NII
Today
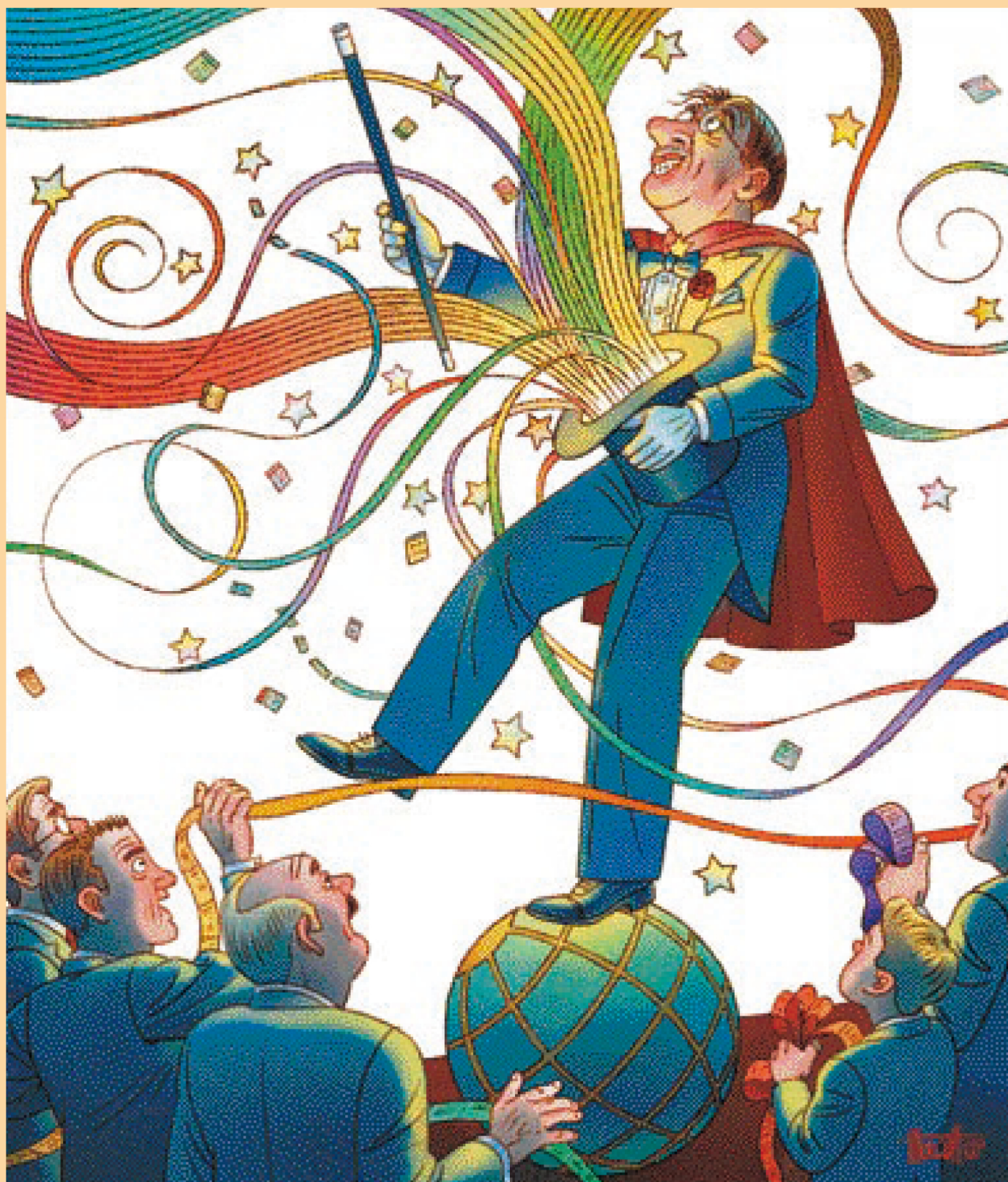### National Institute of Informatics News

NII SPECIAL **Create the infrastructure for knowledge**

**Development with an Awareness of the Needs of Society
—The Goal of NII's Information Services Program**

**CiNii (NII Scholarly and Academic
Information Navigator) Upgrade**

**A Community Dedicated to the Sustainability and
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**Associative Searches and Well-developed Content
Increase the Value of Information**

Hideaki Takeda

Director, Research and Development Center for
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NII Interview: Hideaki Takeda+Kayoko Yamamoto

Development with an Awareness of the Needs of Society

The Goal of NII's Information Services Program

NII Special

Create the infrastructure for knowledge

Yamamoto: The two mainstays of NII's operations are information-related research and providing information services to university and other research institutions. As I understand it, far and away the most widely used of these services is the database service for academic content such as scientific papers. Can you give us a picture of the major databases operated by NII?

Takeda: First, there's the CiNii (pronounced "sai-nii") database. This is a database of scientific papers that have appeared in journals and other academic publications in Japan and that present the achievements of cutting-edge research. As digitizing these papers requires a great deal of effort, the database does not contain all of them. But not only can you search for a paper, you can also access a pdf version of the text.

NII also operates the Webcat database. This is a database of the books in university libraries nationwide. Webcat assists researchers in borrowing rare books and other works from libraries other than the library at the institution with which they are affiliated.

The "Kaken" database is a database of reports on the achievements of the grants-in-aid for scientific research that are awarded by the Ministry of Education, Culture, Sports, Science and Technology. This database is useful for determining what research is currently

being conducted at universities in Japan. It gives you a broad overview of the research of a certain quality that has received economic assistance from the national government.

All three of these databases are available for use by researchers, and NII has been compiling them for more than 20 years.

Yamamoto: Recently we sometimes hear the term "institutional repository." Is NII engaged in this type of activity as well?

