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National Institute of Informatics News

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2005

Mining interesting knowledge from huge databases -
like finding glittering jewels from a mountain of machines

Joint research No.8

NII Joint Research "Interaction Design for Adaptation between a Human and an Agent"

Seiji Yamada (NII)

Special Article

NII Joint Research "Interaction Design for Adaptation between a Human and an Agent"

Joint Research No. 8

We introduce collaboration with Prof. Oka (Kyoto Institute of Technology) as NII Joint Research "Interaction Design for Adaptation between a Human and an Agent"

1. Acquisition of actions related to speech by associating speech-action patterns

First we built an environment where a human and an agent share a virtual world (ball-game), and they are able to communicate each other by speech there (see Fig.1). Through the experimental investigation on the interaction between a human and an agent in the environment, we developed and improved a recognition system that can distinguish human intentional action from its accidental actions and imitate only the intentional actions. For preparation, we gathered and analyzed psychological. Currently we utilize objective numerical data instead of subjective data, and introduce speech pitch as a new feature.

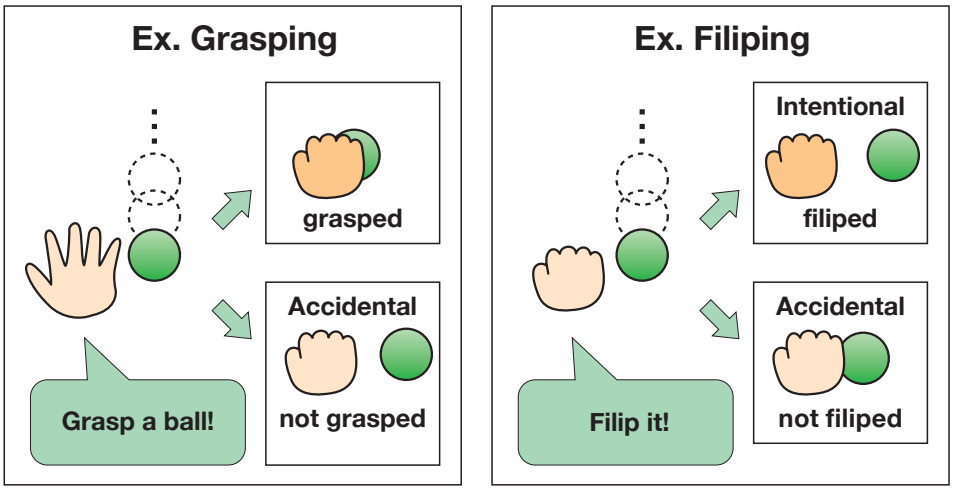


Fig.1

2. RobotPHONE: a robot that learns the correspondence between speeches and motions

In this study, we try to build a system that learns the correspondence between continuous speeches and continuous motions without a built-in speech recognizer nor built-in behaviors. We teach RobotPHONE (Fig.2) to respond to voices properly by taking its hands. For example, one says 'bye-bye' to the RobotPHONE holding its hand and waving.

Fig.3 shows the overview of the proposed system. From continuous input, the system must segment speech and discover acoustic units which correspond to words. The segmentation is done based on recurrent patterns which were found by Incremental Reference Interval-Free Continuous DP (IRIFCDP). The system also segments motion by the accelerated IRIFCDP, and it memorizes co-occurring speech and motion patterns. Then it can respond to taught words properly by detecting taught words in speech input by ShiftCDP.

