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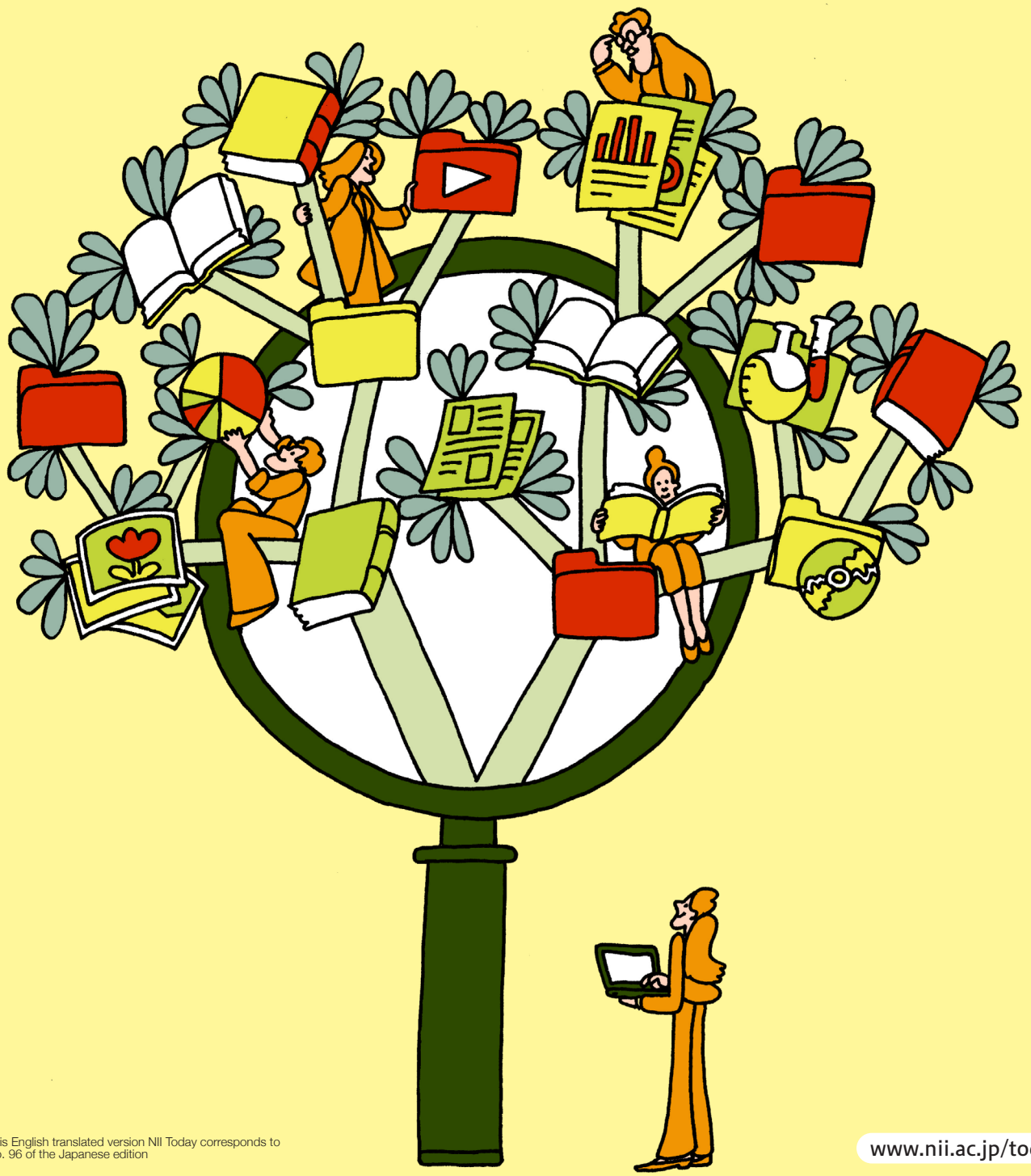
Crystals of knowledge to be discovered

Full-scale launch of CiNii Research



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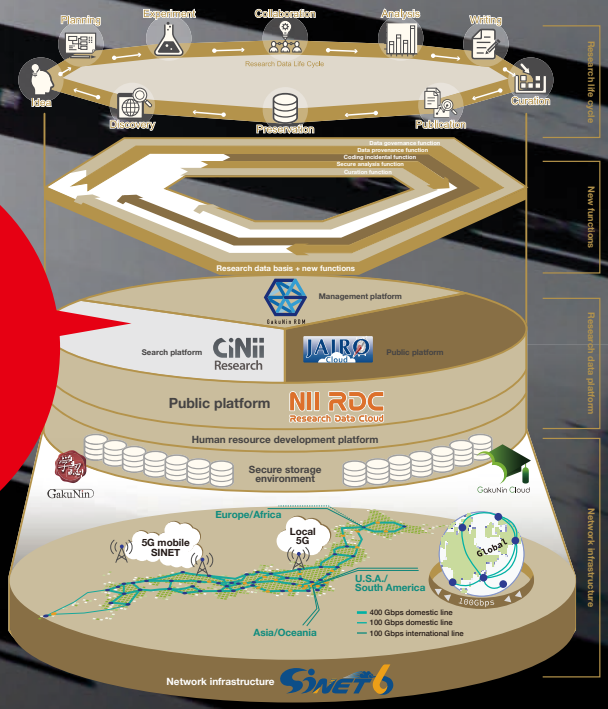
Full-scale launch of CiNii Research

Crystals of knowledge to be discovered

The National Institute of Informatics (NII) acts as a joint research institute for all universities, conducting research to address social issues from the new academic field of informatics.
April 2022 saw the full-scale launch of CiNii Research, a search platform for academic information, the “crystals of knowledge”.
CiNii Research is connected to the high-speed SINET6 network, boasting speeds of 400 Gbps. With this major artery linking universities and research institutes, NII’s vision of a data-driven society is one step closer to becoming a reality.
Issue 96 of *NII Today* features CiNii Research, looking at the advantages it brings and considering what it should look like in the future to adapt to the ever-changing research environment.

NII’s vision of a data-driven society



CiNii Research

Integrated with CiNii Articles in April 2022, creating an academic information search service allowing academic papers, books, research data, and research projects to be searched together

Photography by IMAMURA, Takuya

A hub for a data-driven society “A new platform for knowledge discovery”

interview

Project Associate Professor
Research Center for Open Science and Data Platform
National Institute of Informatics

ONAMI, Jun-ichi

Interviewer
TAKI, Junichi
Senior Writer,
NIKKEI INC.

CiNii Research lets you “find the information you want in ten seconds” and enables “deep search”

The National Institute of Informatics (NII) has launched its new academic information search platform CiNii Research, which allows users to search papers, articles, and other academic information all at once. The new platform is expected to be a hub for the data-driven society paving the way into the future. We talked to one of its developers about CiNii Research and its features.

—What kind of service is CiNii Research?

Academic information search services play a central role in research activities these days. Researchers make discoveries by reading papers—that is something that has not changed—but the focus of activities shifts over time as the world changes.

CiNii (which later became CiNii Articles), the predecessor of CiNii Research, started around 2004 as an article information search service within NII’s academic content portal GeNii (Global environment for Networked Intellectual Information) which was used by many researchers. In 2021, it was newly launched as CiNii Research, a service to boost researchers’ findings by allowing comprehensive searches of research output like research data, not just academic papers.

—What kind of information can be found besides academic papers?