Takeda: The chief characteristic of an institutional repository(*1) is the fact that the university or other research institution takes the responsibility for making information available, based on the policy of that institution. Previously, there was one large database that was maintained by the national government and subjected to centralized control. Now, due to the popularization of the Internet, it is possible for each institution to make information available on an autonomous basis. This enables the institution to make available the bulletins published by individual departments that are used to announce the achievements of humanities researchers, as well as valuable cultural assets or other materials held by the university. NII links the repositories of individual institutions to make it possible for researchers to conduct cross-sectional searches.

Yamamoto: I understand that you need-

(*1) For more information on institutional repositories, see pg. 8 - 9.

(*2) An expanded version will be made available in April 2010.

Kayoko Yamamoto

Editorial staff writer, Science and Technology Division, Editorial Department, The Nikkan Kogyo Shimbun Ltd.

ed to provide special lines to connect university libraries to the various databases maintained by NII.

Takeda: In the past 10 years, the Internet has come into general use, so things have changed completely. For that reason, we've gotten a lot of complaints that the older systems that aren't really compatible with the Internet are hard to use. That's one of the reasons that we're bringing "New CiNii" online in April 2009(*2). Several years ago, you couldn't use Google to search for papers in the NII databases. That's now possible, and the frequency of use has doubled or tripled. It's becoming important to be positioned as a Web service so that even members of the general public who don't know anything about CiNii are able to access papers.

Yamamoto: Do you mean that academic information is not just for specialists anymore?

Takeda: Once the persons and institutions who were the bearers of information could be divided into those providing the information, those using the information, and those that connected the two. But in the Internet age, all of these activities constitute a single loop. The same person or institution can gather information, create new knowledge, and make the data available.

For many years, it was a truism that the value of a paper was determined by getting it published in the authoritative top tier academic journals. But the details of the technologies of Larry Page, the founder of Google, were provided in a simple technical report published at Stanford University with no referee review at the departmental level. Page never compiled this into an academic paper, so people from around the world continue to access this technical report on the Web. Information in this form requires support as well, and this is the reason that NII is interested in institutional repositories.

Yamamoto: What will be the principal features of New CiNii?

Takeda: Even greater ease of use. Even greater speed. And flexibility. It will be possible to look for both items in university collections and academic papers in the CiNii database in the same search and narrow the search down to a list of papers. We've also created a system

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We want to use the Internet to facilitate the flow of information between scholars and the public at large.

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that enables searches by computers, rather than people. Up to now, it was difficult for computers to distinguish what part was an author's name, what was a title, and what was reference title. So the search itself had to be conducted by a human being. But this is now changing.

What we want to pursue in the next year or two is a general introduction of individual researchers. We want these introductions to include information such as the information presented on university websites, the names of topics for which they have received grants-in-aid for scientific research, the other parties engaged in joint research, coauthors and so on. We want to use the Internet to facilitate the flow of information between scholars and the public at large.

Yamamoto: What needs have you ascertained recently on the part of database users?

Takeda: User's expectations regarding information have grown considerably. Before, people were grateful when they found the information they needed. But now they think it's only natural that they should be able to do so. Some of our services are for-fee services, but there's a strong feeling on the part of users that information should be free. They want the information to be linked to other information, they want even greater ease of use, and so on. However, sometimes you can't locate the information you need because there's simply too much of it. At such times, the role of arbitrator — to determine what information is important to that person — is also important. Our mission is to create an information service that provides value to its users.

✎ A word from the Interviewer

I had wondered if a researcher like Mr. Takeda, who studies the flow of information in the Internet, faces a dilemma in terms of the need to be involved with research and also service programs. But he actually seemed to be enjoying himself, saying "I want to make the most of both of them." No matter what fabulous technology someone creates, it will end up as nothing more than a vanity project if nobody uses it. In his quiet way, Mr. Takeda stated very clearly that, in a sense, the key is to determine the needs of society and advance them. I was also impressed by his call for other researchers who found it too much trouble to consider the relationship of their efforts to society that they should consider both research and society.

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Making Academic Papers More Accessible

CiNii (NII Scholarly and Academic Information Navigator) Upgrade

Since its debut in April 2005, CiNii, the NII scholarly and academic information navigator, has continued to evolve based on the concept of making academic information accessible to as many people as possible. To determine how CiNii has changed the world of academic content, we asked three persons who have been intimately associated with CiNii (as planning and design personnel, operation and management personnel and users) to share their thoughts.

What is CiNii?

Ohmukai: Researchers record their research findings in academic papers. Other researchers refer to these papers and cite them, and in this way knowledge is accumulated. The papers themselves are collected by individual academies and universities. However, if they are scattered in many different places, it makes things difficult for the people who want to use them. So it would be advantageous if there was an integrated source of information on academic papers. It is for this reason that CiNii (pronounced "sai-nii") has been established as a database that can be searched easily (see Fig. 1).

Sakaguchi: Since the days that NII was known as the National Center for Science Information System (NACSIS), one of its missions has been to collect the information in academic papers and make it available publicly. So it offered services such as an information retrieval service (NACSIS-IR) and an electronic library service (NACSIS-ELS). CiNii, which represents the integration of these services, was launched in April 2005.

