$
[0044] (12) end for
20 [0045] (13) end if

[0046] This program may run on both processors, and it will (1) check to see if the current processor, μ , on which the task is running, is P1. If it is, then the program will (2) count from 2 to half of the array $x/2$, which is the portion of the array $A[.]$ in the memory of P1, and (3) assign

each member i the value of the previous member, $i-1$, and increment that member by 1. Then, the program will (5) assign a variable t to the value of the last member of the array A in the memory of $P1$, $x/2$. Subsequently, (6) the program will send a message to $P2$ that will include the value of t . (7) if the current processor, μ , on which the task is running, is $P2$, then the program will (8) receive a message from $P1$ containing the value of the last member of the array $A[.]$ on $P1$ via value t and (9) assign the first member of the array $A[.]$ on $P2$ to the value in $t + 1$. Then, the program will (10) count from 2 to half of the array $x/2$, which is the portion of array $A[.]$ in the memory of $P2$ and (11) assign each member i the value of the previous member, $i-1$, and increment that member by 1.

- 10 [0047] Compare the operation of the pseudo-code using the prior art MP technique with the operation of the pseudo-code using navigational programming, as follows:

[0048] (1) for $i = 2$ to x

[0049] (2) $t = A[i - 1]$

[0050] (3) if $i = x/2 + 1$

- 15 [0051] (4) hop ($P2$)

[0052] (5) $A[i] = t + 1$

[0053] (6) end for

- [0054] In this program, the task will (1) count from 2 to x , and for each count, the task will (2) assign the value of the member of the previous count $i - 1$ to the variable t . This variable t is referred to as "agent variable," and is accessible by its owner thread from anywhere. (3) If the count reaches one more than half of the array A , then that means the task needs to access the other half of the array $A[.]$ in $P2$. Thus, the task will (4) "hop" or migrate to $P2$ and continue its computation. If not, then the task will continue its computation on $P1$, and (5) assign the value
- 20

of the previous member and increment it by one. Compared to the implementation done using MP, the DSC program preserves the original code structure (i.e., it does not break the loop into two or more blocks) and the original data structure (i.e., it maintains the global indexing of the array A[.]). DBlock resolution using navigational programming thus preserves the DBlock's

5 code structure and data structure, and the implementation follows the principle of pivot-computes (the pivot node is P1 for the first half of the loop, and P2 for the second).

[0055] Another aspect of navigational programming is distributed parallel computing ("DPC"), which is computing using multiple concurrent DSC programs. With this aspect, original code structure and data structure may be preserved by virtue of using DSC programs. The

10 "intersection" between each composing DSC program and the resulting DPC program may be minimal because it may consist of only local synchronizations, which minimizes the code "pollution" among all the composing DSC programs. The composing DSC programs are said to be "orthogonal" to the DPC program, and thus parallel distributed programming using DSC self-migrating threads exhibits "composition orthogonality." Furthermore, a DPC application

15 targeted to multi-processor environments may be utilized on a uni-processor and operates as a multi-threaded application. Since the memory location information is only used in the hop() commands used as annotations in the code to indicate migration, ignoring these commands would result in a multi-threaded program that runs on a uni-processor without further changing its code structure and data structure. In contrast, in a program developed using MP, the memory
20 location information is used not only in the Send() and Recv() commands, but also in restructuring code structure and data structure, therefore such program would look awkward and become unnecessarily difficult to maintain for uni-processors.

[0056] To illustrate the feature of DPC, consider a sequential program that performs block-fashion matrix multiplication as follows:

[0057] (1) for $i = 0$ to $p - 1$

[0058] (2) for $j = 0$ to $p - 1$

5 [0059] (3) $C_{ij} = A_i B_j$

[0060] (4) end for

[0061] (5) end for

[0062] In a distributed environment, we may use a processor to post-fetch the computed C sub-matrix and pre-fetch the next pair of A and B sub-matrices. The DSC program that performs the
10 computation may be written as follows:

[0063] (1) for $i = 0$ to $p - 1$

[0064] (2) for $j = 0$ to $p - 1$

[0065] (2.1) inject (WR (i, j))

[0066] (2.2) waitEvent ($IO_{b(i, j)}$)

15 [0067] (3) $C_{ij} = A_i B_j$

[0068] (3.1) hop ($! \mu$)

[0069] (4) end for

[0070] (5) end for

[0071] In the program, WR() is a separate DSC program that performs fetching. It is
20 “injected,” or spawned, by the computing thread, and it hops to the other node to perform fetching, after which it “signals” an event to indicate that the fetching is done. The computing thread will (2.2) wait for the event to make sure that the data is correctly post- and pre-fetched,

(3) compute the sub-matrix multiplication, and (3.1) hop to the other node to perform the computation for the next loop. The DSC program WR() may be written as follows:

[0072] (1) WR(int i, int j)

[0073] (2) hop(!μ)

5 [0074] (3) write ($C_{i,j}$)

[0075] (4) read (A_i, B_j)

[0076] (5) signalEvent ($IO_{b(i,j)}$)

[0077] (6) end

[0078] The computing DSC program and the fetching DSC program together make a DPC
10 program. The two DSC threads of the DPC program run concurrently to perform parallel or pipelined computing. In this particular example, the computations and the fetching are pipelined.

[0079] If the prior art Message Passing approach is used, then the pseudo-code may be written as follows:

[0080] (1) if $\mu = P1$

15 [0081] (2) for i = 0 to p-1

[0082] (3) for j = 0 to p-1

[0083] (4) if $(i*p+j)\%2 == 0$

[0084] (5) Send("f", (i, j), P2)

[0085] (6) $C_{ij} = A_i B_j$

20 [0086] (7) else

[0087] (8) Send("c", (i, j), P2)

[0088] (9) write($C_{i,j}$)