Previously, NII provided different databases—CiNii Articles for academic papers, CiNii Books for bibliographic information, and CiNii Dissertations for doctoral dissertation information. As well as integrating these to allow them to be searched together, it now includes the institutional repository database (IRDB) containing data from universities and research institutes across Japan, plus data from the KAKEN Database of Grants-in-Aid for Scientific Research provided

Two policies for development: “easy access” and “deep search”

by the Japan Society for the Promotion of Science (JSPS).
In other words, we have created a new "knowledge discovery platform" providing comprehensive access to information resources relating to research, from the research data behind academic papers, to the research projects that produced the papers and publications.

Find what you want with a daisy-chain of information

—So it is more than simply integrating several databases?

When developing CiNii Research, we had two policies. The first was "easy access": making it accessible and easy to use, providing a simple way to cross-search around 63.5 million items of research data, academic papers, bibliographic information, and project data. Our target was for a user to be able to get the information they want in just ten seconds.
The second policy was "deep search": finding information buried at a deeper level. We wanted to make it like a daisy-chain structure. When you perform a keyword search, information about articles and papers appears as search results. Rather than just showing the metadata, abstract, and DOI (Digital Object Identifier), the page will also show what papers are cited in that paper, information about other papers that paper is cited in, related research data, information about the research project where that paper came from, and so on. This gives the user a bird's-eye view and allows them to move between information using links. This related information could then lead to a further search, bringing you closer and closer to the information you want.
For researchers using CiNii Research or people who want to leverage research results in society, it is not just a way of comprehensively obtaining the information you need, but a gateway to new discoveries.

—How was this "deep search" achieved?

When integrating databases, we focused on the relationships between data. Each concept in a database is called an entity. For example, "Natsume Soseki", the well-known author of Botchan, is recorded in the database as a single entity.
A database includes connections between these thousands of entities. Rather than simply linking entities, CiNii Research gives meanings to the relation-

I would like more researchers in a wide range of disciplines to make use of CiNii Research, and I hope this will lead to rich interdisciplinary research

ships between them. For example, it would show that Natsume Soseki is the author of *Botchan*, and that *Botchan* is one of Natsume Soseki's works. The structure uses arrows to indicate the inter-relationships between entities.

In a conventional database, data are entered in table format, and then the table can be searched to find the required data. With a general internet search engine, there is a huge amount of data consisting of information that is not organized in any way, and keywords are used to search for related information from this mass of data, which is not always satisfactory for researchers. It is not good enough if you want to do a high-level search. Researchers need to be able to reliably identify who an article was written by, and retrieve it in a simple, stress-free way. The latest knowledge databases are structured such that the relationships between items of data, such as the relationship between a paper and its authors, can be clearly identified. CiNii Research has been developed to meet the needs of researchers, helping them to conduct research more efficiently.

Enabling crossover searches

—It is true that internet search engines do not always give you the information you want the first time.

CiNii Research uses a metadata standard called the JPCOAR Schema, a standard established by the Japan Consortium for Open Access Repositories (JPCOAR) based on international interoperability. This is a standard tool which enables crossover searches.

Assigning data based on this standard has allowed us to link data where the different databases overlapped when integrating it into CiNii Research. For example, if there was insufficient information about a certain researcher in one database, it could be enriched by linking and adding information from other databases. By linking all the data—not just the overlapping area of the Venn diagram, but also the data in the outer areas—it is possible to provide plenty of information about an individual entity.

—How much is it being used?

Since it was integrated with CiNii Articles in April 2022, there have been averages of around 180,000 users per day and around 620,000 page views per day. (as of July 2022)

—What factors are behind the current need for an academic information database like CiNii Research?

One factor is the increasing volume of academic information. These days, there is a major trend to publish not just a paper but all the data associated with it. The background behind this data disclosure is to prevent research misconduct and to ensure that research results are reproducible.

There is also a focus on data-driven research: using existing data to accelerate new research. However, the data linked to a single paper can often reach hundreds of gigabytes or even terabytes. It is difficult to know how to provide such large

amounts of data. Thanks to the internet, there is more international communication, too. We need to think about the best standards and formats for exchanging information. Data should be provided in accordance with international standards.

A hub for the data-driven society of the future

—So that is why the standard based on international interoperability is so crucial.

Interdisciplinary research is increasingly important, too. I myself actually studied biology at university. When I first set my sights on a research career, it was right around the time of the human genome project. In the analysis of genetic information, a connection emerged between biology and informatics, and this is one of the reasons that my field of research gradually shifted to informatics.

Bringing together knowledge and information from different fields can bring unexpected findings.

We are currently in talks with the National Institutes for the Humanities, the umbrella organization including the National Museum of Japanese History and the International Research Center for Japanese Studies, with a view to improving the links for humanities and social sciences research. I would like more researchers in a wide range of disciplines to make use of CiNii Research, and I hope this will lead to rich interdisciplinary research.

—Major academic publishers offer their own academic information search services. What is the significance of being provided by a public research institute like NII?

I think it is vital from the perspective of fairness. A lot of scientific research is funded by taxpayers' money. It would not be desirable to have a situation where academic information is only available to those who pay.

It is important to feed research results back into the public domain. In the United States and Europe, there is a movement towards public academic information platforms. There is the National Center for Biotechnology Information (NCBI) in the U.S., and the OpenAIRE project in Europe which champions open access and open data. We are striving to connect these projects together.

—To boost global research activities, it is important to share academic information with the whole of humanity.

The response to the COVID-19 pandemic made me realize how vital it is to release research data quickly. U.S. repositories have played a major role over the past two years. In Japan, NII's information infrastructure should be central to this.

Information technology has advanced dramatically since the SARS (severe acute respiratory syndrome) outbreak in 2003. We need to put systems into place in normal times to ensure science can respond rapidly in case of an emergency, as a kind of insurance policy.

NII's academic information network SINET has been upgraded to SINET6, allowing even faster exchange of information between universities and research institutes all over Japan.

It provides smooth data linkage between NII's data management platform (GakuNin RDM) and data disclosure platform (WEKO3) and the CiNii Research search platform.

I hope CiNii Research will be used by many researchers as a hub for the data-driven society that will pave the way into the future.

A Word from the Interviewer

In my line of work, I do a lot of online searches for researcher profiles, papers, and so on. I often get frustrated when I cannot find what I want. I think a tool that can perform name disambiguation and show a bird's-eye view of data is required by all of society, not just the science community.

We did not manage to cover this in the main text, but there is also an important debate about to what extent information should be made openly available, from the perspective of economic security. CiNii Research is a search platform and does not play the role of filtering information, but I think this could be a contentious issue from the viewpoint of distributing academic information.

TAKI, Jun-ichi

Senior Writer, NIKKEI INC.

Joined Nikkei, Inc. after graduating from the School of Political Science and Economics at Waseda University. Began covering the front lines of research and development in science and technology, as well as the processes by which science and technology policies are formulated, in the mid-1980s. Currently covers the fields of science and technology, as well as the environment. Author of "Eco-Uma ni Nore!"

photo 今村 拓馬（2~7ページ）

A new search platform revealing patterns in research

Providing discovery, aiming for navigation

CiNii Research allows users to search for information related to research in a daisy-chain fashion. Academic papers, research data, and personal information can now be comprehensively linked using NII's own deep learning technology. We talked to one of the developers, who said: "A feature of CiNii Research is that it can take single points of information and weave them together to provide researchers with a cloth of information."

interview

Associate Professor
Digital Content and Media Sciences Research Division
National Institute of Informatics

