

小特集 「人工知能研究者のためのインターネット活用術」

インターネットを利用した情報探索入門

Introduction to Internet Resource Searching

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1. はじめに

刻々と変化する世界中の情報を迅速に収集する能力は現代の日常生活に不可欠であるばかりか、学術研究、企業の開発・研究の明暗を分ける大きなかぎである。電子化図書館やデータベースにアクセスすることによって、関連分野の研究をほぼもれなく調べることができる。今回はインターネットを利用した無料の情報探索の初歩と有料のインターネット情報探索を比較しながら紹介する*。まず手始めに、無料の米国の国会図書館を紹介する。次に OCLC が供給する有料の WorldCat データベース、CARL が提供する無料の Uncover ジャーナルデータベース、OCLC が供給する有料の INSPEC などを紹介する。

2. 米国の国会図書館へのアクセス

米国の国会図書館の IP は locis.loc.gov であるので、telnet locis.loc.gov と入力する。すると次のような画面がでてくる。

```

L O C I S : LIBRARY OF CONGRESS INFORMATION SYSTEM
To make a choice: type a number, then press ENTER

1 Library of Congress Catalog          4 Braille and Audio
2 Federal Legislation                  5 Organizations
3 Copyright Information                 6 Foreign Law
7 Searching Hours and Basics           8 Documentation and Classes
9 Library of Congress General Information
10 Library of Congress Past Facts
11 * * Announcements * *      New Interface for Some Files]
12 Comments and Logoff
Choice: 1

```

* comp.internet.library moderator/founder usenetのmoderated ニュースグループでインターネット上の電子図書館に関する情報を 1992 年より提供している。

そこで 1 を選択すると次の画面がでてくる。

```

LIBRARY OF CONGRESS CATALOG
CHOICE FILE
1 BOOKS: English language books 1968-, French 1973-, German, LOCI
  Portuguese, Spanish 1975-, other European languages 1976-77,
  non-European languages 1978-79. Some microforms 1984-.
2 BOOKS earlier than the dates above. Some serials, maps, PREM
  music, audiovisual items.
3 Combination of files 1 and 2 above (LOCI and PREM).
4 SERIALS cataloged at LC & some other libraries since 1973. LOCS
5 MAPS and other cartographic items (except atlases) cataloged LOCM
  at LC 1968- and some other research libraries 1985-.
6 SUBJECT TERMS and cross references form LC Subject Headings. LCXR
  NOTE: Choices 1,4, and 5, depending on commands used, also
  include ALL catalog files. See HELP screens.
12 Return to LOCIS MENU screen.
Choice: 3