[0089] (10) read(A_i, B_j)

```
[0090] (11)      end if
[0091] (12)      Recv(sync, P2)
[0092] (13)      end for
[0093] (14)      end for
5  [0094] (15)    Send ("stop", (0, 0), P2)
[0095] (16)      else if  $\mu == P2$ 
[0096] (17)      while (1)
[0097] (18)      Recv (s, (i, j), P1)
[0098] (19)      if s == "f"
10 [0099] (20)      write( $C_{ij}$ )
[00100] (21)      read( $A_i, B_j$ )
[00101] (22)      else if s == "c"
[00102] (23)       $C_{ij} = A_i B_j$ 
[00103] (24)      else if s == "stop"
15 [00104] (25)      exit
[00105] (26)      end if
[00106] (27)      Send(sync, P1)
[00107] (28)      end while
[00108] (29)      end if
20 [00109] In the MP implementation, the code for the two different tasks, namely multiplication
and fetching, is tangled, polluting each other. In contrast, the two DSC programs in the
navigational programming approach are composed into a DPC program with only local events or
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injections as the intersection between the two. This demonstrates the composition orthogonality of the navigational programming.

[00110] In yet another aspect of the invention, transformations are provided to convert a DSC application into a DPC application utilizing multiple DSC threads running sequentially or
5 concurrently, thus utilizing parallelization and pipeline opportunities in the sequential computation. To illustrate different approaches for transformation, Figs. 3(a), 4(a), and 5(a) depict sequential computations running in a two-dimensional space with spatial s and temporal t dimensions. These computations may be executing in loops, which means they could continue to spread along both dimensions (only two nodes are shown in Figs. 3(a), 4(a), and 5(a)). Each box
10 in the figures represents a computation. A box marked with R means the computation represented by the box produces intermediate result that will be required by the following computation on the next node, whereas a box marked with NR means the computation on the next node is independent of the computation represented by the box.

[00111] One approach for transformation is illustrated in Figs. 3(a) and 3(b). In this approach
15 the computation on the next node is scheduled as soon as the dependency condition allows it. That is, since in the DSC the computation on the next node only depends on the intermediate result from part of the computation on the current node, as shown in Fig. 3(a), the thread can clone itself as soon as the computation of R is done, and have the clone hop to the next node carrying the intermediate result and continue the computation at the same time when it continues
20 the computation of NR on the current node, as shown in Fig. 3(b). A special case is when $R = \emptyset$ in which case the computations on the two nodes are completely independent of each other and can be performed in parallel.

[00112] Another approach for transformation is depicted in Figs. 4(a) and (b). This approach explores pipeline opportunity. The computation of R1 on the next node only depends on the intermediate result from the computation of R1 on the current node, as shown in Fig. 4(a). The thread is split into two. The first thread would, after performing R1 on the current node, hop to the next node carrying the intermediate result and continue the computation of R1 there. The second thread will be transformed using the first transformation, as shown in Fig. 3(b), or using the second transformation recursively (i.e., to split R2 further). The two threads will be synchronized on the next node. That is, upon finishing its computation, the first thread will signal an event to allow the second thread to move on to its computation on the next node.