Okamoto: The appearance of CiNii had a huge impact. Up to that time, academic information services were for-fee services, and it was difficult to learn how to use them effectively. They were quite a hurdle for the general public. CiNii not only provided this service free of charge,
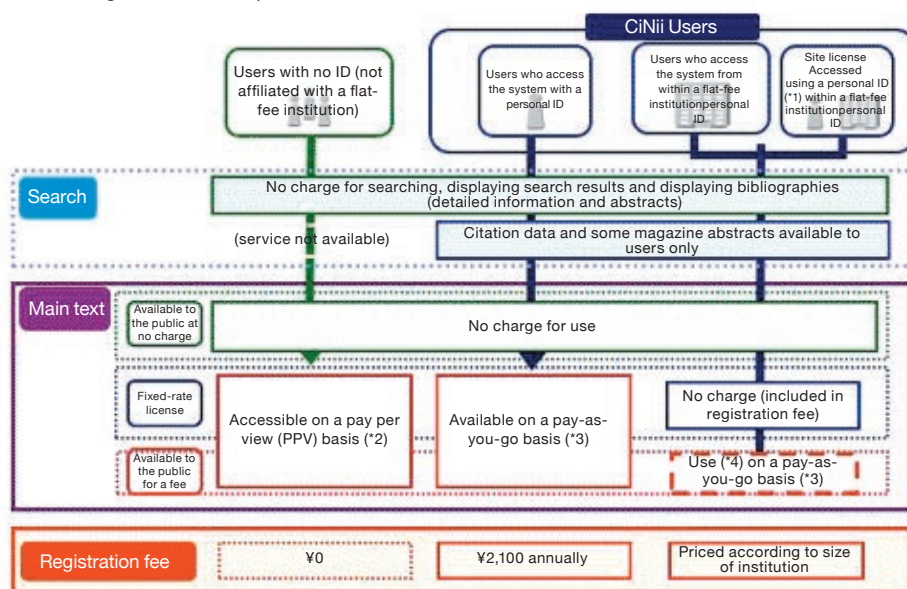

CiNii User Registration and Scope of Use

Fig. 1   CiNii (NII Scholarly and Academic Information Navigator)
There are two versions of CiNii: a free version and a for-fee version. In the December 2006 upgrade, the bibliographies (brief information about the paper) of 20 million academic papers were made available free of charge, enabling anyone to get a general idea of the content of academic papers.

(*1) Obtaining a site license personal ID (free of charge) makes it possible for those not affiliated with institutions to use CiNii in the same manner as institution-affiliated persons.
(*2) Papers can be purchased on an individual basis by credit card. A pay per view (PPV) fee is applied.
(*3) A fee is charged for all accessed documents together. This fee is less expensive than the PPV fee. In some cases, special discounts are available for members of academic associations.
(*4) A site license personal ID is needed to use for-fee documents under an institutional flat-fee system.

Ikki Ohmukai
Assistant Professor, Research and Development Center for Scientific Information Resources and Digital Content and Media Sciences Research Division
Since becoming director of CiNii in 2005, has conducted system development to upgrade CiNii based on the concept of "making academic information available to as many people as possible."

Koji Sakaguchi
Content Team, Scholarly and Academic Information Division, Cyber Science Infrastructure Development Department
Involved with CiNii in a wide range of activities, from system development to data upgrades, system coordination and other operation and maintenance tasks.

Makoto Okamoto
Since 1998, has published the Academic Resource Guide (ARG), an email magazine dealing with academic use of the Internet and other electronic media, in which he regularly discusses CiNii trends.
http://www.ne.jp/asahi/coffee/house/ARG/

it did so in an easy-to-use manner. To an outsider like myself, NII's CiNii, the NDL-OPAC service of the National Diet Library (NDL) and the JDreamII service of the Japan Science and Technology Agency (JST) came to represent the three main pillars of academic information services.

Sakaguchi: The role of NDL is to store all publications issued in Japan and to serve as a legislative services agency. The role of JST is to promote science and technology and disseminate scientific and technical information. NII is a research institute specializing in informatics, and at the same time it plays an important role in building the infrastructure for research into academic information in Japan. In order for these institutions to fulfill their respective missions, they collect academic content independently and provide information services.

Ohmukai: The mission of each of these organizations is different, so previously the fields that they could search were different. But in recent years the range encompassed by each of these services has expanded, and in some areas the scope of the searches have come to overlap one another. As a result, which service would succeed came to be determined by the special features that the service could provide. NII decided to take its NACSIS-IR/ELS services, which previously could only be used by researchers affiliated with academic institutions, and make them available to anyone, anywhere in the world through CiNii. And it offered the service free of charge, right down to the search function and displaying a list of search results. NII continues to upgrade the service in line with the times.

Breaking Down the "Dry" Image

Ohmukai: I've used CiNii for my research ever since my student days. Since that time, I've felt it was a bit dry compared to services that have spread rapidly such as blogs. It's natural for an academic service to be a bit 'stiff,' but with a little ingenuity I thought it should be possible to expand the information to a wider audience beyond specialists and students. I thought otherwise it would be a waste, since the content was so rich. When I joined the staff at NII, I got the chance to put this idea into practice (Fig. 2). The concept was to make academic information available to as many people as possible. First, we made the bibliographies of the 20 million academic papers collected in CiNiii available free of charge. The bibliographies contain the keywords and abstracts for each of the papers. Looking at them, you can get a general idea of the content of the paper.

Okamoto: Now you're talking about the renewal work carried out in December 2006. Whether because it's your job or whether it's your personal interest, I think there is a great need on the part of many people to study academic papers. I think it would be very unfair if you could only access the content of papers if you were affiliated with certain institutions such as universities and companies with a lot of capital. So I give NII a lot of credit for resolving that situation.