```

ここで 3 を選択して artificial life に関する本をさっそく探してみる。

READY FOR NEW COMMAND: artificial life

次に artificial life と入力すると次の 3 冊が見つかった。

```

ITEMS 1-2 OF 3          SET 1: BRIEF DISPLAY          FILE: LOCI
                      (DESCENDING ORDER)
1. 92-50600: Levy, Steven. Artificial life : a report from the frontier where
  computers meet biology / 1st Vintage Books ed. New York : Vintage Books,
  1993. viii, 390 p. : ill. (some col.) ; 21 cm.
  NOT IN LC COLLECTION
2. 91-50749: Levy, Steven. Artificial life : the quest for a new creation /
  1st ed. New York : Pantheon Books, c1992. viii, 390 p. : ill. (some
  col.) ; 25 cm.
  LC CALL NUMBER: QA76.87 .L49 1992
3. 89-203979: Interdisciplinary Workshop on the Synthesis and Simulation of
  Living Systems (1987 : (Los Alamos, N.M.) Artificial life : the
  proceedings of an Interdisciplinary Workshop on the Synthesis and
  Simulation of Living Systems, held September, 1987, in Los Alamos, New
  Mexico / Redwood City, Calif. : Addison-Wesley Pub. Co., Advanced Book
  Program, c1989. xxix, 655 p., [10] p. of plates : ill. (some col.) ; 25 cm.
  LC CALL NUMBER: QH324.2 .I55 1987

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3. WorldCat データベースへのアクセス

ここで、有料のデータベース WorldCat を使って米国の国会図書館と比較検討してみる。11世紀から現在

に至る約3000万冊に及ぶWorldCatのデータベースを用いて artificial life に関する本を探してみる。WorldCatはOCLCが供給する世界最大の本や博士論文のデータベースである。ちなみにOCLCは数テラバイトのデータベースを供給する非営利団体である。

WorldCatで著者、サブジェクト、タイトル検索のいずれかのサーチが次のように簡単にできる。

SEARCH	DESCRIPTION	EXAMPLES
Subject	Type the label SU: and a word(s). (Subject headings and titles)	su:criticism su:freedom of speech
Author	Type the label AU: and the author name or any part of the name.	au:hemingway au:saul bellow
Title	Type the label TI: and the title or any word(s) in the title.	ti:estuary ti:love in the asylum

ここで artificial life のタイトル検索を試みる。

SEARCH WORD(S) (or Action): ti:artificial life

ti: artificial life と入力すると、検索の結果は次に示すように120冊の本が見つかった。

NO.	TITLE	AUTHOR	YEAR
1	Artificial life IV : proceedings of the F...	International W	1994
2	Genetische Kunst--kustliches Leben /	Ars Electronica	1993
3	Physical chemistry of living tissues and ...	Beutner, R.	1933
4	Artificial life and virtual reality /		1994
5	Artificial life explorer's kit /	Thro, Ellen.	1993
6	Artificial life : the proceedings ...		1987
7	Genesis redux : experiments creating arti...	Rietman, Edward	1993
8	The life cycle of Haemolaelaps casalis (B...	Maiello, Daniel	1959
9	The Artificial life route to artificial li...		1994
10	Artificial life III : proceedings of the ...	Artificial Life	1994
11	Windows hothouse : creating artificial li...	Clarkson, Mark	1994
12	Artificial life : the quest for a new cre...	Levy, Stephen,	1992
13	The garden in the machine : the emerging ...	Emmeche, Claus,	1994
14	Adventures in artificial life /	Walnum, Clayton	1993
15	Artificial life explorer's kit /	Thro, Ellen.	1993
16	Creating artificial life self-organization /	Rietman, Ed.	1993
17	Artificial life lab /	Rucker, Rudy v.	1993
18	The artificial production of the partheno...	Shull, A. Frank	
19	Artificial life II : proceedings of the W...	Workshop on Art	1992
20	Artificial life : the quest for a new cre...	Levy, Stephen,	1992
21	Genesis redux : experiments creating arti...	Rietman, Ed.	1994
22	Artificial life playhouse : evolution at ...	Prata, Stephen.	1993
23	Artificial life : a report from the front...	Levy, Steven.	1993
24	Artificial life II video proceedings /		1992
25	Artificial life II video proceedings /		1992
26	Creating artificial life : self-organizat...	Rietman, Ed.	1993
27	The Peel session (21st November 1977)	Ultravox (Music	1977
28	Artificial life.		1994
29	The great want of modern life, entirely p...	Whitman, Walt,	1913
30	Artificial organs : proceedings, XIIIth a...	European Societ	1986
31	Animal life in a small, intermittent, art...	Shaw, Frank,	1947
32	Controlled ecological life support system...		1989
33	Dinners and dinner parties; or, The absur...	Vincent, George	1862
34	Life sciences and space research XXIV(4) ...	COSPAR.	1992
35	Toward a practice of autonomous systems ...	European Confer	1992
36	Life span and reasons of disposal of sire...	Roman, Jorge,	1966
37	Artificial life : the quest for a new cre...	Levy, Steven.	1992
38	Evolution as a theme in artificial life: ...		1990
39	Dinners and dinner-parties, or, The absur...		1862
40	Artificial life : the proceedings of an I...	Interdisciplina	1989
41	Energy	Operation Ivy (1990
42	Life expectancy of retroreflective sheeti...	Horner, R. S.	1990
43	Artificial life II : proceedings of the W...		1992
44	Philosophical principles of universal che...	Stahl, Georg Er	1900
45	The vegetable system. Or, the internal st...	Hill, John,	1772
46	Studying artificial life with cellular au...	Langton, Christ	1987
47	Vegetable system, or, the internal struct...	Hill, John,	1764
48	Studying artificial life with cellular au...	Langton, Christ	1986
49	The vegetable system, or, The internal st...	Hill, John,	1765
50	The effect of anxiety and attributions to...	Strong, LeeRoy,	1989
51	Artificial aging as a predictor of paper?...	Bansa, Helmut.	1989