10 [00113] Another approach is illustrated in Figs. 5(a) and (b). This approach illustrates parallel reduction. The computations on the two nodes each compute a partial result which is added to or multiplied by the total result, as shown in Fig. 5(a). If these computations do not depend on each other, they can be performed in parallel, and the total result can be collected by a separate DSC thread, as shown in Fig. 5(b).

15 [00114] Navigational programming may be facilitated by mobile agent systems. Self-migrating threads may be in the form of mobile agents. Such a mobile agent has the ability to halt its execution, encapsulate the values of its variables, move to another node, restore the state, and continue executing. This ability is often referred to as strong mobility.

[00115] There may be several ways of building mobile agent systems. One way is to build directly on top of message passing. An example of such a system is MESSENGERS, in which applications are developed as collections of mobile agents, which may be referred to as Messengers. In MESSENGERS, three levels of networks are used. The lowest level is the physical network (e.g., a LAN or WAN), which constitutes the underlying computational

processing elements. Superimposed on the physical layer is the daemon network, where each daemon is a server process that receives, executes, and dispatches Messengers. The logical network is an application-specific computation network created on top of the daemon network. Messengers may be injected by a program, which is part of the MESSENGERS system, or by
5 another Messenger into any of the daemon nodes, and they may start creating new logical nodes and links on the current or any other daemons. Based on application need, multiple logical nodes can be created on one physical node.

[00116] A “MESSENGERS daemon” executes compiled Messengers. A daemon and all Messengers running on it share one process, and the Messengers are linked to the process
10 dynamically. Messengers are allowed to call C functions, grouped in a user library which is also dynamically linked to the process. There are four tasks for a daemon. First, to accept signals, such as UNIX signals, to inject Messengers. These signals are sent by the program minject or another messenger. Second, to respond to requests, such as “search node” and “complete link,” from other Messengers. Third, to add incoming Messengers to a ready list. And fourth, to
15 execute Messengers. In addition, a daemon also provides a function, the calling of which would result in the autonomous caller Messenger being sent to a destination daemon. Socket-level message passing is used by a daemon or a Messenger to communicate with remote daemons.

[00117] The structure of a Messenger is depicted in Fig. 6. A Messenger may include a small Messenger control block (“MCB”) 100, which stores data such as “pointer to next function,”
20 library name, and Messenger size. The Messenger may further include agent variables 200, a vector of offsets 300 used to access memory in a Messenger heap used for dynamic arrays, and the heap itself 400.

[00118] There are two types of variables in MESSENGERS: agent variables and node variables.

An agent variable is private to a particular Messenger and travels with that Messenger as it migrates through the logical network. A node variable is stationary and is accessible by all Messengers currently at the logical node to which the variable belongs. Hence agent variables
5 can be used to carry data between nodes, while node variables can be used for inter-agent communication.