*(**Seiji Yamada**, Professor, Intelligent Systems Research Division)*

Fig.2

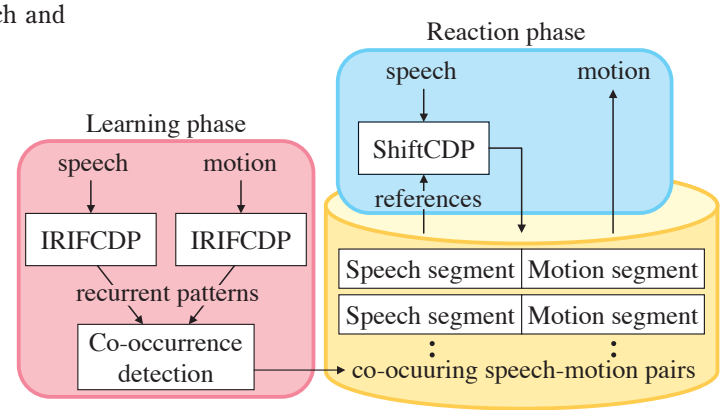


Fig.3

Research & Education

Equivalence under Update and Abduction

Equivalence between two theories or programs is one of the most important notions in Computer Science. For example, one axiom set A_1 represents the specification of a device or a program, and another formula set A_2 is a result of the design of a hardware/software system. Then, we should check whether A_1 and A_2 are equivalent, intending the verification of the design. For this problem, logical equivalence is usually used in classical logic. Similarly, the notion of equivalence has recently become important in logic programming. Because a logic program is used to represent knowledge of a problem domain, we often have to consider whether two logic programs P_1 and P_2 represent the same knowledge. For example, one program P_1 may be viewed as a specification of knowledge in some domain, and another representation P_2 may be expected to be a compact form of P_1 which can easily be computed. In logic programming, a more context-dependent notion of equivalence is necessary to account for the dynamics of program changes. Then, the notion of strong equivalence has been proposed: two logic programs P_1 and P_2 are strongly equivalent if $P_1 \cup Q$ and $P_2 \cup Q$ have the same declarative meaning for any logic program Q. We have further extended the notion of equivalence by taking both addition and removal of programs into account.

The equivalence notion is also important in representation and reasoning in Artificial Intelligence (AI). Besides deduction, explanatory reasoning like abduction and induction becomes important in AI. Abduction has been applied to diagnosis, design, constraint satisfaction, update and discovery. However, there are no concrete methods for evaluation of abductive power, and thus abductive frameworks lack methods of simplification, optimization, debugging, verification, and standardization. We have defined the notion of abductive equivalence and have established its computational theory. In abduction from first-order theories, equivalence with respect to explainability can be characterized by extensional equivalence in default logic, and its decision problem for the propositional case is Π_2^P-complete in polynomial hierarchy. In abduction from nonmonotonic logic programs, explanatory equivalence can be characterized by strong equivalence, and the decision problem is Π_2^P-complete in general. These notions of abductive equivalence enable us to derive the concept of generality in abductive theories as well as the strength/weakness of abductive power.

[Reference] Inoue, K. and Sakama, C., Equivalence in Abductive Logic, in: *Proc. 19th International Joint Conference on Artificial Intelligence* (IJCAI-05), Edinburgh, Scotland, August 2005, pp4 72-477.

*(**Katsumi Inoue**, Professor, Foundations of Informatics Research Division)*

NAREGI Symposium 2005

The NAREGI project is conducting middleware R&D to build a computing grid for the 21st century. This middleware provides an essential foundation for computing and simulation related to both scientific research and product development in a grid environment. Research results for the past year were reported at the NAREGI Symposium 2005 held on February 23 and 24 at Tokyo Fashion Town. The Symposium, which has now been held twice, brought together all the R&D results achieved thus far and presented them as alpha-version programs in demonstrations ranging from executing grid-based jobs to coupled simulation between grid sites. The Symposium also welcomed guest speakers. Dr. Fabrizio Gagliardi, who is project director of EGEE in the European Union, spoke about the

Lecture by EGEE Project Director Dr. Fabrizio Gagliardi


EGEE Project Director : Dr. Fabrizio Gagliardi
GGF Area Director : Dr. David F. Snelling
GGF Chairman : Dr. Mark Linisch
NAREGI Project Leader : Dr. Kenichi Miura

grid initiative in Europe and Dr. David F. Snelling, who is area director of GGF, spoke about the future direction of UNICORE and OGSA. A panel discussion on NAREGI's outlook on the future of the science grid gave NAREGI representatives the opportunity to discuss their future view of grid computing and to report research results.