KANAZAWA, Teruhito

Interviewer
OHKAWARA, Katsuyuki
Freelance journalist

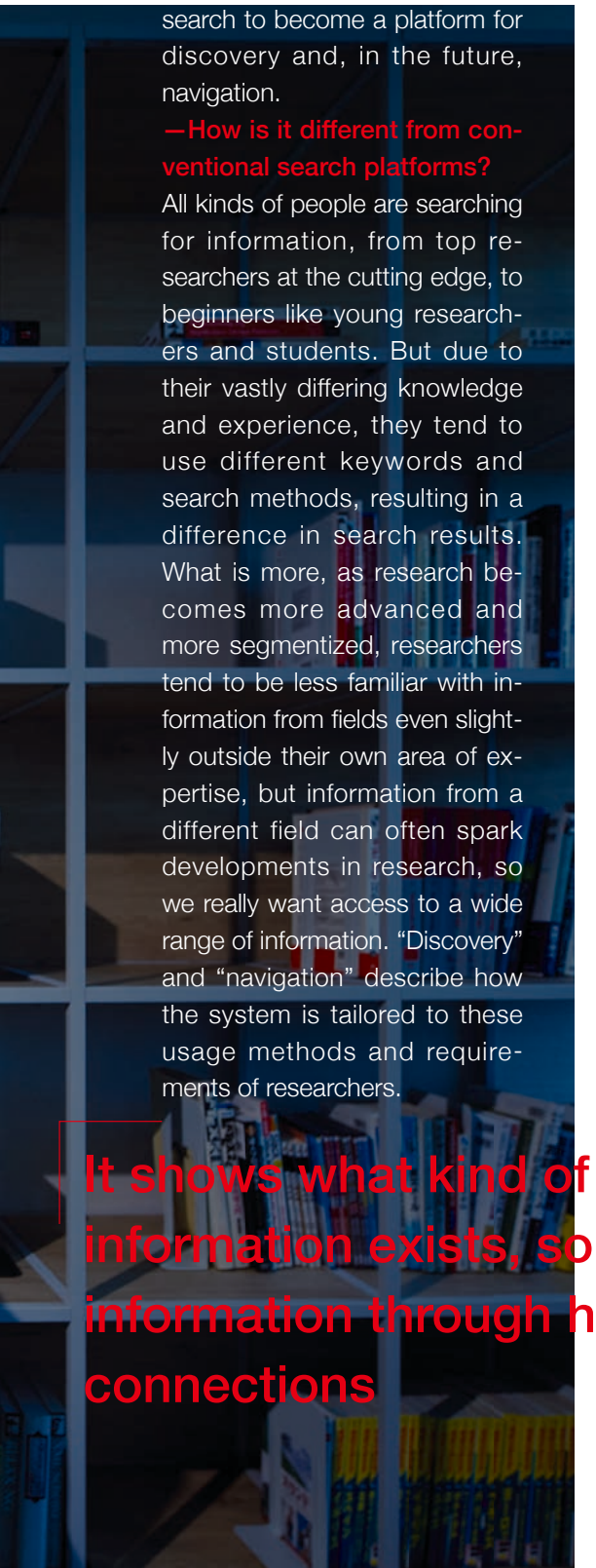
—What is the main feature of CiNii Research?

CiNii Research is an information search platform for people who are looking for academic information. It combines the top-down philosophy of NII, an inter-university research institute providing academic information and promoting open science, with the bottom-up approach that reflects the many research results of researchers on the ground. But if huge amounts of data are simply dumped onto the platform, it will just be a chaotic mass of data. If it only displays items matching your search, you cannot see the horizontal connections between in-

formation, making it difficult to use for research. These are the kind of issues that tend to arise.
With CiNii Research, you can search academic information including papers, research projects, books, and research data, and it shows what kind of related information exists, so you can gather information through horizontal connections. In this way, rather than just a search platform, we want CiNii Research to become a platform for discovery and, in the future, navigation.

—How is it different from conventional search platforms?

All kinds of people are searching for information, from top researchers at the cutting edge, to beginners like young researchers and students. But due to their vastly differing knowledge and experience, they tend to use different keywords and search methods, resulting in a difference in search results. What is more, as research becomes more advanced and more segmentized, researchers tend to be less familiar with information from fields even slightly outside their own area of expertise, but information from a different field can often spark developments in research, so we really want access to a wide range of information. "Discovery" and "navigation" describe how the system is tailored to these usage methods and requirements of researchers.



It shows what kind of related information exists, so you can gather information through horizontal connections

"Discovery" plays the role of a connoisseur, helping users to discover unexpected information related to their search, while "navigation" will act as a navigator or concierge to steer users towards what they need in response to vague requirements.
Data maintenance techniques like automated name disambiguation*1 enable CiNii Research to display related information, so at present we have come as far as "discovery." But we are still working on evolving to "navigation." In the future, as the amount of data increases, we will enable researchers to efficiently find the information they want without getting lost.

The system shows you the best way to narrow down your search

—I believe it also provides faceted search*2 ?

The more information there is, the harder it gets to find what you want. Faceted search supports users with this issue. The system shows you the best way to narrow down your search.
The faceted search in CiNii Research allows you to narrow down your search, for example, to papers in Japanese only, without any text input. It has not yet reached the level of navigation we envision, but I think it will be effective in reducing the effort required to narrow down a search.

—CiNii Articles*3 was integrated into CiNii Research in April 2022. What is the aim of this?

CiNii Articles has been used by researchers to search for academic papers for over ten years. But recently, there has been a growing need for a platform allowing users to view citation information and research data together, not just papers. CiNii Articles was a search service for academic papers, or single points of academic information. But with CiNii Research, even if you start by searching a paper, it links with related information, including books, research projects, and research data, so you can join the points to form lines.
Furthermore, you cannot grasp academic trends or the essential nature of research by looking at one line. It is crucial to join lines together and see it in two dimensions. Extracting several papers by one researcher forms a line in a vertical direction, while data using the same research data and tools to produce different results create a horizontal line. When these vertical and horizontal threads are woven together into a cloth, patterns will emerge. These "patterns" in an area of research are what researchers are interested in. It is important to see the full picture beyond the points and lines, and this can sometimes provide huge clues for research. The role of CiNii Research is to become an everyday tool to show research areas from a bird's-eye view, allowing us to grasp the trends from the whole picture. The name "Research" is meant to convey this.

—What are the features of the "daisy-chain" search in CiNii Research?

When you search using CiNii Research, from the initial point of information that you search for, related information expands both vertically and horizontally, so you can gather related information just by clicking and following the links, without having to think of search terms. This is what we call a “daisy-chain” search. Actually, this was partially provided in CiNii Articles too, but it is much more comprehensive in CiNii Research. The more information that can be pulled out in a long daisy-chain, the wider the range of relevant information researchers will be able to reach.

—What was the key to developing this “daisy-chain” method in CiNii Research?

In a nutshell, it comes down to improving the accuracy of name disambiguation. You may think it would be simple to find people with the same name and determine whether it is the same person, but if people have identical first and last names, it becomes difficult to determine that they are two different people. In addition, Japanese names written with different kanji characters could be spelt the same in the Latin alphabet, and it becomes even more difficult when initials are used.

In the former CiNii Articles, we found ways to distinguish more authors by adding information like which university they belong to or their co-authors. But if the university was not stated or for papers written by a single person, it was difficult to classify entries with identical names, so name disambiguation was not completely achieved in many cases.

In the past, databases did not merge entries with identical first and last names in uncertain cases, but this resulted in one person being recognized as different people, meaning that relationships were not displayed and links could not be made. The name disambiguation system that we have developed uses new technology based on deep learning AI to improve the accuracy of author identification. This enables a level of author name disambiguation that was impossible with previous systems.

Rather than just looking at the name, university, and co-authors to determine whether it is the same person, the new system can estimate whether the research topic is similar to more accurately recognize when entries refer to the same person.

This means that where the daisy-chain of information might have been cut short in the past, you can now keep pulling to reveal a longer chain.

63.5 million items of searchable data

—How much data can be searched in CiNii Research?