[00119] A Messenger's programmer may tell it to migrate using the navigational statements, such as hop(). A destination node's logical address or a logical link between the source and the destination nodes can be used as the argument for the statements. When a Messenger hops, it
10 takes the data in its agent variables with it to wherever it migrates.

[00120] A Messenger can spawn another Messenger using a statement, such as inject(). Synchronization among Messengers uses "events," and statements, such as signalEvent() and waitEvent(). Since no remote data accessing is allowed, the events are local and so is synchronization. A Messenger's execution is not preempted between any two navigational
15 statements. A Messenger must explicitly relinquish control to other Messengers using statements such as hop(). We call this feature non-preemptive scheduling.

[00121] The Messenger compiler lies at the heart of the system. Messengers code, with strong mobility, is translated into stationary code communicating using message passing with sockets. The translated stationary code (in C) is then further compiled into machine native code for
20 execution. Strong mobility in MESSENGERS means that computation migrates in the network in the form of a program counter. The actual mechanism for handling program counters can be seen from a simple example. The basic idea is to break a MESSENGERS program into smaller

functions (in C) at navigational or other context-switching statements, and use the "pointer to next function" as an artificial program counter. Consider the following code:

[00122] (1) S1

[00123] (2) hop()

5 [00124] (3) S2

[00125] This code shows two statements S1 and S2 separated by a context-switching statement hop(). This code is compiled by the MESSENGERS compiler into two functions, each takes a pointer to an MCB 100 as its argument, shown in the following code:

[00126] (1) f1 (mcb)

(1) f2 (mcb)

10 [00127] (2) S1

(2) S2

[00128] (3) mcb --> next_func = 2

(3) end

[00129] (4) ... /* code for hop () */

[00130] (5) end

[00131] In this program, f1() uses a "pointer to next function" to point to function f2(), which is
15 executed after migration. Line (4) in the program represents code that calls the daemon function mentioned earlier, and by calling this function the Messenger autonomously sends itself to a destination daemon.

[00132] One feature of the MESSENGERS system is that it allows code to either be loaded from a shared disk or, in a non-shared file system, be sent across the network at most once,

irrespective of how many times the locus of computation moves across the network. This feature is the key to efficient agent migration.

[00133] The overhead of mobile agent navigation in MESSENGERS may be relatively small due to the following reasons. First, since a Messenger is compiled into smaller functions at
5 navigational statements, it is not necessary to save the function stack but only the pointer to next function. Second, the extra information associated with a Messenger's status (i.e., MCB 100) is small. Third, no marshalling and unmarshalling of the agent variables is needed. Fourth, a Messenger runs in the same memory space of a daemon, which is why adding or removing it from the ready list takes only a few instructions to update some pointers in the list, instead of
10 doing memory copying. The navigation of Messengers is almost as fast as sending TCP messages using a C program.

[00134] In another aspect of navigational programming, an explicit-navigation mobile agent system may be built on top of a DSM. A DSM system may be used to serve as communication media for the globally accessible data, or in other words, agent variables. Fig. 7 depicts the
