NII News

National Institute of Informatics

No. 2 2001

National Institute of Informatics News No. 2

Prof. Yasuharu Suematsu, who was the former president of Kochi University of Technology and Tokyo Institute of Technology (Titech), was appointed as the Director General in April 1, 2001.

Prof. Suematsu received Doctor degree from Electrical Engineering Department of Titech in 1960. He became a professor and a dean of Engineering Department of Titech (1986 - 1988). He served as the President of Titech from 1989 to 1993 and as the President of Kochi University of Technology from 1997 to March 2001.

His research area is optical communications and he has done pioneering work in long-wavelength single mode optical fiber transmission, semiconductor lasers, integrated optics, and optical transmission lines.

He served as the President of the Institute of Electronics, Information, and Communication Engineers from 1992 to 1993. He was a chairperson of the Council for University Foundation and School Cooperation of the Ministry of Education, Science, Sports and Culture (up to 2001). He is a vice chairperson of Japanese National Committee for UNESCO, a chairperson of the science division of the Council for Science and Technology, a member of the Science Council of Japan, etc. Thus, he is actively engaged in the field of science and technology, and higher education.

In his relationship with NII, he was a member of Board of Councilors of National Center for Science Information Systems(NACSIS) from 1990, which was the former NII. He participated in a committee for establishing and organizing NII as a vice chairperson of "Preparatory Committee of Establishing Core Information Research Institute". He became a member of councilors of NII after it was established in April 2000.

Yasuharu Suematsu
Director General, National Institute of Informatics

Inaugural Address

I had the privilege of taking the office of Director General of National Institute of Informatics (NII) in April 2001. Since then, I have committed to make my best efforts for the management and operation of NII, and would like to ask you for your kind cooperation.

In less than one year after NII was established, we unexpectedly had the very sad experience of the sudden death of Dr. Hiroshi Inose, the former Director General of NII. Dr. Inose worked hard for the establishment of this institute. Once again, I would like to express my deepest regret at his death and to pray for his soul. Dr. Takamitsu Sawa succeeded the office of acting Director General of NII and successfully carried out the management of this young organization with the support of the entire staff of NII. I would like to express to them my sincere appreciation.

I have always had a very strong interest in the development of this extremely important organization for informatics. I was a member of Board of Councilors of National Center for Science Information Systems (NACSIS) for 11 years since 1990. During the time, I also served as a member of the Third Party Review Committee of the Center, as well as of the Core Institution for Scientific Research in the Information Field Coordination Committee, and of the Core Institution for Scientific Research in the Information Field Preparatory Committee of NII. NII, born as a great

leap from NACSIS, has a profile as an inter-university research institute to provide opportunities for the pursuit of comprehensive research on informatics and the development and of improvement of infrastructure for dissemination of scientific information. Now, informatics has become a critical research field for the support of the national policies regarding information technologies (IT). The number of the people who pay keen interest in NII is rapidly increasing.

At the same time, NII is faced with a strong urge to be operated as an Independent Administrative Corporation. NII must have a sound capability enough to properly carry out its mission and work it at the international level. Further, Dr. Kinji Ono, Executive Director of Research, and other staff have been making great efforts for the forthcoming inauguration of the Department of Informatics of the Graduate University for Advanced Studies in 2002. It is strongly expected that this doctoral course will become the foundation that will nourish a new work force and the fresh viewpoints of its students will contribute to the advancement of the systematization and studies of informatics.

Finally, we heartily wish that with your assistance and cooperation, this young institute could do a good job in achieving its goals.