Ohmukai: To tell the truth, making the bibliographies publicly available was only one part of the upgrade. What we really wanted to do was to make it so CiNii bibliographies would appear in searches conducted using the commonly used search engines such as Google and Yahoo. Even though we made 20 million bibliographies available free of charge, very few general users would come all the way to the CiNii top page and enter keywords to conduct a search. Unless we created a pathway by which users could arrive at CiNii bibliographies from the search services that they use on a daily basis, it would not lead to increased usage in the true sense of the

Fig. 2 The History of CiNii

April 2005	Made available to the general public
December 2006	1st Upgrade: Bibliographies of all 20 million documents on CiNii made available to the public at no charge
April 2007	2nd Upgrade: Through an arrangement with Google and Google Scholar, CiNii bibliographies (3 million) now show up as hits in searches by ordinary search engines

CiNii Use Environment
Due to the rapid spread of blogs, social networking services and Web 2.0, many people now use the Internet freely. As a result, the value of using search engines as an easy way to look up things is increasing.

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term.

Okamoto: It is true that up to now search services have been separated by field of study and so on. But now we're in an age in which the Internet is everywhere, and using ordinary search engines, you can get a certain amount of information about any field. So this compartmentalization is becoming unacceptable.

Ohmukai: I think that in an age in which information can be easily obtained via the Internet, information that does not turn up in a search may as well not exist. Recently I'm frequently asked this question: "My searches turn up a lot of pages that say 'CiNii' - how do you pronounce that?'" What this means is that more and more people are accessing CiNii content from places other than the CiNii top page. It's proof that we've achieved our goal. Though it also means we need to put a little more effort into explaining how "CiNii" is pronounced...

Sakaguchi: In this way, NII has actively worked to devise a means by which members of the general public can access academic content. But that dosen't mean it's neglected the services for its original users, libraries and universities.

Okamoto: To ensure that its content turns up in searches with general search engines, NII provided permalinks on its bibliography pages. Each page has been given a specific URL. This makes it possible for direct links to be placed when academic papers are introduced on blogs and so on. Improvements such as this also make things more convenient for universities and libraries that have been CiNii users for a long time.

Creating New Encounters

Okamoto: Near NII is a monument commemorating "the birthplace of Japanese baseball." I got curious and checked it out using a search engine, and one of the hits was a paper on the history of baseball in Japan, stored in the CiNii database. This was a moment when learning really came in handy.

Ohmukai: It's certainly a case of "close encounters." Wikipedia and blogs are handy sources of information, and many people use them freely. We're not exactly seeking to compete against these, but I'd like people to know that in many cases reading academic papers gives a more in-depth picture and is a more efficient way of gaining knowledge.

Okamoto: When I access CiNii directly to search for papers, I use two methods. When I'm searching in my area of specialty, I search with the clear purpose of locating a certain paper. On the other hand, sometimes I use CiNii when I'm trying to deepen my understanding of a field that is unfamiliar to me. At the very least, I think academic papers are the ideal means of collecting highly reliable information, the kind recognized by academies and universities.

Sakaguchi: A parent who had a child with an intractable illness was searching for the name of the illness and got a hit for a CiNii paper. The content of the paper was highly technical, and the parent apparently didn't understand it. But the parent went to see the professor who had written the paper. Because the bibliographies were made publicly available, papers are now being used in ways we could not have imagined previously. This incident made me realize the true significance of the CiNii upgrade.

Ohmukai: To ensure that users who happen to access CiNii from ordinary search engines and the like can get even more use out of CiNii, I'd like to create a mechanism that would actively strive to link them with the person who wrote the paper.

## Taken For Granted as Part of the Infrastructure

Sakaguchi: What is becoming a problem in terms of operation is that the system load has become extremely large. In part, this is because the upgrade has been, if anything, too successful. Because the bibliographies were made publicly available to ordinary search engines in April 2007, the number of searches increased roughly tenfold as compared to their previous level (Fig. 3), and this put a tremendous burden on the server. We're working to resolve the problem. But even then, during the university testing season, the students apparently all use the service at the same time. That causes the server to start screaming.

Ohmukai: We've used the same server ever since the service was first made available in April 2005. Because CiNii is being used to this extent, we felt that a mechanism that reflects this reality is needed internally as well, so in 2008 we made the decision to redesign the system from the ground up.

Sakaguchi: In April 2009, I think we'll be able to provide the new CiNii that resolves this problem. With the new CiNii,

Fig. 3   Results of Upgrade
With each upgrade (such as the provision of bibliography permalinks in December 2006 and access via Google in April 2007), usage has increased dramatically.
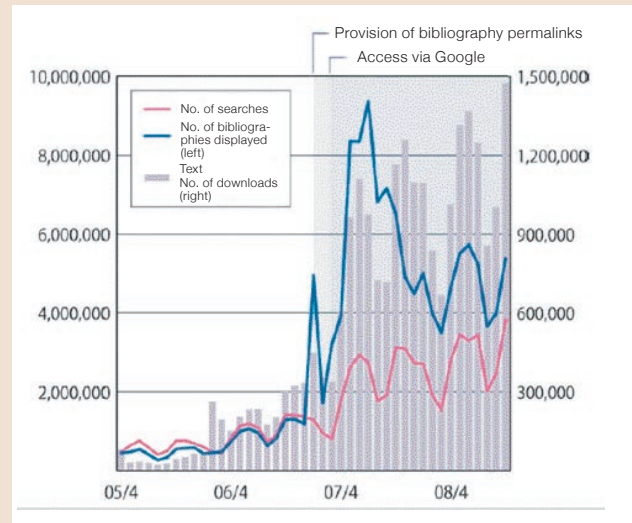
we'll be able to handle increases in use by adding small server computers as they are needed.

Okamoto: I always feel that the method of operating the service is a major issue. The thing that frustrates me when I'm writing an article is that, when I'm doing research late at night for an article that's due the next morning, sometimes a service will be shut down for maintenance. It would be absolutely unforgivable for the water or gas or something else that's considered to be part of society's infrastructure to be delayed. The same should be true for academic information services. For example, if a Japanese person was awarded the Nobel Prize and that person's paper were on CiNii, the number of users would undoubtedly be greater than you could imagine. In an ideal world, everyone should be able to access the information even at such times, and I think that's the mission of NII. Nobody would question the importance of information on an earthquake or other natural disaster, but I think the same should be true of academic information. I don't think we should be stingy with the costs that are required for this type of information.