15 functional components of such a system and the dependencies. A DSM 700 may be built on top of a physical network of machines 800. The mobile agent system 600, which may include a compiler and a daemon system, may be built on the DSM 700. An application may be implemented to include explicit agent navigation 500 that uses the mobile agent system 600. The advantages of such a DSM based explicit-navigation system include: 1) It prevents false
20 sharing; 2) Agent migration is faster using DSM; 3) DSM memory consistency protocols can help to reuse the agent variables when the owner agent visits the same node multiple times; 4) Daemon programming on DSM is dramatically simpler than using socket level message passing programming.

[00135] In another aspect of navigational programming, an implicit-navigation mobile agent system may be based on a DSM. In this system, a mechanism is included that decides for the agent when and where to migrate, and how the migration is achieved. Fig. 8 depicts a functional design of an implicit-navigation agent system. A DSM 1200 may be built on top of a physical network of machines 1300. The design further includes a navigation protocol 1100, which decides when a Messenger migrates and the destination. These protocols 1100 may be designed to follow the principle of pivot-computes. The other component is a mobile agent system 1150 that is able to support run-time strong mobility, i.e., a Messenger should be able to migrate at run-time anywhere in the program without any user direction. An application may be implemented to include implicit agent navigation 1000 that uses the mobile agent system 1150 and navigation protocol 1100. The run-time strong mobility may be used in conjunction with the logical program counter, i.e., the “next function pointer” in MESSENGERS. This may result in more efficient agent navigation combining both the programmer’s knowledge of the application and the run-time system’s capability in dynamic situations.

[00136] In the foregoing specification, the invention has been described with reference to specific embodiments thereof. It will, however, be evident that various modifications and changes may be made thereto without departing from the broader spirit and scope of the invention. For example, the reader is to understand that the specific ordering and combination of process actions shown in the process flow diagrams described herein is merely illustrative, and the invention can be performed using different or additional process actions or a different combination or ordering of process actions. The specification and drawings are, accordingly, to be regarded in an illustrative rather than restrictive sense.

WHAT IS CLAIMED IS:

1. A method of developing a parallel distributed application, comprising the steps of:
establishing one or more distributed shared variables; and
developing one or more distributed sequential computing programs to access the one or
5 more distributed shared variables.
2. The method of claim 1, wherein each of the one or more distributed sequential computing
programs includes one or more self-migrating threads, capable of migrating among one or more
processors and capable of accessing the one or more distributed shared variables.
- 10 3. The method of claim 1, wherein the one or more distributed shared variables are
configured to be located among a plurality of memories.
4. The method of claim 1, wherein the parallel distributed application is configured to
15 operate across multiple processors.