52	Life sciences and space research XXIII(3)...	COSPAR.	1989
53	Intoxication : life in pursuit of artific...	Siegel, Ronald	1989
54	Philosophical principles of universal che...	Stahl, Georg Er	1730
55	On the principles and exact conditions to...	Cheadle, Walter	1892
56	Common sense on chronic diseases; or, A r...	Banning, Edmund	1846
57	Artificial satellite life duration in nea...	Vincent, Thomas	1960
58	Intoxication : life in pursuit of artific...	Siegel, Ronald	1989

59	Working Group on the Artificial Prolongat...	Working Group o	1986
60	Knowledge based simulation : an artificia...	Fox, Mark,	1988
61	Working Group on the Artificial Prolongat...	Working Group o	1986
62	The complete vegetable system, or, The int...	Hill, John,	1824
63	On the principles and exact conditions to...	Cheadle, Walter	1896
64	The vegetable system; or, The internal st...	Hill, John,	1761
65	On the principles and exact conditions to...	Cheadle, Walter	1902
66	Religion and artificial reproduction : an...	Shannon, Thomas	1988
67	Introduction and artificial breathing		1977
68	Artificial limbs give new lease on life /	Ghert, Renee.	1987
69	On the principles and exact conditions to...	Cheadle, Walter	1894
70	Vulcanite rubber artificial limbs, arms a...	Kimball and Com	1864
71	Common sense on chronic diseases; or, A r...	Banning, Edmund	1846
72	Electricity, or ethereal fire, considered...	Gale, T.	1802
73	Electricity, or ethereal fire, considered...	Gale, T.	1802
74	Dragon flies vs. mosquitoes; can the mosq...		1890
75	Facts about artificial sunlight; light, ha...	Hopewell-Ash, E	1925
76	Facts about artificial sunlight; light, ha...	Hopewell-Ash, E	1927
77	On the principles and exact conditions to...	Cheadle, Walter	1906
78	On the principles and exact conditions to...	Cheadle, Walter	1889
79	Jinko seimei jidai The era of artificial ...	Noguchi, Katsu.	1960
80	Reporter on human reproduction and the la...		1971
81	The antidote: or, The preservative of heal...	Pitt, Rob.,	1704
82	The Artificial heart : life, technology, ...		1985
83	Electricity, or ethereal fire, considered...	Gale, T.	1802
84	Common sense on chronic diseases, or, A r...	Banning, E. P.	1844
85	Artificial feeding of infants; the proper...	Cheadle, W. B.	1902
86	Respiratory failure : prolonged artificia...		1971
87	Philosophical principles of universal che...	Stahl, Georg Er	1730
88	ESAO proceedings /	European Societ	1982
89	Artificial respiration/basic cardiac life...		1983
90	Light in daily life : a manual treating na...	Dow, John Stewa	1939
91	A dictionary of the Holy Bible : containi...	Brown, John,	1806
92	Philosophical principles of universal che...	Stahl, Georg Er	1730
93	Life support systems : the journal of the...		1983
94	Advanced life support program.		1975
95	On the use of artificial respiration and ...	Brunton, Thomas	1873
96	Panzeooruktologia romanized form, sive, P...	Lovell, Robert,	1661
97	Common sense on chronic diseases : or, A ...	Banning, E. P.	1848
98	Electricity, or, Ethereal fire considered...	Gale, T.	1802
99	Life under glass. Containing suggestions ...	Shove, George A	1874
100	Who should play God? : The artificial cre...	Howard, Ted.	1977
101	Investigations pertaining to Texas beek...		1913
102	Who should play God? : The artificial cre...	Howard, Ted.	1980
103	Life support techniques in intensive care...		1975
104	Common sense on chronic diseases : or, a ...	Banning, Edmund	1848
105	Life cycle and artificial inoculation of ...	Whitney, M. G.	1972
106	The early life history and ecology of six...	Thomas, David L	1971
107	Iskusstvennye i estestvennye radionuklidy...	TSytsugina, Vik	1973
108	The effect of natural and artificial quin...	Cohick, Albert	1968
109	Ecology and early life history of striped...	Bason, William	1971
110	Mnemonics : or, The new science of artifi...	Dwight, Theodor	1844
111	Who should play God? the artificial creat...	Howard, Ted.	1977
112	Philosophical principles of universal che...	Stahl, Georg Er	1730
113	The snowshoe hare : its life history and ...	Severaid, Joye	1942
114	Who should play God? : The artificial cre...	Howard, Ted.	1977
115	The future of fishing and fish life as re...	Cooper, Gerald	1964
116	Artificial and natural radionuclides in m...	TSytsugina, Vik	1975
117	Fisherman's lures and game-fish food, wit...	Rhead, Louis,	1920
118	Dragon flies vs. mosquitoes. Can the mosq...		1890
119	Physical chemistry of living tissues and ...	Beutner, R.	1933
120	The vegetable system; or, The internal st...	Hill, John,	1900

次に示す Record 79 の内容を見て驚いたのだが、野口氏は1960年になんと“人工生命時代”と題して日本語本を出版していたことがわかった。

ACCESSION: 14622190
AUTHOR: Noguchi, Katsu.
TITLE: [Jinko seimei jidai]
[The era of artificial life.
PLACE: Tokyo.
PUBLISHER: Rironsha,
YEAR: 1960
PUB TYPE: Book
FORMAT: 201 p. ill.
SERIES: Minna shiritai nyumon shirizu
SUBJECT: Biogenesis -- popular works.
Biology -- popular works.
LIBRARIES: MD nlm

4. Uncover ジャーナルデータベースへのアクセス

無料のUncover ジャーナルデータベースを用いて、knowledge, discovery, database の三つのキーワードを使って関連論文を調べてみる。Uncover は4000以

上のジャーナルデータベースで、有料のファクスサービスも提供している。下に示すように著者、サブジェクト、タイトル検索が可能である。