This year's Symposium with 386 participants was bigger than last year's. The lecture and demonstration halls were filled with fruitful discussion and inspiring interaction. In addition to the two special invited talk mentioned above, the NAREGI delegation was honored to show Dr. Mark Linisch, who is chairman of GGF, an alpha-version middleware demonstration. The demonstration went well and helped to enhance international recognition of the NAREGI project.

(Collaborative Center for Research Grid)

Training seminar for Azerbaijan UNESCO/RADIT specialists
—Seminar on managing the preparation, processing, and release of digital images of cultural assets—

As part of a agreement concluded between the National Institute of Informatics and UNESCO in March, 2003 for the Digital Silk Roads Project, we welcomed three specialists from the Regional Academy of Digital Image Technologies (RADIT) in Baku, Azerbaijan to our institute, where they were trained on the use of ASPICO.* Their training during February, 2005 included lectures, hands-on sessions, and visits to various institutions in Japan.

Thanks to RADIT's exchange program with specialists from neighboring countries and its use of the ASPICO portal provided by NII as part of the Digital Silk Roads Project, the future promises more opportunities for researchers in the Central Asia region who are interested in digital image processing for preserving and displaying cultural assets.

*ASPICO: Advanced Scientific Portal for International Cooperation

(International Affairs Division)

Interaction 2005 symposium

The Interaction 2005 symposium was held from February 28 through March 1 on the second floor of the National Center of Sciences. The event ranged across a wide breadth of research on interactions between individuals and between people and machines, drawn from a diverse range of informatics fields. Held annually since 1997, the symposium has grown larger each year. This year's event featured 168 presentations and welcomed 622 attendees — both numbers setting new records.

The symposium is sponsored by the special interest groups of the Information Processing Society of Japan (IPSJ) — this year, by the IPSJ's human interface, groupware and network services, and ubiquitous computing systems special interest groups. Membership in the symposium's organizing committee is made up of a number of researchers from the sponsoring special interest groups, with University of Tokyo Professor Kumiyo Nakakoji serving as this year's General Chair. Osaka University Professor Haruo Takemura chaired the Program Chair.

After being held at the University of Tokyo, the Tokyo Institute of Technology, and Waseda University in past years, the symposium has been held since 2003 at the National Center of Sciences. The initial invitation to host the symposium at the National Center of Sciences was extended by University of Tsukuba Assistant Professor Tomoo Inoue, an NII Research Associate serving on the symposium's organizing committee in 2003. As Local Arrangements Chair, I handled venue preparations and other tasks for this year's symposium.

A characteristic of this program is its concentration over a two-day period, and a diverse range of programs. In addition to a speaker invited from overseas, each year's symposium features more than ten oral presentation and dozens of interactive presentations. This year's symposium added new poster presentations. The interactive presentations are perhaps most characteristic of the symposium, with varied demonstrations drawing on a wide range of materials attracting sizable crowds each year.

This year's program featured a presentation by invited Scott Klemmer of Stanford University on tangible interfaces, as well as 13 oral, 81 interactive, and 73 poster presentations. Advance refereeing ensured the quality of the

oral and interactive presentations, with 38% and 60% of submissions accepted, respectively.

The National Institute of Informatics and the Department of Informatics at the Graduate University for Advanced Studies (Sokendai) provided the following oral, two interactive, and three poster presentations:

・**Toss-It: Intuitive Infomation Transfer Techniques for Mobile Devices with "Toss" and "Swing" Actions:** Koji Yatani (UT), Koiti Tamura (UT), Keiichi Hiroki (UT), Masanori Sugimoto (UT), and Hiromichi Hashizume (NII).