At present, the search includes around 63.5 million items of data. Around 50 million of these are academic papers or articles, making up about 80% of the total. You can search from 17 types of data sources, including the Database of Grants-in-Aid for Scientific Research (KAKEN), mainly in the humanities and social sciences.

However, there are only 130,000 items of research data. This is an area we want to increase. We also plan to provide information that can be used for IR*4 research capability analysis and research support by university research administrators (URAs) *5.

However, papers and citations are written very differently depending on the academic society or organization, so sometimes necessary items like the year of publication are left blank. When uploading new information to

Evolving to respond more closely to users’ needs

CiNii Research, we need to look carefully at these items and perform pre-processing to facilitate name disambiguation based on past experience. This requires an appropriate "recipe", and this is where CiNii Research's Data Quality Improvement Team comes in. They direct how raw data should be processed to ensure the quality of search results, which relies on the good sense of the team members.

On the other hand, I do not think we should just upload any and all data to CiNii Research.

CiNii Research covers papers and results of research involving Japanese researchers, and data from research projects based in Japan. For everything else, we just need to provide links to information in cooperation with other academic information services, within the daisy-chain search that is a feature of CiNii Research.

We will develop APIs for mutual use with other academic information services, and at the same time work on data maintenance to facilitate common use.

—You are also working on development of interdisciplinary research support technology. Will this be linked with CiNii Research?

In an ideal world, if you look up research information relating to COVID-19, for example, CiNii Research would allow you to identify researchers actively sharing information in this field and let you access the latest research data. Simply looking at data modeling research results and social science research data side by side would not show how they are related, but through the theme of COVID-19, it is assumed that new research themes will emerge. And we ope that the navigation technology we have conceived will inspire links between researchers in different fields.

—How will CiNii Research evolve in the future?

In the early part of FY 2023, we want to improve the search function so that you can search for a person (profile) by the title of a paper, research project name, or university name, as well as by the individual's name. Identifying people by their ORCID ID or e-Rad researcher number*6 will allow us to make links more comprehensive. As we enhance the system from discovery to navigation, we will also work on improvements to the user interface and data. We will ensure it evolves to respond more closely to users' needs.

A Word from the Interviewer

Professor KANAZAWA says the appeal of CiNii Research is that it "reveals what you could not see, through its daisy-chain structure." For researchers, rather than finding information itself, like a general search service, they often need to accurately search out related information. In Professor KANAZAWA's words, "We are happy that CiNii Research prompts researchers to make new discoveries and helps with research work." CiNii Research really is an academic information search platform created by researchers, for researchers.

OHKAWARA, Katsuyuki

Freelance journalist

Has covered the IT and electronics industries for around 35 years, including as editor-in-chief of IT industry magazine BCN. Published works include *A Quick Illustrated Guide to Big Data.*

***1 Automated name disambiguation**

Applying natural language processing (NLP) technology, machine learning (ML), and deep learning to identify whether entities with the same name or the same initials refer to the same person, based on how much they have in common (affiliation, co-authors, research topics, etc.)

***2 Faceted search**

A mechanism allowing searches to be refined using various elements. Rather than getting users to enter search conditions, the site prepares search conditions that are likely to be frequently used, so users can narrow down content by simply selecting these search conditions.

***3 CiNii Articles**

A search service operated by NII to search for Japanese academic papers. Integrated into CiNii Research in April 2022.

***4 IR**

Institutional Research. Investigative research to inform planning, policy-making, management, and decision-making at universities and other higher education institutions.

***5 URA**

University Research Administrator. Human resources at a university or research institute providing support and implementing, including research project planning, obtaining and managing funding, industry-academia collaboration for social application of research results, and academic PR. In Japan, a system to train and retain university research administrators (URAs) was launched in 2012.

***6 ORCID ID/e-Rad Researcher number**

ORCID ID is a worldwide ID system used to identify researchers. Researchers with identical first and last names can be identified by their IDs. The e-Rad ID is assigned to individual researchers by the Cross-Ministerial Research and Development Management System (e-Rad) in Japan. This ID can be used continuously even if the researcher moves to a different institution.

Tracking researchers to identify research trends

The potential of CiNii Research from a URA's perspective

If you think CiNii Research is only used by researchers, it is time to think again. For a certain profession, the arrival of CiNii Research is a landmark event. We investigate how these professionals make use of CiNii Research.

Project Professor
Research Enhancement Promotion Headquarters
National Institutes of Natural Science

KOIZUMI, Amane

Conducted neuroscience research at Keio University School of Medicine Department of Physiology and Harvard University. Joined the National Institute for Physiological Sciences (National Institutes of Natural Sciences) in 2007 and has been in his current position since 2013. Involved in research capacity analysis and research management as a Supervising URA.

Project Researcher
Research Center for Open Science and Data Platform
National Institute of Informatics

IKEYA, Rue

Research Administrator
Research Administration Center (KURA)
Kyoto Univercity

AMANO, Eriko

Librarian at Kyoto University Library since 1998, in charge of reference investigation and institutional repositories. Research Administrator since 2014. In charge of open science promotion and URA training programs. PhD (Technology Management).

It includes so much data, from peer-reviewed papers to raw research data (AMANO)

There are people who stand alongside researchers, supporting various aspects of their work. These people are called URAs (university research administrators). There are currently estimated to be around 1,500 URAs at universities and research institutes in Japan. They try to create an environment that lets researchers concentrate on their research by providing support, from obtaining funding to managing the progress of research projects, holding research events, and organizing industry–academia collaborations. Recently, many URAs are also involved in Institutional Research (IR)*1: investigating and analyzing the research capacity of a university or research institute and using the results to inform management decisions.

For these URAs, it is essential to utilize domestic and international academic information platforms like CiNii Research.

Gathering information about researchers

AMANO, Eriko is based at Kyoto University Research Administration Center (KURA). As well as training URAs and managing internal funding for researchers, she is working on comprehensively collecting and visualizing information about the books produced by research at Kyoto University.

"At present, we are identifying and acquiring information on books written by Kyoto University researchers from CiNii Books, but this process still requires some human input. I am hoping that we will be able to automate this using CiNii Research."

KOIZUMI, Amane, a supervising URA at the National Institutes of Natural Sciences, is working on the "MIRAI Project" for DX*2 of URA work. He explains how he uses CiNii Research:

"The work of URAs is becoming more diverse year by year. There is no established way of doing each task, so each individual URA has to use their initiative. The MIRAI Project that we are currently working on aims to share the skills and expertise of individual URAs and digitalize the research support activities that URAs provide. We are using CiNii Research to gather information about researchers for this project."

A massive increase in types and quantities of data

"I think the way that CiNii Research is heading is closely related to the work of URAs," says IKEYA, Rue, who has been a project researcher at NII's Research Center for Open Science and Data Platform (RCOS) since April 2021. She was involved in the development of CiNii Research, looking at research evaluation indicators. She previously worked as a senior URA at the Research Organization of Information and Systems (ROIS) and has close links with URAs from other organizations.

"Organizations are very aware of the importance of evidence-based decision making these days. I want to help the work of URAs through the development of CiNii Research," says IKEYA.

AMANO and KOIZUMI both agree that the best point of CiNii Research is the "types and quantity of data".

"In terms of types and quantity of data, CiNii Research offers incomparably more than its predecessor, CiNii Articles. It includes so much data, from peer-reviewed papers to raw research data. I think it is really good for researchers who want to showcase their research capabilities, as well as for URAs who want to analyze research results," says AMANO.

"I agree with Dr. AMANO. You can just enter the name of the researcher you want to investigate into CiNii Research, and you can follow their latest research work, including conference presentations and papers they have written. I feel confident that I have all the data I need," says KOIZUMI.