The Secret to Success

Ohmukai: Once we get some leeway for the server, we'll move ahead on expanding CiNii further. For example, by combining the functions of CiNii with overseas academic paper search services, we'll be able to create a service that is capable of searching for papers in both Japan and other countries at the same time. And this should lead to new users and the development of new content. By making the functions of CiNii available to outside developers, NII wants to provide a venue where various types of ideas can be achieved. In the upgraded version that will be made available in April 2009, we plan to pro-

vide an Application Program Interface (API). This will make CiNii data available to developers in a form that is easy for computers to handle.

Okamoto: That will be a godsend. NDL has already begun doing this, but if these three institutions - NDL, NII and JST - all provide data together, I'm absolutely sure that people will appear and propose ways of using academic learning in ways that we've never imagined. This will represent an earthquake in the world of academic content.

Sakaguchi: I predict that many interesting types of services and content will appear from this point on. This is the process of building an infrastructure. Naturally NII itself plans to use this infrastructure to provide new services as well.

Okamoto: After observing the world of academic information for the past ten years, I feel strongly that we're at the end of the age in which only a handful of forward-thinking researchers constructed websites. Organizations, too, are now putting more energy into using websites to provide information. At the same time, blogs and other simple information-providing media have also emerged, and so individuals are also eagerly making information available. The situation is still in flux, but I get the feeling that organizations are coming to accept information that has been provided by an outsider like myself. I've gotten reactions to my blog from a number of people at NII.

Sakaguchi: Everybody at NII reads your email magazine.

Okamoto: Once I issued an impassioned call for permalinks. And I also wrote about the need for an API. I don't think my suggestions were the catalyst, but CiNii is being upgraded in the ways that I recommended. I think

there is growing momentum for national government agencies and private citizens to work together to build an academic environment.

Ohmukai: We knew that permalinks and API were needed as accepted norms in the world of the Web. But in some ways their importance is not recognized within the framework of academic information services. When we're creating a new service, the opinions of people like Mr. Okamoto who are well versed in both the world of libraries and the world of the Web are persuasive, so they can provide us with some extra ammunition.

Okamoto: When you speak of the significance, position and achievements of CiNii, even more than the fact that it's an outstanding system, I think it's important to focus on the process through which CiNii was created. Regular office staff members play a major role in the creation of this type of system, but have been joined also by people like Mr. Ohmukai, people from the generation that views the Internet as a natural part of their world. We also had the flexibility to incorporate outside views. Within NII, an organization was created that was able to take the knowledge created up to now by veteran staff and skillfully overlay that with the knowledge of researchers and the younger generation. I think this is the secret to CiNii's success.

Sakaguchi: From an operation and management perspective, with the cooperation of Mr. Ohmukai and the knowledge of outside personnel like Mr. Okamoto, my goal is to make CiNii even easier to use and more accessible.

(Written by Akiko Ikeda)

A Community Dedicated to the Sustainability and Growth of Institutional Repositories

More and more universities and other institutions throughout Japan are establishing institutional repositories. As a new form of NII-university collaboration, the Digital Repository Federation, a community of institutional repository managers in Japan, has been established. The aim of the Federation's activities is the sustainability and growth of institutional repositories.

Masako Suzuki
DRF Coordinating Committee / Otaru University of Commerce Library

Shigeki Sugita
DRF Coordinating Committee / Hokkaido University Library

(*1) http://www.soc.nii.ac.jp/anul/j/publications/reports/74.pdf

(*2) http://www.nii.ac.jp/irp/en/

(*3) http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu4/toushin/06041015.htm

(*4) http://drf.lib.hokudai.ac.jp/drf/index.php?Digital Repository Federation (in English)

Institutional repositories are digital archives established at universities and other academic institutions to preserve the educational and research achievements produced at that institution (articles, research papers, learning materials etc.), and to make them freely available to the public. Institutional repositories are attracting a great deal of attention as a means of making available the educational and research outcomes of academic institutions, which up to now was usually not in general circulation, to potential readers throughout the world, and to enable these institutions to fulfill their responsibility to be accountable to society by showcasing the fruits of their education and research.

Joint NII-University Projects

The term "institutional repository" (IR) as a joint project made up of NII and university libraries first appeared as a keyword in the report entitled " New Trends of the Digital Library" (the Japan Association of National University Libraries, May 2003) (*1). The report recommended "increasing the dissemination of the educational and research outcomes of academic institutions by means of institutional repositories" and proposed that "a pioneering joint project made up of NII and university libraries be established" as a means of achieving this objective. In that same year, 2003, the very first IR in Japan was made publicly available on a trial basis by the Chiba University. As of the end of 2008, there are 88 IRs in Japan. There are now approximately 1,300 IRs worldwide, and Japan ranks fourth in terms of the number of IRs that have been established.

In the background of the rapid growth of IRs lies the NII Institutional Repositories Program (*2), part of the NII's Cyber Science Infrastructure (CSI). Since 2004, NII has been promoting the provision of information sharing about the software and training courses to enable systems to be designed with open specifications that conform to international standards. In 2005, thanks to the effort of the person in charge at that time, the CSI-commissioned project that would eventually become the pioneering joint project was

initiated. Unlike previous one-way structures in which NII would take the lead and solicit university cooperation, this initiative was characterized by the fact that the university solicited projects that were designed to resolve problems.