5. The method of claim 1, wherein the parallel distributed application is configured to
operate using multiple threads.
- 20 6. The method of claim 1, wherein the parallel distributed application is configured to
operate across multiple nodes.

7. The method of claim 1, further comprising the step of transforming the one or more distributed sequential computing programs into one or more distributed parallel programs.

8. The method of claim 7, wherein the step of transforming the one or more distributed sequential computing programs into one or more distributed parallel programs comprises the step of:

spawning one or more child distributed sequential computing programs from the one or more distributed sequential programs when one or more intermediate conditions occur within the one or more distributed sequential programs.

10

9. The method of claim 1, further comprising the step of configuring the one or more distributed sequential programs to include one or more mobile agents.

10. The method of claim 9, wherein the one or more mobile agents are implemented using self-migrating threads.

15

11. A distributed sequential computing system, having one or more memory areas and one or more processors, comprising:

one or more distributed shared variables located in the one or more memory areas; and

20 one or more mobile agents, configured to migrate among the one or more processors, that access the one or more distributed shared variables.

12. The system of claim 11, wherein the one or more mobile agents are implemented using one or more self-migrating threads.
13. The system of claim 12, wherein the one or more self-migrating threads are configured to
5 move from one processor to another processor.
14. The system of claim 12, wherein the one or more mobile agents are configured to operate within a distributed shared memory system.
- 10 15. A distributed parallel computing system, having one or more memory areas and one or more processors, comprising:
one or more distributed shared variables capable of loading into the one or more memory areas; and
one or more distributed sequential computing systems, configured to operate in the one or
15 more processors and configured to access the one or more distributed shared variables.
16. The system of claim 15, wherein the one or more distributed sequential computing systems comprise one or more mobile agents.
- 20 17. The system of claim 16, wherein the one or more mobile agents are implemented using self-migrating threads.

18. The system of claim 16, wherein the one or more mobile agents are explicit-navigation mobile agents.
19. The system of claim 16, wherein the one or more mobile agents are implicit-navigation mobile agents.
20. The system of claim 16, wherein the one or more mobile agents are configured to move from one processor to another processor.
21. The system of claim 16, wherein the one or more mobile agents operate within a distributed shared memory system.
22. The system of claim 15, wherein the one or more processors are located across a physical network.
23. A distributed shared memory based system, comprising:
a physical network;
a distributed shared memory system configured to access the physical network; and
a mobile agent system coupled to the distributed shared memory system.
24. The system of claim 23, wherein the mobile agent system supports compile-time explicit strong mobility.

25. The system of claim 23, wherein the mobile agent system supports compile-time implicit strong mobility.

ABSTRACT

The present invention relates generally to computer programming, and more particularly to systems and methods for parallel distributed programming. Generally, a parallel distributed program is configured to operate across multiple processors and multiple memories. In one