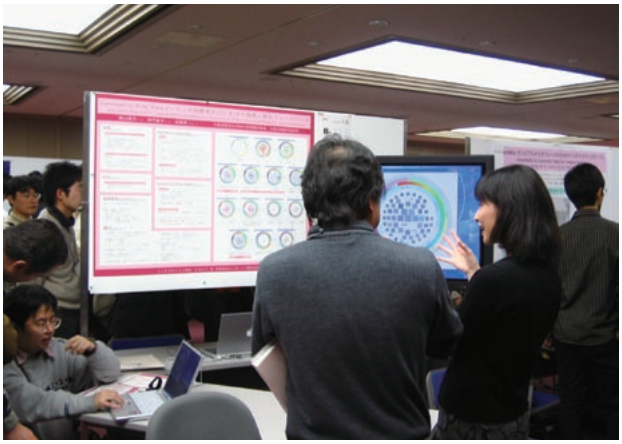
・**Concentric Ring View F+: Search History and Relevance Feedback on a Ring Structured Graphical Search Interface** Tomoko Kajiyama (Sokendai), Noriko Kando (NII), and Shin'ichi Satoh (NII)

・**ActionLog: Location-Based Authoring Support System** Kosuke Numa (Sokendai), Hiroki Uematsu (YNU/NII), Masahiro Hamasaki (Sokendai), Ikki Ohmukai (NII), and Hideaki Takeda (NII)

・**People and Robots Can Only Interact if There is Enough Overlap in their Umwelten:** Alexander I. Kovacs (Sokendai)

・**Qube: Walk Around on Hypercube:** Soshi Hanamura (YNU), Kaiichiro Soma (YNU), Takayuki Komatsu (YNU), Hiroki Uematsu (YNU/NII), Kosuke Numa (Sokendai), and Seiya Negami (YNU)

・**Communication Support with Location-Based Information:** Hiroki Uematsu (YNU/NII), Kosuke Numa (Sokendai), Masahiro Hamasaki (Sokendai), Ikki Ohmukai (NII), and Hideaki Takeda (NII)



An interactive presentation by a student from the Department of Informatics

These research presentations attracted considerable attention and were featured in media reports.

Next year's event — Interaction 2006 — is planned for March 2-3, 2006, at the National Center of Sciences. Members of NII look forward to playing a variety of proactive roles in next year's symposium as well.

*(**Hiroshi Hosobe**, Associate Professor, Research Center for Testbeds and Prototyping)*

NII Message from NII Researcher

Mariko Mikami

Project Researcher, Infrastructure Systems Research Division

The traffic of information through Websites has increased enormously recently.

It is crucial to create an environment where the participants in markets, i.e. those who receive and utilize information for business activities, can be reasonably guaranteed efficiency and a high level of trust in information.

One of my areas of research themes is the development of a system to evaluate the reliability of information in order to enhance governance in the e-society of the near future.

In order to achieve adequate governance, the evaluation method should not place importance on the subjective majority opinion of the information recipients.

The methodology should consider the neutrality of information disseminators and their responsibility for the accuracy of information, care for minorities and general public welfare.

The journalism industry has long dealt with the processing of information.

I have been active as an independent journalist in the areas of business, economics and finance in Japanese and US markets, reporting and presenting my materials in books, journals, newspapers and in TV broadcasts.

I have been privileged to observe the ways of thinking common to various media as well as the differences between media categories.

With such knowledge and experience, I am now undertaking a project to structure evaluation system of information.

C.V.

Graduated from the Faculty of Environmental Information, Keio University (major: Media Environment Course)

Concluded a freelance agreement with the Shukan Asahi editorial section of Asahi Shimbun in Tokyo. Commenced working as an independent journalist in 1997. Wrote for publications including Sekai (published by Iwanami Shoten), Ronza (published by Asahi Shimbun), Gendai (published by Kodansha), Bungei Shunju (published by Bungei Shunju), and Shukan Economist (published by Mainichi Shimbun), primarily in fields such as finance, accounting, human resources, auditing, and policy.

Article published in the June 2004 issue of Sekai selected as a one of the representative essays published in Japan (by the Foreign Press Center)

Special correspondent for Time Inc.'s business journal Business2.0 since June 2004.