Professor and Director , Intelligent Systems Research Division

Haruki Ueno

Graduated in 1964 from the National Defense Academy (electricity engineering major); completed in 1971 the doctor's course Graduate School of Engineering of Tokyo Denki University; D. Eng.; served as lecturer at Aoyama Gakuin Univ., professor of Dep. of Engineering, Tokyo Denki University, and professor at Research Information Research Division, NACSIS; took the present post in April 2000; covers specialty in intelligent engineering, information engineering and education informatics; in addition to 1985 Excellent Prize of the Science & Technology Book Culture Award of the 4th Nikkan Kogyo Shinbun for his work "Introduction to Intelligent Engineering" (Ohm publisher), given others including the Distinguished Service Medal from Japanese Society for Artificial Intelligence in 1986; and, serves as representative for the group "Research on Concept Formation and Practical Technologies of Symbiotic Information Systems(SIS)".

In the 21st century it is expected that an environment will be realized in which every person can utilize various information services from his or her room: benefits of information services can be enjoyed by any one at any time at any place. Or, it may be able to say that, in the advanced information society, every one has the right to utilize advanced information technologies (ITs).

Our history has shown that the progress of software (in a broad sense) is very often far behind that of hardware. The process towards the practical application of ITs will start from the first stage where limited number of people can enjoy its benefits, proceeding to the second stage where those who have had training of certain level can, and then to the third stage where every one can without difficulty. Telephone, TV and camera are some examples of the technologies in the third, matured stage.

ITs are now entering into the second stage towards the practical use, but not yet the third. At present, some involvement by the National Government in the information literacy education is required, but ultimately, ITs have to gain a position where no such education is necessary so far as they are used in ordinary ways. It is not natural that so-called digital divide leads to the generation of the weak in information. Despite Internet-browser, E-mail, i-mode, etc that have helped ITs become familiar with us, the present situation is far from its ultimate goal. Universality and multi- functionality, unique characteristics of ITs, make it very difficult to overcome this situation.

Therefore, it is necessary for us to change our way of thinking and to take an approach that computers and information systems, not users, should be educated and trained. In other words, the research and development of "intelligent information systems" is essential. Although practical problems or issues of products commercialization may be solved by the industry, the development of fundamental concept and the fundamental studies based on long-term perspective are the challenges that universities and inter-university research institutes, such as NII, should pursue.

Symbiotic Information Systems (SIS) have been proposed as a research subject in which the realization of the situation that information systems are naturally integrated into people's living is aimed at. In this field, the issue of how people and information systems should be in the advanced information society, and relevant theories and technologies as well, are pursued. SIS have an especially strong relationship with research on artificial intelligence (AI) in the sense that it aims at the development of intelligent computers. Nevertheless, I think that SIS is a more general, important challenge in the field of informatics. Recently, NII has designated SIS research as one of its leading subjects for the coming five years and launched it as COE project. This project focuses on the construction of concept and theories of SIS and research on technologies. We would also make efforts to help nonspecialists understand SIS by means of concrete and easy-to-understand prototypes and exhibitions, and further to get their response back to our research.

We are the first in the world to suggest SIS research, but many researchers have engaged in its related studies, such as human-machine collaboration, easy-to-use computers, intelligent human interface, natural language-phonetic interaction, intelligent information retrieving

systems and humanoid robotics. In the light of ultimate goal of SIS, these are however far from it, and further they have been studied separately. We are making an attempt to integrate them based on the concept of SIS and to give a long-term goal.

Answering the social urge is one of the critical stances that IT research, in particular SIS research, should maintain, among different scientific research areas. However unfortunately, many of Japanese IT researchers in general appear to be able to catch the fashionable subjects, but not those involved in thinking. Since papers and discussion in the academic community only provide limited range of new suggestions/Japanese IT researchers with history and tradition that are different from those of western countries will be required to turn their ways of thinking to discover goals and themes of studies through the actual communication with the society.

Symbiotic Information Systems(SIS) mean the environment where people and information systems naturally co-exist. A biological term "symbiosis" gave a clue for the creation of this concept. Now, SIS is defined as follows: symbiosis means a state that constituents of a system are individually of autonomic nature, respect to each other, and cooperate to form communities; symbiotic community means a community formed based on SIS as defined above; and, Symbiotic Information Systems (SIS) mean a system that is composed of people and information systems based on the concept of symbiosis. Thus, SIS requires typically interdisciplinary studies.