As they both point out, CiNii Research will help researchers to promote their research results. This will also be useful for URAs

in evaluating and analyzing research.

Expectations for visualization of Japanese-language research results

Japanese researchers publish their research results in languages including Japanese and English. But the overseas academic information platforms that URAs have mainly relied on in the past contain hardly any information on research results published in Japanese. So, until now, the capabilities of Japanese researchers have largely been evaluated based only on papers written in English.

"Papers in English make up only a small part of the research results by Japanese researchers," points out AMANO. "This trend is particularly noticeable in the humanities and social sciences. I have long doubted whether Japan's research capabilities can be accurately analyzed using information from other countries."

This is where CiNii Research will really come into its own.

"Information in Japanese is essential for accurate research IR. I hope that analyzing data from CiNii Research will allow us to properly visualize Japan's research capabilities," says KOIZUMI.

"As well as papers and research data, CiNii Research includes all kinds of output in Japanese, like information on books written by Japanese researchers, which will make it easier to discover research results," adds IKEYA.

Until now, research IR analysis by URAs has mainly focused on research results, but AMANO hopes that using CiNii Research will allow analysis focusing on individual researchers.

"All kinds of data are interconnected within CiNii Research. Using these relationships between data, we will be able to get information like what universities a researcher has belonged to and who they have interacted with. This will enable us to visualize a researcher's whole career and network. I think it will be fascinating to be able to analyze people in this way."

Rather than just seeing research capability in terms of results, we can trace the path a researcher has taken and see the network they have built up. This shows the huge potential of CiNii Research.

More accurate name disambiguation is a top priority

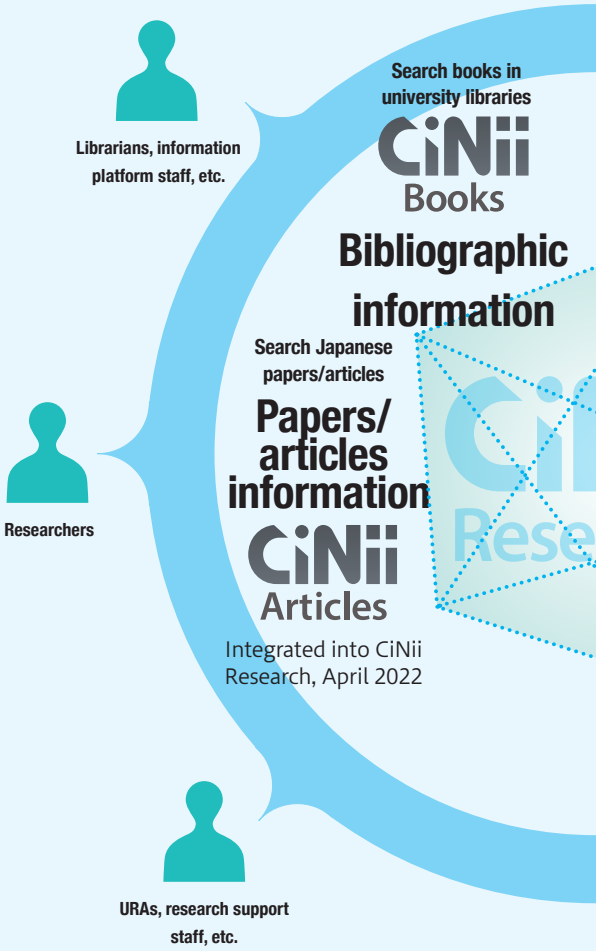
Added functions and improvements are constantly being made to CiNii Research.

We asked KOIZUMI, "What improvements to CiNii Research would you like to see from an URA's point of view?"

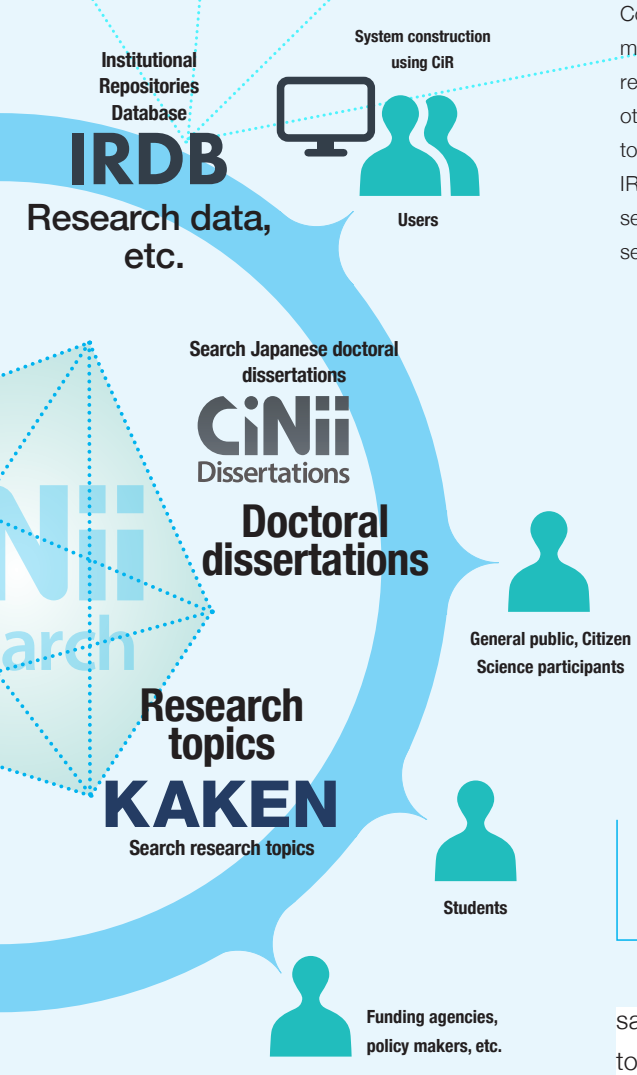
KOIZUMI's reply was "Enhancement of the analysis interface."

He explained: "In the MIRAI Project that I am currently working on, we want to use CiNii Research to trace relationships between people and trends in research. However, the user interface is not yet powerful enough to perform such a big-picture analysis, so at the moment, we are using our own analysis tool to analyze data from

Conceptual diagram of CiNii Research and target users



I want to help the work of URAs through the development of CiNii Research (IKEYA)



***1 IR (Institutional Research)**
Collecting and analyzing data and information to inform decision-making and research planning at universities and other education and research institutes, to support more effective management. IR activities to enhance academic research capabilities are referred to as "research IR".

***2 DX (Digital Transformation)**
Transforming products, services, business models, corporate culture, etc., using data and digital technology to gain a competitive advantage. Unlike simply introducing IT, DX means fundamentally reviewing and transforming the way an organization works.

***3 Name disambiguation**
Uniquely identifying individual researchers and properly linking their personal information and related data (research results, etc.). If name disambiguation is not applied properly in a database, one researcher's work may wrongly appear as the work of another researcher with the same name.

I hope that analyzing search data will help us to better visualize research trends in Japan (KOIZUMI)

CiNii Research. It would be easier if the whole analysis process could be done on CiNii Research."

When we asked AMANO the same question, she replied: "I think improving the accuracy of name disambiguation*3 is a top priority. At present, there are often two or more entries for the same researcher. This is crucial when using CiNii Research for research IR. If the accuracy of name disambiguation can be improved, it should dramatically increase the value of CiNii Research. I think one way of handling the necessary data maintenance would be to work with librarians, as NII has already done for book cataloging information."

Pooling expertise and encouraging cooperation

CiNii Research is not just for researchers; it is a tool that can be used effectively by many people. In particular, it will continue to develop into a vital tool for URAs.