National Institute of Informatics Project Researcher since July 2004

Main newscaster on the NHK business program "Business Miraijin" ("Untreprenoue for the Future") since April 2005

Author of Gappei Jinji ("Human Resources Management in Mergers"; Shoeisha, 2002), Megabank Kessan: Nichi-Bei-O Doko ga Chigau no ka? ("Financial Status of Mega banks: Differences Between Japanese, American, and European Practices"; Kadogawa Shoten 2003; ranked no.16 on Weekly Toyo Keizai's list of the 100 best economics books of 2003 as selected by 50 economists)

Her most recent publication, "Paracite Middle No Shougeki" ("Palacite Middle") focuses on the behavior of Japanese middle-aged management.

The National Institute of Informatics' Ceremony for Presentation of the Ph.D. Conferment Commemoration Medal

In March 2005, the Department of Informatics at the Graduate University for Advanced Studies conferred its first Ph.D. degrees since its founding in April 2002. In commemoration of this milestone, a Ceremony for Presentation of the Ph.D. Conferment Commemoration Medal was held March 25 at the Josui Kaikan.

In this ceremony, graduating Ph.D. candidates were awarded medals commemorating the conferment of their degrees.

At the ceremony, the five degree recipients, Director General Yasuharu Suematsu, and core NII personnel all wore academic gowns, and the introduction of degree recipients' acheivements was followed by the granting of a commemoration medal by Dr. Suematsu to each graduate in front of family members and continuing students. Mr. Suematsu concluded the ceremony with a congratulatory address. From start to finish, the ceremony took place in a stately atmosphere.

Ceremony for Presentation of the Ph.D. Conferment Commemoration Medal

(Research Cooperation Division)

Seven new students entered the Department of Informatics at the Graduate University for Advanced Studies (SOKENDAI) in April 2005

On Tuesday, April 12, the Department of Informatics at the Graduate University for Advanced Studies (SOKENDAI) welcomed the seven new students who entered the Ph. D program in April 2005. Events kicked off with departmental advising for new students at the National Institute of Informatics.

Advising for new students included self-introductions and an informatics program orientation. Following the advising sessions, students were given a tour of the NII Library and the graduate student lounge. New students were also treated to a party held in the tearoom on the third floor, where they were welcomed by the new Director General Sakauchi and other faculty members as well as current students.

Earlier, on Thursday, April 7, the entrance ceremony was held at the main campus of Sokendai in Hayama, Kanagawa Prefecture.

With the addition of these new students, the Department of Informatics now has a total of 57 students, 23 of whom are from overseas.

(Research Cooperation Division)

Entrance ceremony of the Graduate University for Advanced Studies on April 2005


Orientation at NII

Message from Graduate Students

Daisuke Kimura

Third year, Department of Informatics, School of Multidisciplinary Sciences, Graduate University for Advanced Studies

I entered the Department of Informatics at the Graduate University for Advanced Studies in April 2003. Professor Makoto Tatsuta, who had served as my advisor for my master's degree, transferred to the National Institute of Informatics, and I moved to that program along with him.

My specialty is theoretical computer science. My research interest is the interconection between programming theory and mathematical logic. Today, a wide range of mass-produced software is in use in the world. As a product of human efforts, this software often includes programming errors. Since the category of software includes products used for mission-critical applications such as banking systems and aircraft control, so we need ways to verify software's safety, and to generate newer, safe programs from preexisting one. Programming theory is a field of mathematical theory that provides such tools. Besides, mathematical logic is a field involving strict formulation of human's logical inference, and analysis it by mathematical methods. When we formalize and objectify programing language, especially functional programing languages, by mathmatical models, we can see logical systems and functional programing languages to be essentially the same. It is interesting to see the close relationships between logical concepts used by humans and computer programs we see operating right before our eyes.

Development & Operations

Attendance at CEAL's annual meeting

The annual meeting of the Council on East Asian Libraries (CEAL) was held in Chicago from Monday, March 28 through Saturday, April 2. Attending from the National Institute of Informatics were Akira Miyazawa, Director of the Research Information Research Division; Keita Tsuji, Assistant Professor in the Human and Social Information Research Division; Takashi Koga, Assistant Professor in the Research Chief of the Center for Information Resources; and Hiroshi Ogiwara, Academic Information Service Section Manager in the Contents Division.

