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- (71) Applicant (for all designated States except US): RE-GENTS OF THE UNIVERSITY OF MINNESOTA [US/US]; 450 McNamara Alumni Center, Minneapolis, MN 55455-2070 (US).
- (72) Inventor; and
- (75) Inventor/Applicant (for US only): GEORGOPOULOS, Apostolos, P. [US/US]; 1735 Morgan Avenue South, Minneapolis, MN 55405 (US).
- (74) Agents: BRAGINSKY, Vadim et al.; Patterson, Thuente, Skaar & Christensen, P.A., 4800 IDS Center, 80 South Eighth Street, Minneapolis, MN 55402-2100 (US).

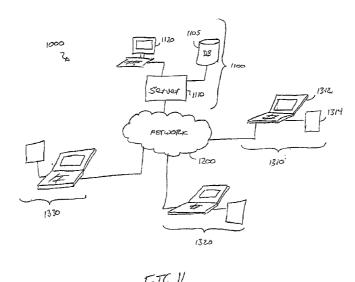
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(57) Abstract: A set of brain data representing a time series of neurophysiologic activity acquired by spatially distributed sensors arranged to detect neural signaling of a brain (such as by the use of magnetoencephalography) is obtained. The set of brain data is processed to obtain a dynamic brain model based on a set of statistically-independent temporal measures, such as partial cross correlations, among groupings of different time series within the set of brain data. The dynamic brain model represents interactions between neural populations of the brain occurring close in time, such as with zero lag, for example. The dynamic brain model can be analyzed to obtain the neurophysiologic assessment of the brain. Data processing techniques may be used to assess structural or neurochemical brain pathologies.



#### INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER INV. A61B5/04 A61B5/04 ADD. G06F19/00 According to International Patent Classification (IPC) or to both national classification and IPC **B. FIELDS SEARCHED** Minimum documentation searched (classification system followed by classification symbols) A61B : G06F G06K Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data C. DOCUMENTS CONSIDERED TO BE RELEVANT Citation of document, with indication, where appropriate, of the relevant passages Relevant to claim No. X US 2002/055675 A1 (LLINAS RODOLFO [US] ET 1-109AL LLINAS RODOLFO R [US] ET AL) 9 May 2002 (2002-05-09) paragraph [0047] - paragraph [0114] X US 6 195 576 B1 (JOHN ERWIN ROY [US]) 1-109 27 February 2001 (2001-02-27) column 5, line 40 - column 14, line 40 EP 0 355 506 A (SIEMENS AG [DE]) 1,34,53, 28 February 1990 (1990-02-28) 64,90, 106-109 the whole document US 4 736 751 A (GEVINS ALAN S [US] ET AL) A 1,34,53, 12 April 1988 (1988-04-12) 64,90, 106-109 the whole document Further documents are listed in the continuation of Box C. See patent family annex. Special categories of cited documents: "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the A document defining the general state of the art which is not considered to be of particular relevance invention earlier document but published on or after the international "X" document of particular relevance; the claimed invention filing date cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document referring to an oral disclosure, use, exhibition or document is combined with one or more other such docu-ments, such combination being obvious to a person skilled other means document published prior to the international filing date but later than the priority date claimed "&" document member of the same patent family Date of the actual completion of the international search Date of mailing of the international search report 20 June 2008 1 02/07/2008 **Authorized officer** Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016 Hooper, Martin

### INTERNATIONAL SEARCH REPORT

information on patent family members

International application No PCT/US2007/015545

Patent document cited in search report			Publication date	Patent family member(s)		. 1	Publication date
US 200	2055675	A1	09-05-2002	NONE		,	
US 619	5576	B1	27-02-2001	NONE			
EP 035	5506	Α	28-02-1990	JP JP US	2082941 2694737 4974602	B2	23-03-1990 24-12-1997 04-12-1990
US 473	6751	A	12-04-1988	DE EP JP WO	3741874 0524170 63226340 9202176	A1 A	14-07-1988 27-01-1993 21-09-1988 20-02-1992