5 aspect of the invention, a parallel distributed program includes a distributed shared variable located across the multiple memories and distributed programs capable of operating across multiple processors.

Fig. 1(a)
(Prior Art)

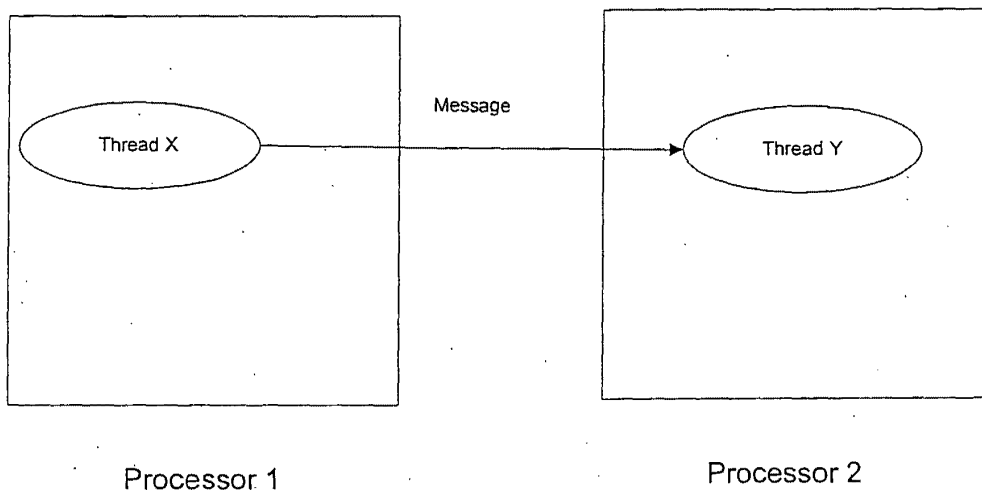


Fig. 1(b)
(Prior Art)

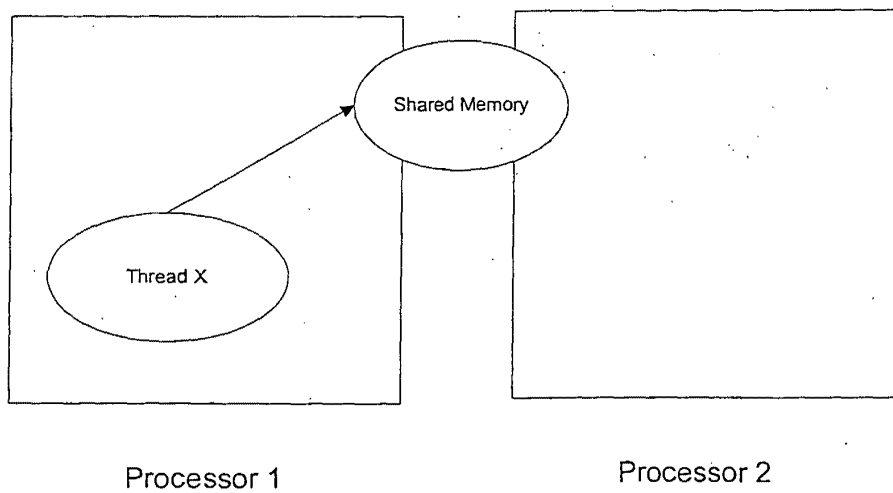


Fig. 2

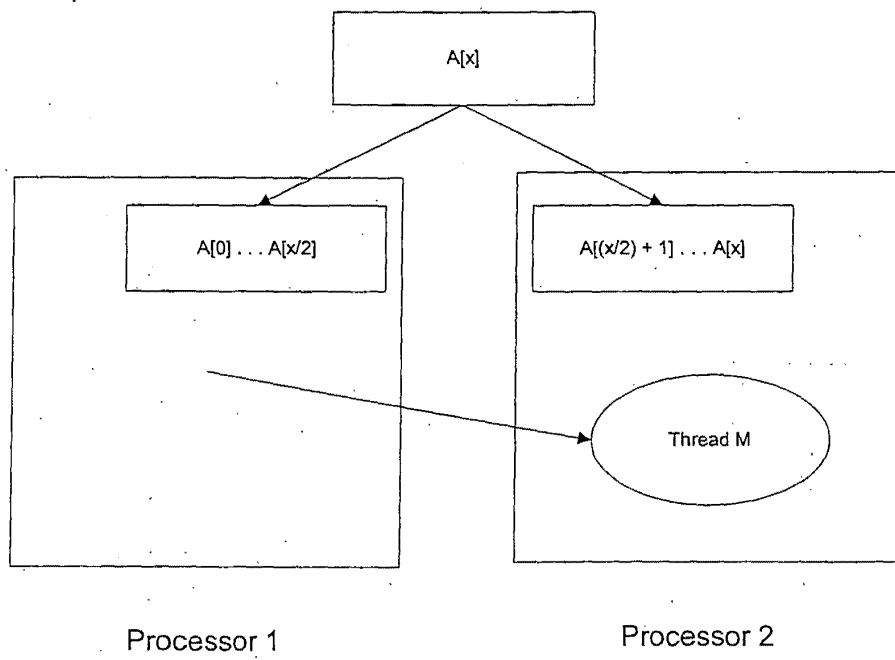


Fig. 3(a)

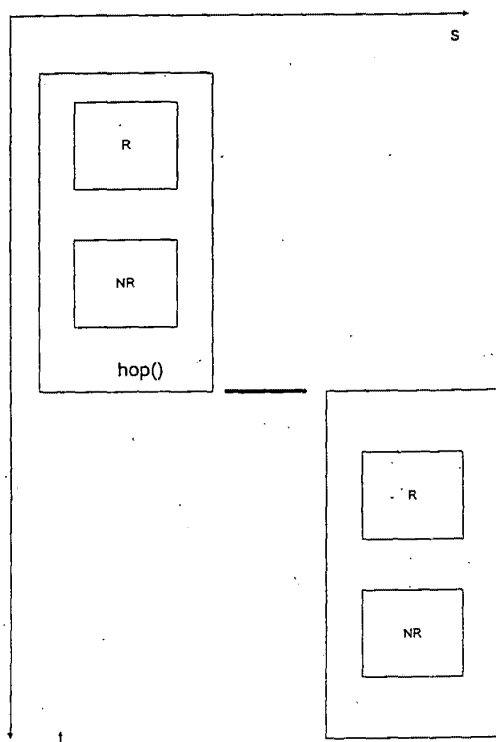


Fig. 3(b)

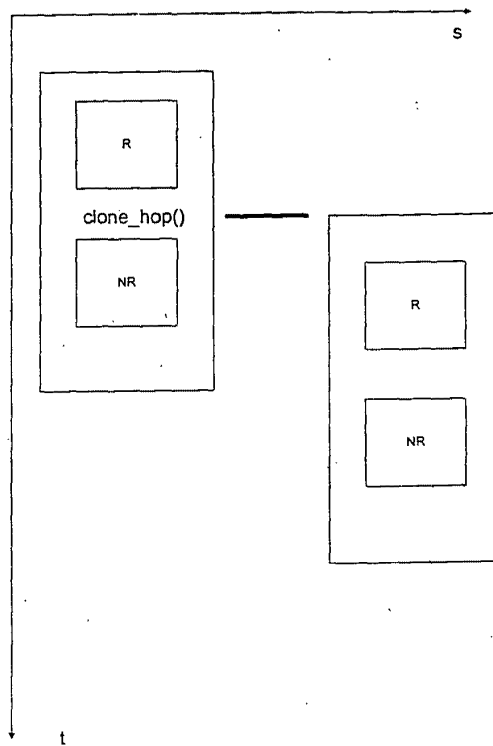


Fig. 4(a)

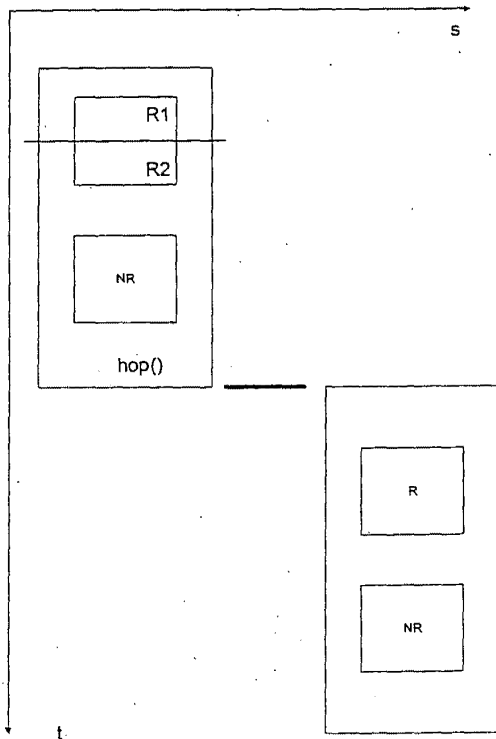


Fig. 4(b)

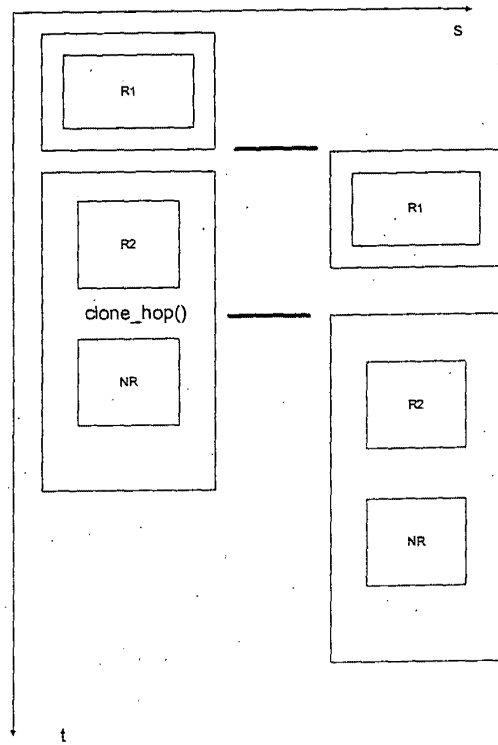


Fig. 5(a)

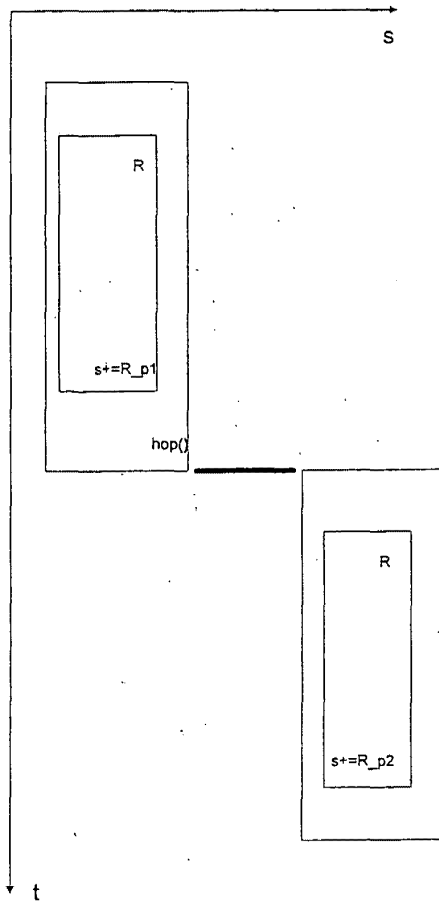


Fig. 5(b)

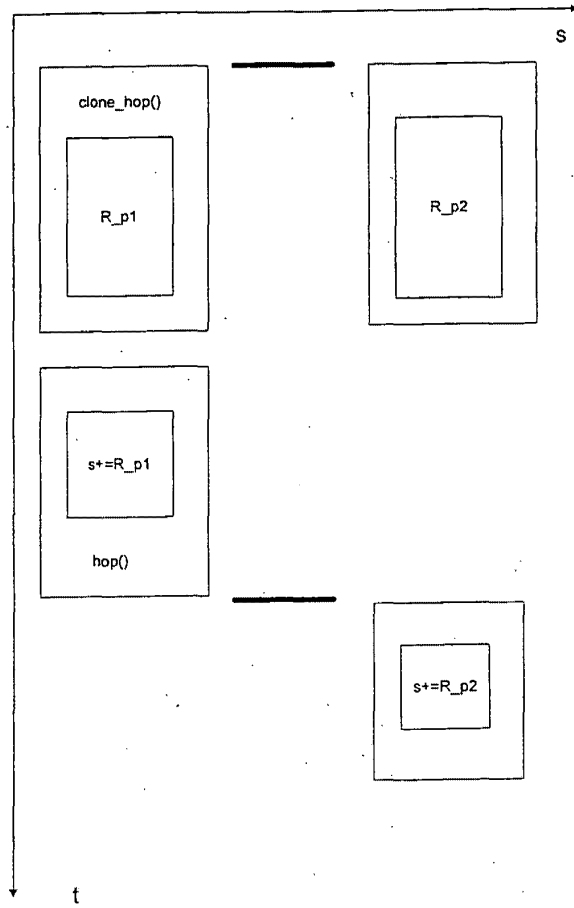


Fig. 6

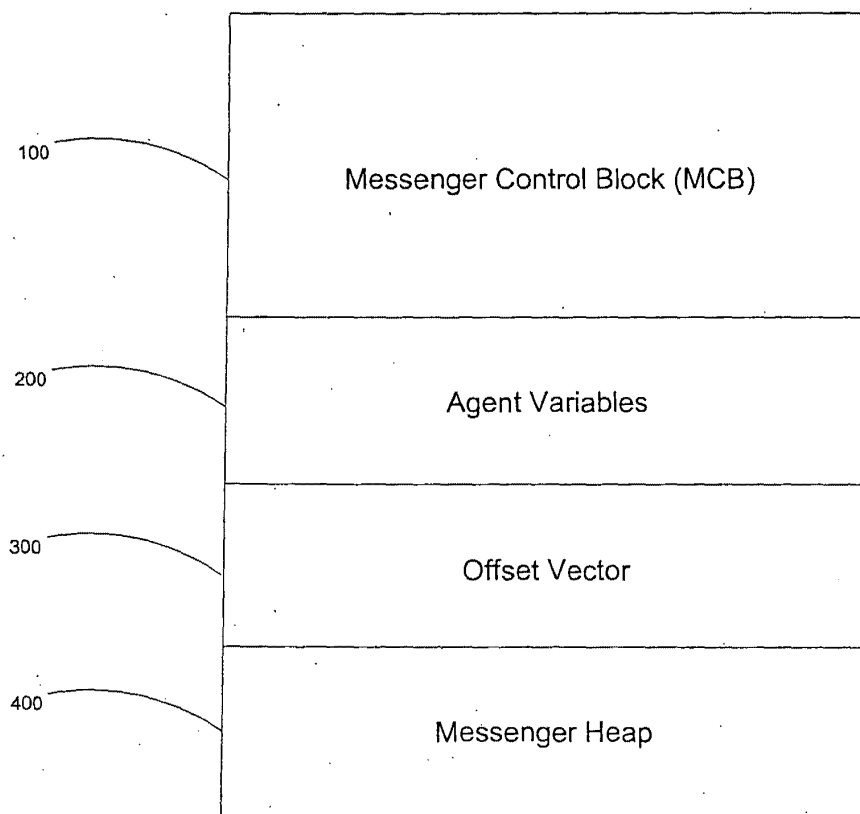


Fig. 7

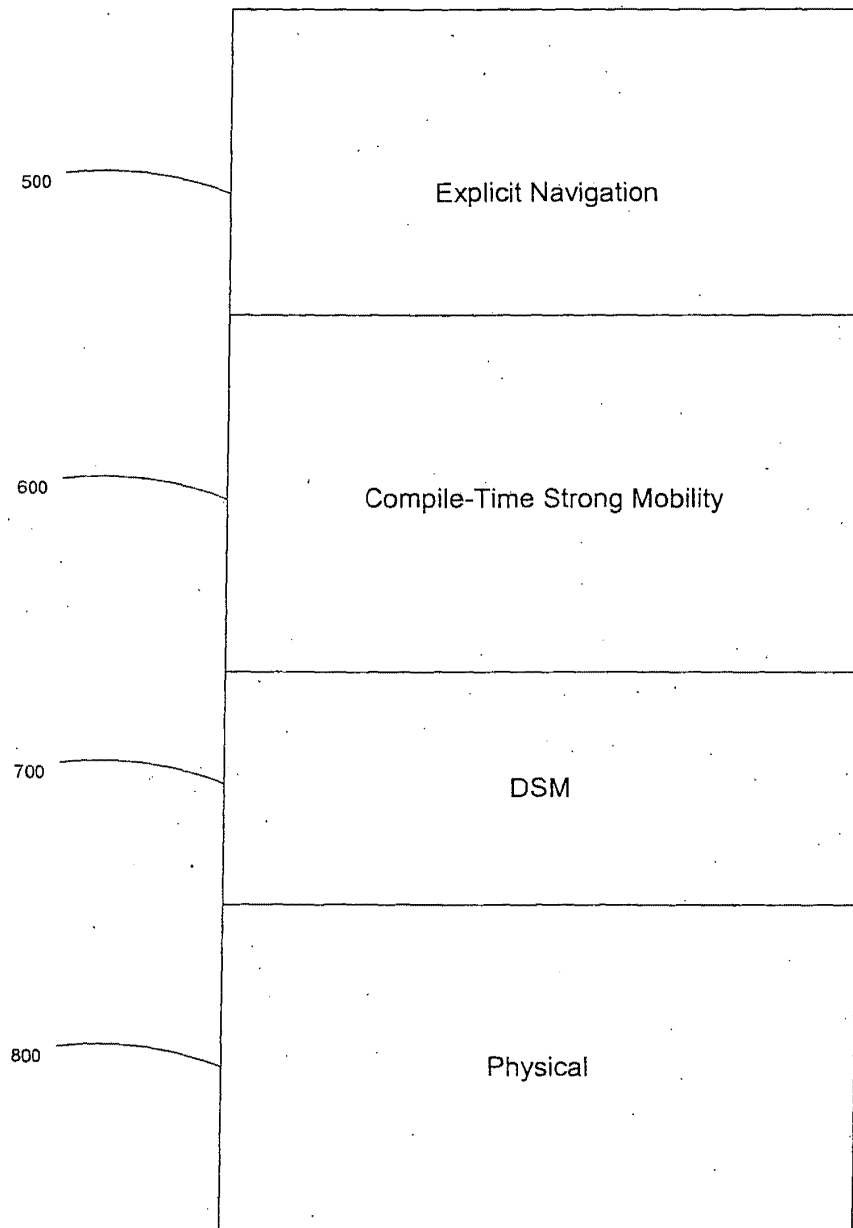
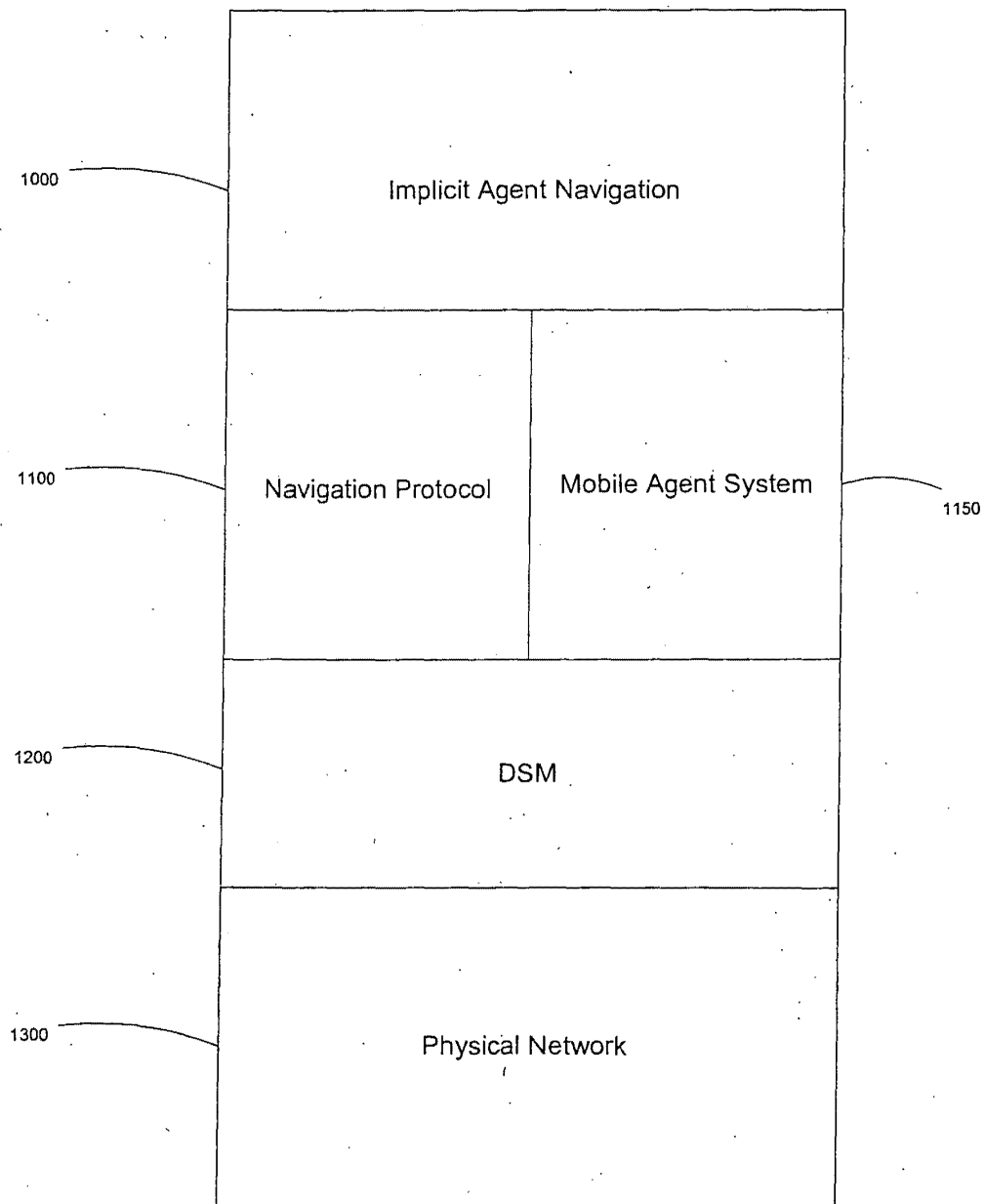


Fig. 8



PATENT APPLICATION FEE DETERMINATION RECORD
Effective October 1, 2003

Application or Docket Number

10850842

CLAIMS AS FILED - PART I

	(Column 1)	(Column 2)
TOTAL CLAIMS	25	
FOR	NUMBER FILED	NUMBER EXTRA
TOTAL CHARGEABLE CLAIMS	25 minus 20 =	5
INDEPENDENT CLAIMS	4 minus 3 =	1
MULTIPLE DEPENDENT CLAIM PRESENT ☐		

* If the difference in column 1 is less than zero, enter "0" in column 2

CLAIMS AS AMENDED - PART II

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT A	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	Minus	=
	Independent	Minus	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐		

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT B	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	Minus	=
	Independent	Minus	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐		

	(Column 1)	(Column 2)	(Column 3)
AMENDMENT C	CLAIMS REMAINING AFTER AMENDMENT	HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA
	Total	Minus	=
	Independent	Minus	=
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM ☐		

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
 ** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20."
 *** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3."
 The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

SMALL ENTITY TYPE ☐

OR OTHER THAN SMALL ENTITY

RATE	FEE
BASIC FEE	385.00
XS 9=	45
X43=	43
+145=	
TOTAL	473

RATE	FEE
BASIC FEE	770.00
XS18=	
X86=	
+290=	
TOTAL	

SMALL ENTITY

OR OTHER THAN SMALL ENTITY

RATE	ADDITIONAL FEE
XS 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
XS18=	
X86=	
+290=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
XS 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
XS18=	
X86=	
+290=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
XS 9=	
X43=	
+145=	
TOTAL ADDIT. FEE	

RATE	ADDITIONAL FEE
XS18=	
X86=	
+290=	
TOTAL ADDIT. FEE	

PATENT APPLICATION SERIAL NO. _____

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET

05/25/2004 AAD0FD1 00000057 150665 10850842

01 FC:2001	385.00 DA
02 FC:2201	43.00 DA
03 FC:2202	45.00 DA

PTO-1556
(5/87)

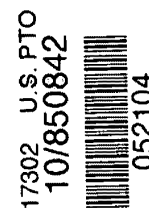
*U.S. Government Printing Office: 2002 — 489-267/66033



16805 U.S. PTO

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Lei Pan, Lubomir F. Bic and Michael B. Dillencourt
Title : Systems and Methods for Parallel Distributed Programming
Docket No. : 703538.4044
Customer No. : 34313



Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

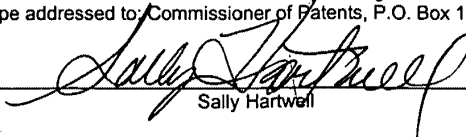
UTILITY PATENT APPLICATION TRANSMITTAL

1. Type of Application
This new application is for a(n)
☒ Utility (non provisional)
☐ Design
☐ Plant
2. ☒ Applicant claims small entity status. See 37 CFR 1.27