How will the job of URAs change with CiNii Research as a new information platform?

KOIZIMI says it will lead to a broader role for URAs. "Rather than each URA using CiNii Research in a segmented way, we want to create a movement to pool our expertise and cooperate. I hope this will also accelerate DX and show new directions for URAs."

IKEYA believes it will also play a role in connecting URAs and librarians. "I hope CiNii Research will contribute in terms of collaboration between librarians, who are experts in data structure and academic information platform, and URAs aiming to improve their analytical skills."

CiNii Research does not just make connections between data. Perhaps it can become a new platform connecting people, too: connecting URAs to other URAs, or URAs to librarians. By forming all kinds of connections, what kinds of chemical reactions will CiNii Research set off?

Reporting and writing by OTA, Makoto/Photography by KAKE, Makoto (page 12)

members

Associate Professor
National Museum of Japanese History
National Institutes for the Humanities

GOTO, Makoto

Specializes in historical informatics and humanities informatics. Studying the collection and utilization of humanities research data, and building data infrastructure for historical resources in regions of Japan and historical research utilizing these resources. Also involving humanities research evaluation.

Senior Engineer
Materials Data Platform Center
Research and Services Division of Materials Data and Integrated System
National Institute for Materials Science

TANABE, Kosuke

Engaged in the design, development, and operation of academic information distribution systems including library systems, researcher directory systems, and data repositories. Previously research assistant at the Graduate School of Bionics, Computer and Media Sciences, Tokyo University of Technology. Member of the CiNii Research Study Group.

Research Support Planner
Research Support Division
Hokkaido University Library

YAMAGATA, Tomomi

Before current role, was responsible for purchase and management of resources for the university library and worked in the secretariat of the Japan Alliance of University Library Consortia for E-Resources (JUSTICE). Mainly interested in how academic information distribution is changing with the spread of open access.

A research platform providing navigation across disciplines

Roundtable

Researchers and librarians talk about CiNii Research's strengths and their expectations

CiNii Research has entered a new phase,
coming into full operation from April 2022.
We asked people who search for and utilize data for
their honest opinions from their own perspectives.
What value do they find, and what are their expectations?

—Firstly, I would like to ask each of you about your involvement with CiNii Research, and how you use it.

OHMUKAI: Up until three years ago, I worked at the National Institute of Informatics (NII) as a development leader on the CiNii*1 series. I was involved with CiNii Research until the stage of considering the basic concept and drawing up a roadmap for development.

I am currently at the University of Tokyo's Faculty of Letters. My research theme is how researchers and students in the humanities will use this kind of information technology and how data should be created for that purpose, so I am looking at CiNii as a user.

GOTO: Purely from a user's point of view, of course CiNii Research is a starting point when searching for the papers you need. Before start-

Associate Professor,
Center for Evolving Humanities
University of Tokyo Graduate School of Humanities and Sociology
Visiting Associate Professor, NII

OHMUKAI, Ikki

Assistant professor and associate professor at the National Institute of Informatics before taking current position. Involved in research, development, and education in humanities informatics, web informatics, and academic communication. Published works include *ウェブがわかる本: Understanding the Web* (Iwanami Shoten). Chair of the Future Scholarly Information Systems Committee.

Associate Professor,
Faculty of Business Sciences
University of Tsukuba
Visiting Associate Professor, NII

YOSHIDA, Mitsuo

Before starting current position, was assistant professor at the Graduate School of Engineering (Department of Computer Science and Engineering), Toyohashi University of Technology. Current research involves quantitatively and empirically observing and analyzing social phenomena, mainly using large-scale data from the web. Co-author of *Introduction to Computational Social Science* (Maruzen Publishing).

***1 CiNii**

CiNii is the collective name for CiNii Articles, CiNii Books, and CiNii Dissertations. Currently, CiNii refers to CiNii Research, CiNii Books, and CiNii Dissertations. CiNii Research is the latest service evolution of CiNii.

***2 Data repository**

"Repository" means a place where something is stored. A system of centrally storing, managing, and providing various data such as research, experimental, and statistical data.

ing my current position at the National Museum of Japanese History, I taught at a small private university in Kansai. When teaching students, I always used to say: "First look it up on CiNii, then we can talk about it."

When I took my history students on a trip to Tokyo, from the ruins of Edo Castle, we could see the building where NII is based. I pointed it out to the students and told them "that is the home of CiNii" and they all put their hands together in gratitude! (laughs)

YAMAGATA: From my perspective, working at the university library of Hokkaido University, when explaining the different services to new students, CiNii Research is one of the first things we introduce them to.

We also tell them about the "Web of Science" (database of academic papers) and "PubMed" (database of academic papers in medicine and biology), but because CiNii Research is in Japanese, it is more accessible for beginners, and easier for us to introduce.

Another aspect of library work is ILL (interlibrary loans), where it is used to check whether another institution has the resource that you want.

TANABE: My personal involvement is that I give opinions as a member of the CiNii Research Study Group.

At the National Institute for Materials Science where I currently work, I am involved in the development and operation of data repositories *2. Related to this, one major challenge is collecting our institute's experimental data on materials science and uploading the data to CiNii Research for open use.

YOSHIDA: At the University of Tsukuba, I am mainly involved in SNS research and, recently, research on academic information retrieval. As a visiting associate professor at NII, I am involved in examining the development of new functions within CiNii Research.

To be honest, in my job, I often need to look up English language resources, so I use my university's own system, Tulips Search, which

I hope it will continue to be a service that is easy for beginners to use in Japanese [YAMAGATA]

provides access to full texts within the scope of the contract, so I do not often have opportunities to view abstracts using CiNii Research.
But I sometimes use it if a researcher appears on TV and I want to find out what they have written.

—What are the strengths and weaknesses of CiNii Research?

GOTO: I think the greatest benefit of CiNii is the ability to comprehensively search Japanese-language documents. I particularly appreciate being able to search papers and books at the same time since it became CiNii Research. It offers comprehensive coverage with few omissions. In the humanities in particular, if you are dealing with Japan, it is important to be able to accurately search the Japanese-language documents, so this is a major advantage.

OHMUKAI: Like Professor GOTO, I am looking at it from a humanities perspective. I think a major difference between the humanities and the sciences is that research is evaluated not just from academic papers but from a mixture of papers, books, and so on.
With the new CiNii Research, as well as papers and books, you can even find out what research projects someone is currently working on. I think one of its strengths is being able to see all the research a certain person has done on a single screen.
On the other hand, I would not go so far as self-branding as such, but I do feel that researchers need to be aware of how they are seen.

YAMAGATA: Personally, I feel it has become somewhat more difficult to understand how to access the full text, compared to the former CiNii Articles.
It might be because I was familiar with the pre-integration CiNii series for so long. I would like to see better accessibility at a glance.

GOTO: This is actually the flip side to what I said earlier. While I appreciate being able to search for papers and books at the same time, I do feel that this has made it more likely for unwanted information to get mixed in.
Of course, this can be resolved by refining your search techniques, but I think the need for such techniques is itself a weakness.
Having said that, I am involved in many integrated search systems, and this is a problem that always arises. The ability to search information of different qualities together is an advantage in terms of completeness, and can sometimes lead to unexpected discoveries, but it makes it difficult to judge the quality of information. If this issue could be resolved, it would make the system easier to use.

YOSHIDA: This is something can be said for all abstract databases, not just CiNii Research, but I think one weakness is that you do not know the scope of articles that can

What I appreciate most is being able to search papers and books at the same time [GOTO]

Approaches and ways of using CiNii Research

- ☐ One of the first academic information services introduced to new university students.
- ☐ A “starting point” when searching for the papers you need. When teaching students, I always say: “First look it up on CiNii, then we can talk about it.”
- ☐ Used for ILL (interlibrary loans) to find out whether another institution has the resource that you want.
- ☐ Used to find out what a certain researcher has written.

be searched.