```
Enter N for NAME search
W for WORD search
B to BROWSE by journal title
QS for QUICKSEARCH information
S to STOP or SWITCH to another database
Type the letter for the kind of search you want,
and end each line you type by pressing <RETURN>
```

W を選択して knowledge, discovery, database の三つのキーワードを使って探索してみた結果を次に示す。

```
WORKING...
KNOWLEDGE 8485 ITEMS UnCover
KNOWLEDGE + DISCOVERY 37 ITEMS
KNOWLEDGE + DISCOVERY + DATABASE 1 ITEM

1 Platetsky shapiro g (The Knowledge engineering review.... 03/01/94)
Knowledge discovery in database: progress report.
AUTHOR(s): Platetsky-Shapiro, Gregory
TITLE(s): Knowledge discovery in database: Progress report.

In: The Knowledge engineering review.
MAR 01 1994 v 9 n 1
Page: 57
SICI Code: 0269-8899(19940301)9:1L:57:KDD;1-
This article may be available in your library, at no cost to you. To have
it faxed from UnCover, the following charges apply:
Service Charge: $ 8.50
Fax Surcharge: $ .00
Copyright Fee: $ 5.25
-----
Total Delivery Cost: 13.75
```

ここで 13.75 ドル払えばファクスサービスが受けられるようである。

5. Uncover ジャーナルデータベースへのアクセス

有料である OCLC の INSPEC ジャーナルデータベースを使って同様の論文検索を試みる。