The CSI-commissioned project implemented in FY 2005 - 2007 was continued in the form of the Phase 2 in FY 2008 - 2009, based on the achievements of that FY 2005 - 2007 project with the backing of the "Report on the prospects for future scholarly information infrastructure" (Council for Science and Technology May 2006) (*3). In FY 2008, more than 70 universities cooperated as partners to promote the project.

The Digital Repository Federation (DRF) (*4) was established in November 2006 as a community of IR managers in Japan under the leadership of Hokkaido University, Chiba University, Kanazawa University and Osaka University. DRF continues to attract new universities and other institutions. At the time of its founding, DRF had only 25 participating institutions, but this number has now increased to 85 (56 national universities, 3 public universities, 24 private universities and 3 research institutions).

Building Equitable Relationships on a Nationwide Scale

Specifically, DRF conducts five activities. Its two main activities are (1) operating an open mailing list and website and (2) holding workshops and other meeting events several times each year. In addition, DRF also (3) conducts research regarding copyright, improving access and other issues, (4) shares expertise with similar initiatives overseas, and (5) studies approaches to ensuring a sustainable community.

Even in the past, there have been many opportunities for librarians to get together. University libraries have various cooperative relationships that include inter-library loan (ILL) services, which enable students and researchers to order the books and documents they need, and shared union cataloging (NACSIS-CAT). DRF is further enhancing this environment by creating ongoing equitable cooperative relationships

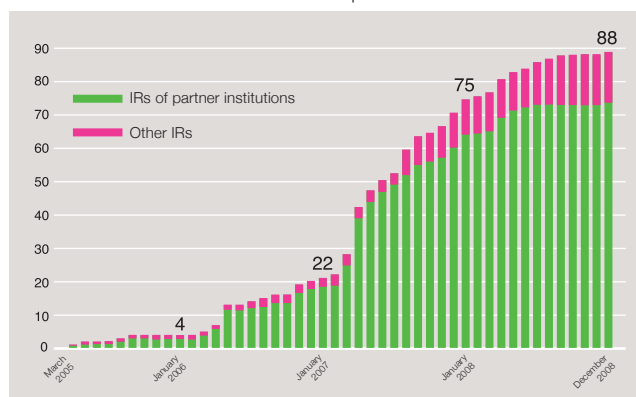## Increase in the Number of Institutional Repositories

(Chart showing IRs of partner institutions and Other IRs)

- IRs of partner institutions
- Other IRs

Values: 4, 22, 75, 88 across March 2005 to December 2008

Status of included content (JAIRO / as of the end of January 2009)

- Journal Article — 29%
- Thesis or Dissertation — 5%
- Departmental Bulletin Paper — 38%
- Conference Paper — 7%
- Presentation — 3%
- Book — 4%
- Technical report
- Research paper
- Article
- Preprint
- Learning Material
- Data or Dataset
- Software
- Others — 11%
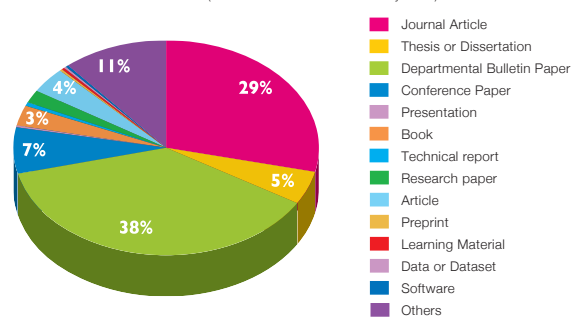
Content: 573,010 items (JAIRO http://jairo.nii.ac.jp/en/)

With the sharing of information as a result of DRF and other activities, the number of IRs that have established institutional repositories now exceeds the number of universities that are funded by the NII's CSI-commissioned projects, and the number continues to increase.

(in other words, a community) on a national scale, something that was difficult to achieve merely through occasional opportunities for assembly and training. This has been made possible by the mailing list and the website, which uses a Wiki system that allows people to easily edit content using their web browsers.

Masako Suzuki, DRF Coordinating Committee / Otaru University of Commerce Library, says the advantages of DRF are that it goes beyond the level of an organization and serves as a venue for managers to share expertise with and help one another. "The fact that they can meet face to face and relate to one another as people on a one-to-one basis means a lot," she says. At the same time, she says, DRF also serves as a venue for friendly competition on IR. Since DRF website and mailing list are open, the managers of institutions that are attempting to establish IRs can experience vicariously the experiences of universities that have already done so.

Still, it is sometimes difficult to establish individual repositories. As a solution to this problem, the 11 universities making up the Hiroshima Association of University Libraries have joined to create a shared repository on a single server, and this repository was made available beginning in April 2008. The Hiroshima University Library, which serves as the secretariat, freely provides support for the autonomous efforts of individual universities. Fumiyo Ozaki, DRF Coordinating Committee / Hiroshima University Library, says that creating and maintaining a repository is like raising a child. "The experience brings joy, but in order to continue to raise your child you also need to resolve many problems, so it's important to share information with other parents and use the accumulated knowledge from those who have been parents before you. DRF makes this possible."

Also Contributing to Personnel Training and Internationalization

DRF is a relaxed community. Its operating policy is that organizations and individuals that wish to cooperate autonomously should cooperate with one another to the greatest degree possible. Shigeki Sugita, DRF Coordinating Committee / Hokkaido University Library, says the biggest problem that must be resolved in the future is how to maintain accumulated knowledge and personal connections despite a personnel organization in which managers change every few years. "In addition, in order for IRs overall to serve as a forum for academic communication, determining future approaches from an international perspective will be indispensable."

DRF has achieved successes in the area of cooperation with NII-sponsored IR-related training projects. Moreover, DRF is also contributing to standardization efforts. One example is the Memorandum of Understanding (MoU) concluded in 2008 for cooperation with the EU-sponsored Digital Repository Infrastructure Vision for European Research (DRIVER) project.