I have been using it for a long time, so I can get some idea of the scope by looking at the list of databases included, but students who are new to it would not be able to get any idea of the scope. In fact, many people do not understand the difference between abstract databases and publishing systems like electronic journals, which often makes it difficult to find what they are really looking for.

YAMAGATA: Certainly, many beginner students do not understand the different between a database providing full text access and a database of abstracts.

Within a university network, access to contracted content like electronic journals is all connected and seems seamless, which makes such problems more likely. In terms of my own work, perhaps this is something we should teach students as part of our university library guidance.

TANABE: There are no students at my research laboratory, so we do not often use CiNii Research. Specialized researchers tend to look at the same database services every day. They seem to mostly use commercial databases like Web of Science and Scopus (databases of academic papers) or Google Scholar (database of academic papers).

If you want to investigate specialized data in depth, I feel that CiNii Research is not really adequate. For that reason, I wish there could be a bit more connection between CiNii Research and specialized databases.

As Professor GOTO said earlier, it is quite hard to understand "why are these data here?" For example, if something is simply labeled research data, does it have supplemental data from a journal, or independent data unrelated to a journal? As it stands, this seems rather difficult to know. I think there is also the issue of how meaningful the results are for research data when the search only includes documents from Japan.

Future of collaboration linking to content

—From what we have discussed, "collaboration" seems to be a major issue for an abstract database.

GOTO: Looking to the future, I think there is room to consider how many of the services providing research resources can be covered.

For example, the National Diet Library is building an integrated search service for digital archives called JAPAN SEARCH. Should catalog data from such sources be added to CiNii Research? I think this could be one issue for discussion. The reason why I say an "issue for discussion" is that the characteristics are very different, so we need to consider whether it is desirable to have it. More searchable in-

Strengths and roles

- ☐ Extremely effective when searching for papers in neighboring fields.
- ☐ Comprehensive search of Japanese-language documents.
- ☐ Now possible to search academic papers, books, research data, and even ongoing research projects at the same time.
- ☐ Gives an overview of the research a researcher has done on a single screen.
- ☐ The ability to search information of different qualities together is an advantage in terms of completeness, and can sometimes lead to unexpected discoveries.

I wish it would offer a bit more connection to specialized databases [TANABE]

formation means more noise, so this is something we need to consider carefully.

TANABE: Earlier, I mentioned linking to specialized databases. Another difficulty is the relationship with closed databases. In the field of materials science in particular, data-driven research is progressing rapidly. But for various reasons, like the highly competitive nature and the details of joint research agreements, some data cannot be made openly available, or it would be extremely difficult to do so. Of course, CiNii Research would not easily be able to collect such closed data, but I wish it could offer good navigation at least.

OHMUKAI: In research, if you do not end up with the information you need, it does not matter how good the abstract is. An abstract is just one resource for deciding whether to pick up a paper.

Currently, the process of obtaining information is not always the same. Some information can be downloaded immediately with a single click. Some books you can just go to the library and it is there on the bookshelf. Others need to be ordered in. With routes to the goal becoming more diverse, the question is what scope should be covered? Or for something that is outside that range, how smoothly can it lead to the next action?

We originally called CiNii an "academic information navigator", but I think the meaning of the word "navigator" has changed a lot over the past ten or twenty years. I think it would be good to improve data and usability so that people will recognize CiNii Research as an important component in the overall process of obtaining information.

YAMAGATA: Particularly for academic papers, because DOI (digital object identifiers) *3 are now widely used, if you can confirm that a paper exists using CiNii, going onwards from there is much easier than it used to be. Whether you can actually access it from there depends on the type of content and what kinds of contracts your university has.

OHMUKAI: Information ID has cer-

How can we increase opportunities for the general public to access academic papers? [YOSHIDA]

Hopes for the future

- [ ] How much can we collaborate with services providing research resources? But more searchable information means more noise, so we need to carefully consider whether it is desirable to have it.
- [ ] I would like it to link to specialized databases to allow users to search for specialized data.
- [ ] For closed data, the data cannot be collected easily, but I would like to see good navigation.
- [ ] I would like data and usability to be improved so that people will recognize CiNii Research as an important part of the overall process of obtaining academic information.
- [ ] How can we find "connections that users have not thought of" and how can we take them to "points they never thought of"?
  Theme of navigation for the 2020s.
- [ ] If it is to be used by the general public, some kind of system similar to book reviews might make it easier to use.

tainly improved dramatically in the last twenty years. As ID systems advance, users can benefit from the power of libraries and other databases with very little effort. So, once you know the title of a book, you can access the book. Once you know the title of a paper, you can access the paper. Users now take this for granted.

That being the case, perhaps we could say that the theme for navigation in the 2020s should be how to find "connections that users have not thought of" and how to take them to "points they never thought of".

Where can we take a user in response to a question with no goal? Rather than saying "now that ID systems are in place, it will be the same whoever does it," I hope there will be more and more room to try harder than ever.

Future prospects for CiNii Research

—Professor OHMUKAI has already touched on this, but what about the future?

YAMAGATA: CiNii Research is a public platform, a gateway that beginners can easily use in Japanese, and a friendly presence. I hope all this will continue without being lost.

Meanwhile, the research cycle is becoming very fast. The actual flow of research may not have changed that much, but the distribution of academic information is changing. Data used to be just stored in a laboratory, but now researchers want to publish preprints *4. I hope CiNii Research will continue to change with the times.

GOTO: Core specialist researchers probably will not use CiNii Research much. I think this is true of integrated search services in general.

That is because an integrated search service is a kind of guidepost, and these people already know the way.

But I think CiNii Research is very powerful in terms of education or for beginners. Although it does not go as far as "integrating the humanities and the sciences", CiNii Research is very effective when searching for papers in neighboring fields.

When I want to find out about something outside of my specialty, I first look it up using CiNii Research to get a sense of the field and find out who is involved in research. It might even provide a starting point to connect people across fields. I think this will be effective in the future.

YOSHIDA: Something else I have been thinking about recently, although this may seem obvious, is that only information about the writer appears on academic papers. But when you buy a book, I am sure you usually look at the rating on Amazon or book reviews in the newspaper and so on. You do not read an academic paper because someone has recommended it; you still have to actively search for papers.

Of course, I do not like the idea of anyone being able to add a review to a paper however they like (laughs), but from the perspective of increasing opportunities for the general public to access academic papers, I think it would be good to think about adding some kind of starting point. CiNii Research in particular is a publicly open service. If we want many people to use it in the future, not just researchers, then this kind of system might make it easier to use.

There is more and more room for CiNii to try harder than ever [OHMUKAI]

***3 DOI (Digital Object Identifier)**
DOI stands for Digital Object Identifier, an international identifier (code) assigned to digital content.

***4 Preprint**
A version of an article published or posted online before appearing in a journal or being peer-reviewed.

Interview/Written by KAWABATA, Hideki

NII NEWS TOPICS

Period

Period :
May 7 (Sat.) to
August 4 (Thu.), 2022

More details about news items are available online.(in Japanese)
www.nii.ac.jp/news/2022

Obituary

FURUI, Sadaoki, Executive Director of Research, National Institute of Informatics
Passed away on July 31, 2022.
Our sincere condolences.

Event report (1)

"Our academic platform has taken off" Open Forum 2022

This year's Open Forum included the opening ceremony of SINET6, which was launched in April 2022, and several online sessions around NII's Research Data Cloud (NII RDC) including a night session on the "Data Management Platform Handbook for Open Science". A total of 8,333 people accessed the sessions during the event from May 30 to June 2. We greatly appreciate so many people taking part. Documents and videos of the sessions can be found on the website below.
https://www.nii.ac.jp/openforum/2022/

Guests at the opening ceremony of SINET6, which was live-streamed.