```
SEARCH WORD(S) (or Action): su:knowledge discovery database
Searching for su:knowledge discovery database
```

su: knowledge, discovery, database という検索の結果、なんと 58 編の論文が見つかった。

NO.	TITLE	AUTHOR	YEAR
1	Intelligent information systems	Golshani, F.	1993
2	Knowledge discovery in databases: an attri...	Jiawei Han	1992
3	Proceedings of 18th International Conferen...	Li-Yan Yuan	1992
4	Application of a deductive database system...	Satou, K.	1994
5	Layered knowledge chunks for database infe...	Hinke, T.H.	1994
6	Proceedings of the Twenty-Seventh Annual H...	Hunter, L.	1994
7	Interestingness of criteria for results ev...	Gebhardt, F.	1994
8	Discovering concept clusters by decomposin...	Ning Zhong	1994
9	Induction of meta-knowledge about knowledg...	Gaines, B.R.	1993
10	A framework for knowledge discovery and ev...	Yoon, J.P.	1993
11	From data properties to evidence	Bell, D.A.	1993
12	Abstract-driven pattern discovery in datab...	Dhar, V.	1993
13	Database mining: a performance perspective	Agrawal, R.	1993
14	Efficient deduction and induction: key to ...	Han, J.	1993
15	Mining for financial knowledge with CBR	Buta, P.	1994
16	Recognition of functional dependencies in ...	Zembowicz, R.	1993
17	A stochastic approach to genetic informati...	Konagaya, A.	1993
18	Integrated support for data archaeology	Brachman, R.J.	1993
19	ANA: automatic natural acquisition	Enguehard, C.	1993
20	ProloGA: a Prolog implementation of a gene...	Medsker, C.	1993
21	Knowledge discovery for evolutionary systems	Yoon, J.P.	1992
22	Knowledge discovery in very large database	Nishio, S.	1993
23	SIGMOD '93. 1993 ACM SIGMOD. International...		1993
24	Studies in managerial problem formulation ...	Courtney, J.F.	1993
25	Semiformal representations in hypermedia f...	Russell, D.M.	1993
26	Data-driven discovery of quantitative rule...	Han, J.	1993
27	Knowledge discovery in databases: an overview	Frawley, W.J.	1992

28	Database structure and discovery tools for...	Mauri, P.	1992
29	Knowledge extraction from databases: desig...	Kaufman, K.A.	1991
30	Discovery of conceptual categories in an i...	Raghavan, V.V.	1991
31	EFD: a hybrid knowledge/statistical-based ...	Major, J.A.	1992
32	Knowledge discovery workbench for explorin...	Piatetsky-Shapi	1992
33	Problems for knowledge discovery in databa...	Klogsen, W.	1992
34	Visualization for knowledge discovery	Grinstein, G.	1992
35	Discovering functional and inclusion dependen...	Kantola, M.	1992
36	Knowledge discovery from historical data: ...	Lynch, K.J.	1991
37	The Super Database Computer (SDC): system ...	Kitsuregawa, M.	1991
38	Network management using database discover...	Gerla, M.	1991
39	Knowledge discovery as a threat to databas...	O'Leary, D.E.	1991
40	Discovery of medical diagnostic informatio...	McLeish, M.	1991
41	Automating the discovery of causal relatio...	Long, J.M.	1991
42	Rule discovery for query optimization	Siegel, M.	1991
43	Using functions to encode domain and conte...	Frawley, W.J.	1991
44	Learning useful rules from inconclusive data...	Uthurusamy, R.	1991
45	Information discovery through hierarchical...	Chiu, D.K.Y.	1991
46	Knowledge discovery in databases: an overview	Frawley, W.J.	1991
47	Knowledge discovery in databases	Piatetsky-Shapi	1991
48	Striking a balance: benefit and risk in ma...	Berry, R.J.	1992
49	Learning in relational databases: an attri...	Cai, Y.	1991
50	A computerised sentencing information syst...	Chan, J.B.L.	1991