3. ☒ Specification, including Description, Claims and Abstract (Total Page: 26)
4. ☒ Drawing(s) (35 USC 113) (Total sheets 8)
5. Oath or Declaration
 - a. ☐ Newly executed (original or copy)
 - b. ☐ Copy from a prior application (37 CFR 1.63(d)) (for continuation/divisional with Box 18 completed)
 - i. ☐ Deletion of Inventors (Signed statement attached deleting inventors(s) named in the prior application.) See 37 CFR 1.63(d)(2) and 1.33(b).
6. ☐ CD-ROM or CD-R in duplicate, large table or Computer Program (Appendix)

CERTIFICATE OF MAILING
37 CFR §1.10

Date: May 21, 2004
Express Mailing Label No.: EV 314509508 US

I hereby certify that on the dated listed above, this paper (along with any paper referred to as being attached or enclosed) is being deposited with the United States Postal Service in accordance with 37 C.F.R. § 1.10 as "Express Mail Post Office to Addressee," with sufficient postage in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450.


Sally Hartwell

OC-130280.1

Applicant : Lei Pan et al.
Docket No. : 703538.4044

7. ☐ Nucleotide and/or Amino Acid Sequence Submission (if application, all necessary)
a. ☐ Computer Readable Form (CRF)
b. ☐ Specification Sequence Listing on:
i. ☐ CD-ROM or CD-R (2 copies); or
ii. ☐ Paper
c. ☐ Statement verifying identity of above copies
8. ☐ An assignment of the invention to _____
☐ is attached. A separate ☐ "COVERSHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.
☐ will follow.
9. ☐ Power of Attorney
10. ☐ 37 CFR 3.73(b) Statement (when there is an assignee) (Power of Attorney by Assignee)
11. ☐ English Translation Document (if applicable)
12. ☐ Information Disclosure Statement/PTO 1449 (or PTO/SB/08a)
☐ Copies of citations
13. ☐ Preliminary Amendment
14. ☒ Return Receipt Postcard (MPEP 503) (Should be specifically itemized)
15. ☐ Certified Copy of Priority Document(s) (if foreign priority is claimed)
16. ☐ Non-publication Request under 35 USC 122 (b)(2)(B)(i) (Applicant must attach form PTO/SB/35 or its equivalent)
17. ☐ Other

18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment or in an Application Data Sheet under 37 CFR 1.76:

☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application no. _____, filed _____.

Prior application information:

Examiner: _____ Group Art Unit: _____

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. This incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

052104

16805 U.S. PTO

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 Docket No. : 703538.4044

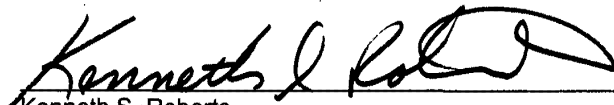
19. Fee Calculation: TOTAL AMOUNT OF PAYMENT: **\$464.00**
- A. ☒ The Commissioner is hereby authorized to charge indicated fees and credit any overpayments to Deposit Account No. 15-0665.
☒ Charge any additional fee required under 37 CFR 1.16 and 1.17 to Deposit Account No. 15-0665.
- B. ☐ Payment Enclosed
☐ Check ☐ Credit Card ☐ Money Order ☐ Other

BASIC FILING FEE:						\$770.00
Total Claims	25	-	20	=	4 x \$18.00	\$72.00
Independent Claims	4	-	3	=	1 x \$86.00	\$86.00
Multiple Dependent Claims	\$290	(if applicable)	☐			\$0.00
TOTAL OF ABOVE CALCULATIONS						\$928.00
Reduction by 1/2 for Filing by Small Entity. Note 37 CFR §§ 1.9, 1.27, 1.28. ☒						\$464.00
Extension of Time (from above)						\$0.00
Assignment -- \$40 (if applicable) ☐						\$0.00
TOTAL FEES SUBMITTED HERewith						\$464.00

- C. ☐ This application is being filed without fee or Declaration under 37 CFR §1.53.

20. Correspondence Address
☒ Customer Number. 34313

Respectfully submitted,


 Kenneth S. Roberts
 Registration No. 38,283

Dated: May 21, 2004

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