NEWS RELEASE 2022

Jul. 27 An overview of personal information protection rules for research in the big data era: "Data Management Platform Handbook for Open Science" published

Jul. 7 Development of new methods to mathematically prove the safety of self-driving vehicles: Speeding up society's acceptance of automated driving by efficiently deriving logical safety rules

May 24 Data science in the response to the COVID-19 pandemic: Lecture by Dr. NAGAI, Ryozo, President of Jichi Medical University, and discussion with KITSUREGAWA, Masaru, Director General of NII. Keynote speech on opening day of NII Open House, Friday June 3

May 17 Learn programming thinking at the National Institute of Informatics Open House: Computer Science Park on Saturday June 4, online and in Tokyo, Hamamatsu, and Himeji

May 16 Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology (Science and Technology Promotion Category) for the research and development of the Researchmap research information infrastructure service: Jointly awarded to ARAI, Noriko (NII); MASUKAWA, Ryuji (NII); and MIYASHITA, Hiroshi (Uniadex)

May 13 NII Weeks 2022, from Monday May 30 to Friday June 10. Our Open Forum on Informatics, NII Open House, and Japan Open Science Summit will be held on consecutive days to introduce NII's work to a wide audience

EVENT 2022

▶ www.nii.ac.jp/event/2022

- □ Oct. 14 Workshop on advanced network utilization research: ADVNET2022
- □ Sep. 9 55th "DX Symposium for Educational Institutions" (held online)
- □ Sep. 6 ERATO Project Colloquium by SANADA, Takahiro, Kyoto University
- □ Aug. 19 54th "DX Symposium for Educational Institutions" (held online)
- □ Aug. 17 Talk on "Privacy-Preserving Generative Model for Images"
- □ Aug. 16 Talk on "Security Intelligence: New Paradigms for Networked Security"
- □ Aug. 8 Talk on "How Autonomous Vehicles can contribute to Smart City"
- □ Jul. 27 29th Cloud Seminar for Research and Education "IoT services"
- □ Jul. 22 53rd "DX Symposium for Educational Institutions" (held online)
- □ Jul. 1 52nd "DX Symposium for Educational Institutions" (held online)

AWARD 2022

Jun. 15 A paper by Prof. Emeritus HASHIZUME, Hiromichi et al. was selected as a Specially Selected Paper by the Journal of the Information Processing Society of Japan (announced on June 15, 2022)

May 24 Prof. ARAI, Noriko (Information and Society Research Division) awarded the 4th JTS Academic Award

May 15 A paper by Prof. Emeritus HASHIZUME, Hiromichi et al. was selected as a Specially Selected Paper by the Journal of the Information Processing Society of Japan (announced on May 15, 2022)

INFORMATION 2022

Jul. 29 Computer Science Park 2022: Videos and documents of lessons for parents and children to enjoy at home

Jul. 28 National Institute of Informatics FY 2022 Overview (Japanese version) published

Jul. 26 NII Open Forum on Informatics 2022: Lecture videos and documents posted online

Jul. 7 Osaka University Multimodal Dialogue Corpus (Hazumi) online version became available

Jun. 22 Deciding the next Director General of the National Institute of Informatics

Jun. 9 Published introductory video for the Rinrin-hime information security course

Jun. 1 PR magazine NII Today No. 95 “Knowledge yet to be discovered: SINET6 is here!” was published

May 17 Open House 2022: List of demonstrations and posters online and at the in-person venue

- □ **Jun. 21** ERATO Project Colloquium by HAMANO, Masahiro, prof. Miin Wu School of Computing, Taiwan, will be held on June 21st
- □ **Jun. 14** The 16th NTCIR Conference - Evaluation of Information Access Technologies
- □ **Jun. 13** MIT-NII Workshop on Probabilistic Computation and Human Intelligence
- □ **Jun. 10** 51st Cyber Symposium on Online Education and Digital Transformation in Universities and Other Institutions “DX Symposium for Educational Institutions” (held online)
- □ **Jun. 3** NII Open House 2022 (public presentation of research results) [Hybrid event]
- □ **May 30** SINET6 Opening Ceremony
  NII Open Forum on Informatics 2022 (held online)

Event report (2)

Open House 2022 “Exploring the future of informatics”

Our Open House event is held annually to present and publicize NII’s research results. This year’s Open House was a hybrid event, held both in-person and online on Friday June 3 and Saturday June 4. The first in-person event in three years included keynote speeches, conversations, exhibition of research posters, and the Computer Science Park (beginner and intermediate levels). The online event included live-streaming from the venue and poster sessions, with participants from Japan and other countries. Around 833 people took part and watched over the two days. Videos from the event can be found on the website below.

https://www.nii.ac.jp/event/openhouse/2022/

Dr. NAGAI, Ryozo, President of Jichi Medical University (right), who took part in a conversation following the keynote speech, and KITSUREGAWA, Masaru, Director General of NII

Young researchers from NII held a lively discussion with Director General KITSUREGAWA about the future of IT.

We want your feedback!

Please let us know what you think about this magazine.

www.nii.ac.jp/today/iken

Bit
(NII Character)

[Essay]

Ever-changing CiNii

Adapting to new needs

CiNii is one of the best-known services provided by the National Institute of Informatics (NII). New employees who have recently joined NII often mention that they used CiNii during their student days. We talk about CiNii, but in fact the service has completely transformed over time. When CiNii was first launched in 2005, it was integrated with search services provided by NII, such as the NACSIS-IR database of academic papers and NACSIS-ELS. Later, by incorporating information such as journal articles on J-STAGE and institutional repositories, and by linking up with Google, usage increased rapidly.

This put extra load on the CiNii service itself, meaning the system architecture needed to be revised. In 2009, as well as rebuilding the architecture, the user interface was also updated, resulting in improved system stability and usability. The user interface designed at that time still forms the basis of the present design of CiNii Research and other CiNii services.

Before Webcat—provided as a search service for NACSIS-CAT bibliographical data—was ended in 2012, CiNii Books was officially launched, in November 2011, as its successor. At that same time, the name of the existing CiNii service was changed to CiNii Articles.

In 2013, the regulations for academic degrees were revised such that all dissertations awarded from April 2013 onwards were required, in principle, to be published online instead of in print. This prompted the launch of CiNii Dissertations in October 2015 as a search service for doctoral dissertations.

Since the mid-2010s, there has been a global movement promoting open science, leading to growing demand for papers and research data to be made openly available. We launched a preview version of CiNii Research in November 2020 that allowed integrated searches of academic papers, research data, projects, and so on. After adding more detailed search capabilities and search functions using logical operations to the preview version, CiNii Research was officially launched in April 2021.

This meant that CiNii comprised four different services: CiNii Articles, CiNii Books, CiNii Dissertations, and CiNii Research. However, because CiNii Research includes data on academic papers, books, magazines, and doctoral dissertations, CiNii Articles was merged with CiNii Research in April 2022, with the article search function integrated into CiNii Research. We are also considering merging CiNii Books and CiNii Dissertations into CiNii Research in the future.

So, over time, the services within CiNii have transformed to meet new needs in light of political changes and global trends in academic information. There are sure to be more changes affecting academic information in the future. I look forward to seeing how CiNii will adapt and adjust.

Head of Academic Content Team
Cyber Science Infrastructure Development Department
Scholarly and Academic Information Division
National Institute of Informatics

SAKAGUCHI, Koji

Weaving Information into Knowledge
NII

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