51	Acquisition of semantic information from a...	Calzolari, N.	1989
52	Discovery of quantitative rules from large...	Han, J.	1990
53	Reactor diagnostics rule generation throug...	Reifman, J.	1990
54	PLATYPUS: inheritance and scientific disco...	Ghormley, R.E.	1990
55	Learning for the adaptive control of large...	Gao, Z.	1989
56	Logical decision rules for automatic disco...	Lbov, G.S.	1989
57	Interactive graphics: linking the human to...	Ganter, J.H.	1988
58	Optical disc technology in the transmissio...	Beltrame, F.	1987

6. その他の OCLC データベースへのアクセス

40 余りの OCLC が供給するデータベースを次に示す。インターネットを介してのそれらへの unlimited アクセスは 1 年間で約 1,500 万円である。

NO.	DATABASE	DESCRIPTION
1	A&H Search	Arts & Humanities Search. A citation index.
2	AGRICOLA	Materials relating to all aspects of agriculture.
3	ApplSciIndex	Applied science and technology literature.
4	ArtIndex	Leading publications in the world of the arts.
5	BioDigest	Non-technical digests in biology, ecology & health.
6	BiographyInd	Guide to wide range of biographical material.
7	BiolAgrIndex	Leading publications in agriculture and biology.
8	BIOSIS/FS	A wide range of bioscience topics.
9	BookRevDigt	Reviews of fiction and nonfiction books.
10	BusinessNews	Daily news and information from 350 sources.
11	BusinessOrgs	Organizations that serve business and industry.
12	BusPerInd	Popular business magazines.
13	EducationInd	Leading publications in the field of education.
14	Encyclopedia	Concise Columbia Electronic Encyclopedia.
15	EngIndex/FS	Concise Engineering and Technology Index.
16	EventLine	Scheduled conventions, exhibits, etc., worldwide.
17	GenSciIndex	Leading general science periodicals.
18	HumanitiesIn	An index of articles in the humanities.
19	INSPEC	The database for physics, electronics and computing.
20	LibraryLit	Materials on libraries and librarianship.
21	MDX Health	Digest of medical and health information.
22	MicrocompAbs	Microcomputer Abstracts.
23	MLA	Literature, languages, linguistics, folklore.
24	NewsAbs	Newspaper Abstracts. From over 25 newspapers.
25	PAIS Decade	Materials on public affairs (most recent 10 years).
26	PerAbs	Periodical Abstracts. From over 1,500+ journals.
27	PsycFIRST	Psychology abstracts from over 1300 journals.
28	ReadersGuide	Readers' Guide to Periodical Literature.
29	ReadGuideAbs	Abstracts of articles from popular magazines.
30	SocioAbs	Abstracts of articles on all aspects of sociology.
31	SocSciInd	Guide to the literature of the social sciences.
32	WilBusAbs	Leading English-language business periodicals.
33	Worldscope	Financial reports on companies worldwide.

その他の便利な OCLC データベースを下に示す。

NO.	DATABASE	DESCRIPTION
1	WorldCat	Books and other materials in libraries worldwide.
2	Article1st	Index of articles from over 8,500 journals.
3	Contents1st	Table of contents of more than 8,500 journals.
4	ConsumerIndx	An index of articles providing consumer information.
5	Disclosure	Financial reports on publicly owned companies.
6	ERIC	Journal articles and reports in education.
7	FactSearch	Facts and statistics on topics of current interest.
8	GPO	U.S. government publications.
9	MEDLINE	Abstracted articles from medical journals.

7. World Wide Web(例えば Mosaic など)上の強力なインターネット探索ツール: Jughead

Mosaic などを使ってインターネット上の無数のデータベースの探索がキーワードで簡単に行える。ここでは無料の Jughead データベースを用いて一つの探索例を紹介する。Jughead データベースにキーワードを与えるだけでキーワードに関連する複数のデータベースを見つけだすことができる。Mosaic の URL に (gopher://liberty.uc.wlu.edu: 3002/7) の入力を行い、patent というキーワードを用いて探索を行った結果を示す。