CEAL, an association of researchers and librarians of North American East Asian libraries, holds an annual meeting as part of the meeting of the Association for Asian Studies (AAS), an organization of Asian-studies researchers across North America. Through events including meetings of subcommittees such as the Committee on Japanese Materials (CJM) and the Committee on Library Technology (CLT) and meetings sponsored by related organizations, the CEAL annual meeting serves as a venue for presentations on the activities of libraries and other institutions and the issues they currently face, as well as a lively exchange of views between presenters and other participants.

In addition to participating in the series of programs at the annual meeting, in the CJM session held Thursday, March 31 (attended by approximately 110 participants), Assistant Professor Takashi Koga followed up last year's introduction of the GeNii service (see issue no.8) with a description of the service launch and its content. His presentation was entitled "GeNii, Kick Off!" Since the service was launched on April 1, while the meeting was underway, attendees showed high interest and expectations for the service, posing specific questions concerning matters such as conditions of use and application methods.

On Thursday, Mr. Ogiwara also introduced the Korean Collection RECON Project in his presentation to the Committee on Korean Materials (CKM), entitled "Korean Collection RECON Project in NII/NACSIS-CAT Network" (attended by approximately 70 participants). Promotion of this project is expected to lead to increased service use by individuals working with Korean-language materials overseas.

Reference: CEAL Web site:
http://www.sois.uwm.edu/jeong/ceal/

(Contents Division)

CJM session at the CEAL annual meeting (Chicago)

Memorandum concluded with Indiana University

On April 2, 2005, Michael A. McRobbie, Vice-President of Indiana University and TransPAC2's U.S. representative, and Masao Sakauchi, Director General of the National Institute of Informatics, signed a memorandum on research cooperation.

The signing took place at a ceremony held by Indiana University at the ANA Hotel in Tokyo to mark the opening of TransPAC2. In attendance were representatives of the U.S. National Science Foundation and the U.S. Embassy to Japan. A similar memorandum on research cooperation was signed by the Japan APAN Council Chair, Shigeki Goto, who also serves as the TransPAC2 joint research representative for Japan and the National Institute of Information and Communications Technology President, Makoto Nagao).

The attendees to these ceremonies included officials from other countries in the Asia-Pacific region, representatives from Japanese industry and academia, and officials from the Japanese Ministry of Education, Culture, Sports, Science and Technology, the Ministry of Internal Affairs and Communications, the Ministry of Agriculture, Forestry and Fisheries, the National Institute of Advanced Industrial Science and Technology (AIST), Riken Japan, and the National Cancer Center.

The TransPac2 project was started by Indiana University on a National Science Foundation grant. It seeks to strengthen academic research networks linking the U.S. and nations in the Asia-Pacific region. The key element of the Asia Pacific Advanced Network (APAN), i.e., the high-speed telecommunications lines provided by TransPac2 to connect the U.S. and Japan, is expected to play a major role in strengthening the information networks connecting the academic research communities of the Asia-Pacific region.

The signing of this memorandum was also part of an effort at NII to strengthen ties with APAN.

(International Affairs Division)

Third International Symposium

The third International Symposium of the National Institute of Informatics was held in March, 2005 at the University of Tokyo's Takeda Hall. This symposium, titled e-Biology Initiative: Towards New Frontiers of Biology, was cosponsored by the 21st Century COE Program for Elucidation of Language Structure and Semantics Behind the Genome and Life System, whose representative at the symposium was Toshihisa Takagi of the University of Tokyo's Graduate School of Frontier Sciences, and the Japan Science and the Technology Agency's Core Research for Evolutional Science and Technology (CREST) project on Advanced Media Technology for Everyday Living, whose representative was Junichi Tsujii of the University of Tokyo's Graduate School of Interdisciplinary Information Studies.