"In recent years, there has been a dramatic increase in the momentum for IR establishment," says Izumi Sugita, Chief of the Library Liaison Team in the Scholarly and Academic Information Division of the NII's Cyber Science Infrastructure Development Department. "But one of the major roles of DRF is also to establish models for maintaining and expanding the IR following the completion of the CSI-commissioned project, and to work to strengthen cooperation. NII will make the achievements of IRs more visible in order to promote IRs in the future as well."

In terms of the provision of information, IRs fundamentally change libraries from passive to active services. They increase the value of the existence of libraries and increase the motivation of librarians. "I find the most fulfilling part of IRs is the communication with researchers," says Suzuki. "It made me very happy when some researcher told me 'I was really motivated when I realized that people were actually using the IR to read papers I'd written.'"

The hope is that, by helping to energize institutional repositories, DRF can help to energize Japan's entire academic environment.

(Written by Asako Tsukasaki)

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Associative Searches and Well-developed Content Increase the Value of Information

Associative searches provide a broader range of information as compared to ordinary searches used to narrow down the information to locate the data that is needed. Improved technologies for the transmission of information, more well-developed content and collaboration with museums, art museums and so on have resulted in an explosion of sites such as Cultural Heritage Online that have associative search functions.

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Cultural Heritage Online (Fig. 1 top) is designed for people who want to be able to freely enjoy art objects, buildings and other cultural assets. Let's forego the detailed explanation and check it out directly.

At the top of the initial page is a button labeled "Search by Historical Period." Let's search for the Azuchi-Momoyama period (1568-1603), since that's the setting for the current NHK Taiga Drama. The search results show a large number of personal letters. a few paintings and two items of pottery. When you click the box to place a check mark next to both of these items and click the " + Search" button, you are rewarded with the appearance of a large number of vases and jars. One bamboo item is also displayed;

let's look at that one in detail.

This is a work by tea master Sen Rikyu, made of bamboo from Izu-Nirayama. Among the related works is an intriguing bamboo tea scoop named "Teardrop," also created by Sen Rikyu. It appears to be a simple tea scoop, but the explanatory text notes the following: "Ordered by (Toyotomi) Hideyoshi to commit suicide by ritual disembowelment, Sen Rikyu himself fashioned this tea scoop and used it during his final tea ceremony" (Fig. 1 bottom). So this innocuous item was in fact the final work created by Sen Rikyu.

As you follow the associations from one to another in this manner, you accumulate more and more information. But a casual search can also provide unexpected discoveries that draw you in, as in this case. This is one of the real benefits of associative searching.

Upgrading Associative Search Content

Yuzo Marukawa, Associate Research Professor of the NII's Research and Development Center for Informatics of Association, says that the associative search functions of Cultural Heritage Online are unlike ordinary searches that narrowing down information. "They're are somewhat like 'or' searches," he says. "The search calculates the similarity from word patterns in the name, explanatory text etc. for each item and displays the search results in order starting from those with the highest score." Marukawa says the purpose of associative searches is "to provide users with new encounters and new opportunities." For this reason, Cultural Heritage Online is designed to enable even people with no specialist knowledge to locate and enjoy cultural assets.

From the outset, it would be unacceptable if users could not conduct searches without knowing the names of works and artisans. For this reason, the works are organized in terms of categories that are accessible even to a novice: historical period, field, region and so on. Photographs are also provided for every item. When museums and art museums were asked to provide data, one of the requirements was that photographs be included. Photographs have a

Fig. 1   Cultural Heritage Online
(http://bunka.nii.ac.jp/)
This service provides some 15,000 works from the collections of 82 museums and art museums throughout Japan for online viewing. These include the database of cultural treasures officially designated by the Agency for Cultural Affairs. On March 26, 2008, the official release version of the service was made available for public viewing.

Fig. 2   Yuuhokan – Stroll Museum   (http://search.artmuseums.go.jp/yuuhokan/)
The Stroll Museum was devised as an electronic exhibition support system.

Fig. 3   Powers of Information (http://rensou.info/poi/)
An electronic exhibition service created in cooperation with the National Art Center, Tokyo and the Tokyo National Museum. Viewers select any one of 12 categories to view high-resolution images of a variety of works. The sounds deserve special mention.

major impact. However, the text is also very important, as in the example of the work by Sen Rikyu. It would also be unacceptable if the site could only be enjoyed by novices. Accordingly, the site also includes a text-only Cultural Heritage Database that makes it possible to conduct more in-depth research.

Associative searches demonstrate their true potential only when information transmission technologies and content are also available on the Internet. "These three elements are intertwined, so new value can be produced," says Marukawa. It goes without saying that content is important; Cultural Assets Online was made possible through the full cooperation of the Tokyo National Museum, National Art Gallery and other museums and art museums throughout Japan.

Associative Searching as a Guide for Action

The features of associative searching are not limited to those that we have discussed up to now. "I think information has meaning only when it affects people's behavior," says Marukawa. "I want associative searching to shake up people's brains and help them make their next move."

Last time, we pressed the Sen Rikyu "Teardrop" button. This time, let's press the "IMAGINE" button. This button makes it possible to conduct federated associative searches that include 15 other databases (*1) in addition to Cultural Heritage Online. In the "New Books & Topics" section (*2), we find a book entitled "The Unspoken Avante-Garde Nature of Sen Rikyu" (Iwanami Press, 1990). This appears to be a collection of essays on the world of "wabi" and "sabi" created by Sen Rikyu.