```
ees_patent_buyoff.article [gopher.eff.org]
Patent [gopher.eff.org]
Patent and Copyright Committee [ns.ac.edu]
Patent and Trademark Office [ming.law.vill.edu]
Patent Cooperation Treaty; with Regulations (1970) [gopher.law.cornell.edu]
Patent Law [gopher.law.cornell.edu]
Patent Office Reform Panel Final Report [wiretap.spies.com]
Patent Regulatory Proceedings (USPTO) [ming.law.vill.edu]
Software Patent Files [path.net]
Software_patent [gopher.eff.org]
U.S. Copyright and Patent Information [count51.med.harvard.edu]
U.S. Patent and Trademark Office [town.hall.org]
U.S. Patent and Trademark Office Information [bairn.gslis.ucla.edu]
US Patent Office Info [usa.net]
Virginia Federal Documents and Patent Depository Libraries [gopher.lib.virginia:]
$25 Patent Bundle [marketplace.com]
Keyword Search of the U.S. Patent and Trademark Office Data [town.hall.org]
Patent Information (Washington and Lee University) [liberty.uc.wlu.edu]
patent-sampler.src [pixie.gatech.edu]
(patent-sampler.src at cnms-moon.think.com) [saturn.soils.umn.edu]
中略
Search the European Patent Office database (Finland) [finsun.csc.fi]
Search the Patent Cooperation Treaty [gopher.law.cornell.edu]
Search U.S. Patent Data, 1994- [liberty.uc.wlu.edu]
Search U.S. Patent Database 1994- [liberty.uc.wlu.edu]
U.S. Patent applications [jupiter.cc.gettysburg.edu]
U.S. Patent Database 1994- [liberty.uc.wlu.edu]
U.S. Patents, Sample of Patent Applications [liberty.uc.wlu.edu]
Patent Act (WWW) [fatty.law.cornell.edu]
Patent Act (WWW character mode) [www.law.cornell.edu]
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ここで、URL 入力が gopher://town.hall.org/11/patent を用いて、具体的に“neural network”というキーワードで関連 patent を探索した、その結果を次に示す。

```
05282261: Neural network process measurement and control
05285297: Apparatus, and method for color calibration
05317676: Apparatus and method for facilitating use of a neural network
05317676: Apparatus and method for facilitating use of a neural network
05321795: Pattern association central subsystem and a perception learning system
05303328: Neural network system for determining optimal solution
05278945: Neural processor apparatus
05305235: Monitoring diagnosis device for electrical appliance
05295227: Neural network learning system
05276771: Rapidly converging projective neural network
05295197: Information processing system using neural network learning function
05303330: Hybrid multi-layer neural networks
05311421: Process control method and system for performing control of a controll
05325464: Pyramid learning architecture neurocomputer
05325464: Pyramid learning architecture neurocomputer
05276773: Digital neural network executed in integrated circuit technology
05285523: Apparatus for recognizing driving environment of vehicle
05309525: Image processing apparatus using neural network
05285522: Neural networks for acoustical pattern recognition
05287430: Signal discrimination device using neural network
05297232: Wireless neural network and a wireless neural processing element
05293457: Neural network integrated circuit device having self-organizing functi
05305204: Digital image display apparatus with automatic window level and windo
05313558: System for spatial and temporal pattern learning and recognition
05278755: Method for determining image points in object images using neural
05293456: Object recognition system employing a sparse comparison neural networ
05283418: Automated rotor welding processes using neural networks
05319737: Network structure for path generation
05308915: Electronic musical instrument utilizing neural net
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05283855: Neural network and method for training the neural network
05305250: Analog continuous-time MOS vector multiplier circuit and a programabl
05325862: Method and/or system for personal identification and impairment
05319722: Neural network for character recognition of rotated characters
05317675: Neural network pattern recognition learning method
05285524: Neural network with daisy chain control
05293453: Error control codeword generating system and method based on a neural
05283838: Neural network apparatus
05299269: Character segmentation using an associative memory for optical charact
05276772: Real time adaptive probabilistic neural network system and method for
Query Report for this Search
```