More than 100 researchers and business people braved the rain to discuss issues from the front lines of biology and informatics in Japan and overseas, and there were lively exchanges of views among the participants. Events such as this are helping to promote a new style of research in the life sciences.

(International Affairs Division)

Fourth International Symposium

The International Symposium on the Future of the Book was the fourth International Symposium of the National Institute of Informatics. It was held in the Hitotsubashi Memorial Hall of the National Center of Sciences in March, 2005.

The symposium featured lectures by Michael A. Keller, Ida M. Green University Librarian at Stanford University, Tetsuo Matsuda, Executive Director of Chikuma Shobo Publishing Co., Ltd., Shun Tsuchiya, a professor in Chiba University, and Akihiko Takano, a professor at NII, on topics such as Web content issues and prospects, digital publishing, and associative retrieval. It welcomed more than 220 participants from the fields of library sciences and publishing. The participants said they found the symposium stimulating and interesting and that it provided them with an excellent opportunity to discuss the future of books, reading, and research.

(International Affairs Division)

Symposium held: SPARC now and after: Society Journals, Institutional Repositories and Open Access

SPARC now and after: Society Journals, Institutional Repositories and Open Access was held on Thursday, March 24, 2005 in Room B101 of Building 14 at Waseda University.

This symposium featured a presentation by Rick Johnson, Executive Director of SPARC in the United States, entitled “SPARC: What is it? What is it achieving?”– a report on the current status of SPARC activities in the United States and the projects plans for 2005.

The latter half of the symposium featured reports on the Schalary publishing activities of Japanese academic societies by IPAP (The Institute of Pure and Applied Physics), and on the current status of the construction of Institutional repositories by Chiba university libraries. The symposium provided an opportunity for editors and staff from academic societies, university libraries, and production staff and others to discuss in depth open access movement, institutional repository, and issues related to the future of scholary Communication including scholary publishing.

The contents of this symposium and related reference materials are available on the ISCI Web site (http://www.nii.ac.jp/sparc/).

(Contents Division)

Rick Johnson

Research Organization of Information and Systems holds intellectual property seminar entitled “Utilizing Intellectual Property (Part 2)”

On February 25 of this year, the Intellectual Property Center Research Organization of Information and Systems held an intellectual property seminar, entitled Utilizing Intellectual Property (Part 2): Towards New Service Forms Utilizing Databases, to deepen understanding of intellectual property use issues. This seminar featured lectures by Kazuhiro Hiraide, manager of the Office for Intellectual Property Center of Inter-University National Institutes, on the state of Inter-University National Institutes’ intellectual property activities and handling of copyrighted materials; National Institute of Informatics Professor Akihiko Takano on the spread of content distribution technologies that enable dynamic linking with external content, such as new-publication maps utilizing the Generic Engine for Transposable Association (GETA); and Visiting Professor Keisuke Okuzumi of the International Research Center for Japanese Studies on databases and copyrights. Some of these lectures were presented some contents used in these lectures were connected to interest web site, in order for the audience to understand clearly what the lecturer would like to make a presentation. More than 60 individuals attended, including those working with intellectual property at universities and companies as well as graduate students. The seminar was marked by overflowing enthusiasm, as attendees listened intently to the lectures and posed numerous questions in the subsequent question-and-answer sessions.

(Intellectual Property Center)