Clicking the "Rurubu domestic tourist information" section displays a travel itinerary for visiting the Ichijo-Modoshibashi bridge in Kyoto, where Sen Rikyu's head was put on public display. "We want the users of Cultural Heritage Online to not only enjoy these works on the Web but ultimately to go to the museums and art museums and view them in person," says Marukawa. The real aim of associative searching is to provide a guide for action.

Increasing the Value of Information

The sites with which the NII's Research and Development Center for Informatics of Association is involved are not just attractively designed. Take, for example, the National Art Gallery's Stroll Museum (Fig. 2). Marukawa says this site was created to enable users to enjoy the museum's collection "freely and in an intuitive manner." The site received the Good Design Award (*3) in 2008. That same year, the NII Center's "IMAGINE Book Search" and "Let's Go to Jimbocho" sites also received the Good Design Award in recognition of the excellence of the total design including both system and ease of use.

"Many cultural assets still exist in various parts of Japan," says Marukawa. "We've created a clearinghouse for data on these assets, and we hope that local governments and other entities will make an active effort to provide us with data. For that purpose, we felt we had to make Cultural Heritage Online into a site that institutions would want to register with because it would be to their advantage." Naturally there are problems. One is the issue of copyright. Unavoidably, the popularization of the Internet has produced great changes in the copyright environment. Marukawa says there is no alternative but to deal promptly with the changed circumstances. Marukawa says that he has always been interested in cultural assets. "I consider things that are related to human activity to be arts in the broad sense of the term," he says. "And ultimately I want to begin a federated associative searching service which includes all of them." This effort has already begun. One example is "IMAGINE Arts", which expands the scope of Cultural Heritage Online through the addition of a humanities database and so on. Marukawa's ambitious goal is to make this available online sometime this year.

Marukawa says he wants to use associative searching as the beginning and obtain content from museums and art museums throughout Japan. "I want to provide an environment that can increase the value of information 10 or even 20 times," he says. This wish is coming closer and closer to realization.

(Written by Tomoaki Yoshito)

(*1) In addition to bookstores, used bookstores, Wikipedia etc.

(*2) The Research and Development Center for Informatics of Association has compiled a database of all of the 11,000 new books that are available. The works are categorized according to 1,000 keywords selected from all of the new books, and a reader's guide is also appended to each work. New publications will be added and the reader's guides will also be revised.

(*3) Sponsored by the Japan Industrial Design Promotion Organization. The award was created with the aim of fostering an appreciation of good design on the part of the general public and encouraging both industrial development and richness in daily life.

Matryoshka in the hightech wonderland

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Matryoshki are Russian dolls nested one inside another. Matryoshka was created as hand made wooden craft in the outskirts of Moscow and traveled to Paris in 1900 where it became quite popular. Now I often see colorful matryoshka dolls in many international cities when I travel for conferences and research collaborations. Recently I noticed that Matryoshki are becoming popular in Tokyo too, though the difference in Tokyo is that the image of matryoshka rather than the dolls themselves is increasingly popular. This tweak might be typical in the adaption of foreign culture in Japan in general, and surely Tokyo is a showcase of every detail of this aspect.

Another thing Tokyo is known for is its convenience, a high tech city full of cool gadgets, which range from high speed internet to toilets which automatically open and close their lid and flush for you. This certainly grasps some aspect of Tokyo as visitors from overseas are quite often impressed and appreciate the technology so easily available, though we, NII researchers, easily get frustrated with the slow internet access in the UK and the poor cell phone connectivity in the US. However, whenever visitors jump to the conclusion that the Japanese general public hugely appreciates science and scientists, we cannot help our faces turning sour. In our daily life in Tokyo, we hardly come across any scientific references, just like in a novel by Haruki Murakami.

State of the art science contains new concepts and hence is naturally difficult to understand. As the years pass, new concepts are used and applied in many different ways and situations becoming understood more deeply. Thus it gradually turns into a concept shared widely among people and becomes a part of our culture. The emergence of quantum mechanics began at the end of 19th century and in the late half of the 20th century it was used to support the rapid growth of information processing, which has directly and hugely changed our daily life. However, the word "quantum" is rather unfamiliar to the general public in Japan. In other cities, "quantum" is already a common noun and I often enjoy talking to taxi drivers and shop assistants about my research field, quantum information processing. Why isn't this happening in Japan? I have a suspicion of what is to blame here.

"Quantum" in Japanese is "ryoshi", which is a well-thought translation representing the concept directly. However, at the same time, the look and sound of the word is rather problematic from the viewpoint of public relations. Ryoshi in kanji can be read as "ryoko" which is a common name for girls, hardly anything to do with scientific images. Furthermore, the sound of the word, ryoshi, is exactly the same as fisherman, which might not be relevant to the quantum world of physics. Japanese is rather poor in sound and many words sound the same, however this can be a big disadvantage when we introduce a new word with a brand new concept.

Last year, a chance for "ryoshi" to be promoted as big as I can imagine finally appeared out of the blue sky. Yes, of course I am talking about "Quantum of Solace", the new release in the 007 movie series. I was secretly excited by the idea of the day when finally people on the street spoke the word "quantum" with joy on their face. However it turned out that the title in Japanese went out without "quantum" at all. Though it is a pity that we will never know what people might have thought about a 007 movie with a scientific reference. We've got to know by now that a dream of a scientist like this is hardly granted. Nonetheless I believe that some day "quantum" will find its own place in Japanese culture, and in the meanwhile, I will investigate the way to communicate to the general public on state-of-the-art scientific research. The website "Matryoshka" is one of such activities, entertaining readers with the weird nature of quantum physics.(*) Despite the initial struggle attracting readers, the good news is that the website is gradually getting popular. With the hope for the future, we progress bit by bit towards the tipping point.

(*)www.ryoshi.com is in Japanese only.