05303328: Neural network system for determining optimal solution の内容の一部を下に示す。

-----BEGIN PRIVACY-ENHANCED MESSAGE-----

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Proc-Type: 2001,MIC-CLEAR
Originator-Name: keymaster@town.hall.org
Originator-Key-Asymmetric:
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PATN Patent Bibliographic Information

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WKU Patent Number: 05303328
SRC Series Code: 7
APN Application Number: 7820976
APT Application Type: 1
ART Art Unit: 238
APD Application Filing Date: 19911024
TTL Title of Invention: Neural network system for determining opti
ISD Issue Date: 19940412
NCL Number of Claims: 25
ECL Exemplary Claim Number: 1
EXA Assistant Examiner: Doans; Robert W.
EXP Primary Examiner: Fleming; Michael R.
NDR Number of Drawings Sheets: 18
NFG Number of Figures: 29
```

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COD Assignee Type Code: 03
```

PRIR Foreign Priority

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CNT Priority Country: JFX
APD Priority Application Date: 19901024
APN Priority Application Number: 2-284236
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CLAS Classification

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OCL Original U.S. Classification: 395 23
XCL Cross Reference Classification: 395 11
XCL Cross Reference Classification: 395 22
EDF International Classification Edition Field: 5
ICL International Classification: G06F 1518
FSC Field of Search Class: 395
FSS Field of Search Subclass: 23;22
```

OREF Other Reference

Hopfield et al., "Neural Computation of Decisions in Optimization Problems", Biological Cybernetics 52, 1985, 141-152.

Kirkpatrick et al., "Optimization by Simulated Annealing" Science, 220(4598), 1983, 671-680.

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Bilbro et al., "Optimization by Mean Field Annealing", Advances in Neural Info. Proc. Syst. 1, 1989, 91-98.

LREP Legal Information
FRM Legal Firm: Antonelli, Terry, Stout & Kraus

ABST Abstract

A neural network system includes an input unit, an operation control unit, a parameter setting unit, a neural network group unit, and a display unit. The network group unit includes first and second neural networks. The first neural network operates according to the mean field approximation method to which the annealing is added, whereas the second neural network operates in accordance with the simulated annealing. Each of the first and second neural networks includes a plurality of neurons each connected via synapses to neurons so as to weighting outputs from the neurons based on synapse weights, thereby computing an output related to a total of weighted outputs from the neurons according to an output function. The parameter setting unit is responsive to a setting instruction to generate neuron parameters including synapse weights, threshold values, and output functions, which are set to the first neural network and which are selectively set to the second neural network. The operation control unit responsive to an input of a problem analyzes the problem and then generates a setting instruction based on a result of the analysis to output the result to the parameter setting unit. After the neuron parameters are set thereto, in order for the first and second neural network to selectively or to iteratively operate, the operation control unit controls operations of computations in the network group unit in accordance with the analysis result and then presents results of the computations in the network group unit on the display unit.

BSUM Brief Summary

BACKGROUND OF THE INVENTION

The present invention relates to a neural network system, and in particular, to a neural network system capable of determining an optimal solution to a problem at a high speed.

Heretofore, a neural network, handling an optimization Problem has been described in "Neural Computation of Decisions in Optimization Problems", Biological Cybernetics, 52, (1986), pp. 141-152 (to be referred to as reference 1 herebelow). In reference 1, a method of determining a local minimum has been described. Moreover, as a method of determining an optimal solution, there exists a simulated annealing method which has been described in "Optimization by simulated annealing", Science, 220, 4598 (1983), pp. 671-680 (to be referred to as reference 2 herebelow). A cooling schedule used by the simulated annealing method has been proposed in "Stochastic Relaxation, Gibbs Distributions, and the Bayesian Restoration of Images", IEEE, PAMI6 (1984), pp. 721-741 (to be referred to as reference 3 herebelow) and in "Optimal simulated-annealing method based on stochastic-dynamic programming", PHYSICAL REVIEW A, 5, 39 (1989), pp. 2635-2642 (to be referred to as reference 4 herebelow).

8. おわりに

今回紹介したインターネットの情報探索の例はたいへん初歩的なものであり、このほかにも有益なインターネット探索ツールがたくさん存在する。世界中から情報のアンバランスといわれまいよう、日本からも積極的に有益なデータベースを構築し、世界に向けて情報発信しましょう。

◇ 参考文献 ◇

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- 邦訳：村井 純 監訳：インターネットユーザズガイド (発売オーム社).
[WIDE 94] WIDE Project 編：インターネット参加の手引, 1994年版, bit 別冊, 共立出版(1994).

著者紹介



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記念論文賞を受賞, 1989年NSF/RIA受賞, 1992年IEEE Trans. on Neural Networksより功労賞, 1993年TEPCO賞およびKAST賞, 1994年高柳賞, *IEEE Trans. on Neural Networks* および *Int. J. of Neural Computing* の Associate Editor を歴任, 現在 *Int. J. of Multimedia Tools and Applications* および *Neurocomputing* の Associate Editor. 主な著書・論文「だれでもわかるデジタル回路」(オーム社, 1984), 「ニューロコンピューティング」(培風館, 1992), "Neural Network Parallel Computing" (Kluwer Academic Pub., 1992), "Analog VLSI Neural Networks" (Kluwer Academic Pub., 1993), "Neural Networks in Design and Manufacturing" (World Scientific Pub., 1993), "Neural Computing for Optimization and Combinatorics" (World Scientific Pub., 1994), その他130編以上の科学論文 (*Science*, Vol. 245, pp. 1221-1223 など),