Seminar commemorating the retirement of Professor Takeo Yamamoto

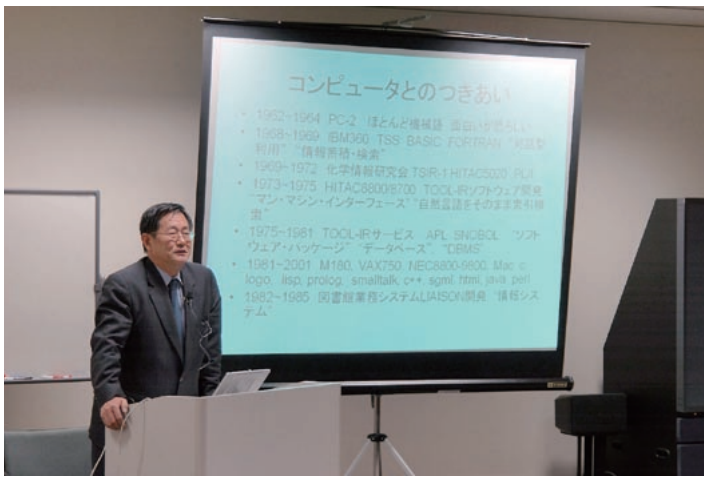
On Tuesday, March 29, 2005, the National Institute of Informatics held a seminar to commemorate the retirement of Takeo Yamamoto, Professor of Information Retrieval Research in the Multimedia Research Division, and Director of the Multimedia Research Division.

On this date, Professor Yamamoto presented a lecture entitled “Academic Information and Computers: My Experiences and Thoughts,” based on a wealth of experiences gained through numerous research activities that helped lead to the establishment of large-scale academic information systems such as online literature search systems and library systems, including the startup of Japan’s first online literature database service, the precursor to NII’s NACSIS-IR database service.

In his lecture, Professor Yamamoto discussed numerous episodes from his career, including his awareness as a young researcher of the need for a chemical information database, as well as stories from days in the world of computers. Over 100 attendees listened intently, hoping to glean valuable nuggets from the professor’s experiences.

We offer our best wishes for Professor Yamamoto’s future progress and activities.

(General Affairs Division)



Intellectual Property Center News

Non-working compensation for jointly-owned patents

One of the major issues that arises in industry-academy-public-sector partnerships is that of non-working compensation for jointly-owned patents, a difficult negotiating point when concluding a joint research agreement. Despite common use of the term "non-working compensation for jointly-owned patents," its meaning is initially difficult to grasp. Despite its the term's apparent link to intellectual property rights, those not well versed in joint research tend to wonder what it actually refers to. It is hardly obvious that the term refers to payments made to the joint owner of a shared patent who does not work the patent when another joint owner has worked it. The most typical example is the case wherein a research institution and a company collaborate in joint research that results in a jointly-owned patent, after which the company works the patent, then refuses to provide compensation when the research institution demands payment. This is the classic conflict arising from joint research.

The Japan Patent Law clearly states that unless the terms of an agreement separately concluded between both owners of a jointly-owned patent state otherwise, either owner of the patent may work the patented invention without obtaining the approval of the other owner (Article 73, Paragraph 2). For this reason, when a company has begun to work a patent on its own, it will naturally resist demands for compensation from a research institution. Originally, the company is the joint owner of the patent in a position to benefit from working it, while the research institution — with the exception of cases such as when it will establish a startup entity to do so — is not in a position to work the patent. Although the research institution insists that the company distribute profits from working the jointly-owned patent in accordance with the institution's contributions, since the results of the research are due not to the company's efforts alone but to those of the institution, the company insists it will not consent to providing compensation for working the patent in addition to assuming the business risks involved in doing so. This issue often arises between companies and research institutes such as universities entering into joint research agreements.

(Intellectual Property Center)

Description of a cover

Fast Data Mining Algorithm

Recent progress of Information technologies makes us enable to collect many kinds of data speedy and automatically by electric devices. The databases of these data are often huge, and hard to arrange for analysis. Although such databases include valuable information and knowledge, finding these takes quite long computation time. In this study, we developed fast algorithms (programs) for finding all "frequently appearing patterns from databases", which are part of such "valuable knowledge". It has many applications such as machine learning, analysis of databases, marketing, diagnosis of failure, and automatic language processing. The databases appearing in these applications are huge, thus programs without recent algorithmic techniques possibly take over 1 year. In contrast, our algorithms are based on new results of algorithm theory, and needs only few minutes even if input database has millions of records. In the programming competition on the last international data mining conference, our programs got Best Implementation Award, and are beginning to be used worldwide.

Detailed information on the research
and projects of NII is available at our Website.

http://www.nii.ac.jp/

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Research Organization of Information and Systems
National Institute of Informatics

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