Because NII is an only inter-university research institute in Japan, research on SIS will have to be promoted in collaboration with universities, other institutions and companies in Japan and foreign countries. We will appreciate if many will participate in this project in various ways.

NII Open Lecture was Held

NII Open Lecture is held for the purpose of widely delivering the research and development activities by NII, covering mainly staffs dedicating to support academic researchers of institutions of universities and companies, libraries, information processing centers, etc. which are all have close relation with NII. Here, researchers of NII and other organizations present reports on the up-to-date issues of their specialty.

In fiscal 2000, the first year after NII started, NII Open Lecture was held in two places in the eastern and the western regions and attracted over 330 participants. Main participants included university library staff and researchers and staff of universities, companies and institutions.

The representative of the organizer NII made an address, and then four researchers of NII introduced the purposes of their informatics researches at NII. Further, Prof. Setsuo Arikawa, the Graduate School of Information and Electrical Engineering, Kyushu University, who was also Head Librarian of the University and Prof. Masao Sakauchi, Director General of Institute of Industrial Science, University of Tokyo, made lectures, including their expectations and suggestions to NII.
Participants gave us their comments that they were able to understand well the NII's activities and that

they expected its future growth.

The date, places and program of the NII Open Lecture was as follows:

1. Date and place:
(Western region) Nov. 8, 2000(Wed.) 10:00 - 16:30
Conference Room A, Kyoto International Conference Hall
(Eastern region) Nov. 22, 2000(Wed.) 10:00 - 16:30
National Center of Science, Hitotsubashi Memorial Hall

2. Theme:
Informatics: Towards the New Horizon of Information

3. Program:
* Address by the representative of the Organizer:
　Western region
Takamitsu Sawa, Planning and Coordination
Director, NII (Deputy Director General)
　Eastern region
Kinji Ono, Executive Director of Research, NII

* Image of the Future of Informatics Research
-- What does NII aim at?
By Prof. Kinji Ono, NII

* Intelligence, People and Information Systems
-- To encourage research on Symbiotic Information
System
By Prof. Haruki Ueno, NII

* Dissemination and Utilization of Scientific
Information
-- Approach with bibliometrics
By Prof. Masamitsu Negishi, NII

* Information Resources and Informatics Research
By Prof. Jun Adachi, NII

* Expectations to NII
By Prof. Setsuo Arikawa, Head Librarian, Kyushu
University

　Western region only

* Expectations to Informatics Research
-- Towards informatics to generate new values for
people and the society
By Masao Sakauch, Director General of Institute of
Industrial Science, University of Tokyo

　Eastern region only

* Questions & answers

President:
　Western region
Takasi Hamada, Director, International and Research
Cooperation Department, NII

　Eastern region
Prof. Akira Miyazawa, NII

(Dissemination Activities Division)

NII Monthly Seminar

National Institute of Informatics (NII) was founded
in April 2000 as an inter-university institute for
"Informatics", for the purpose of making broad
contribution to the society through the efforts to
establish an academic field of information and
make advance in information technologies (ITs) in
cooperation with universities, other institutions,
companies, etc. both in Japan and foreign
countries.
Informatics is a science to make comprehensive
research on information essential for our activities,
which includes identifying its nature and structure,
realizing the efficient processing methods, and
studying the interaction and communication
procedures between people and the society. In
addition, informatics is an interdisciplinary field
where the existing information sciences,
information engineering, through cultural sciences,
bioinformatics researches and other studies are
inter-linked as a new scientific field to provide the

foundation for the advanced information society in the 21st century.

To build up this new science on information and to promote its basic studies, NII consists of 7 Research Areas and 55 sub-divisions (including 28 ones for visiting researchers: all planed) as well as 2 Research Centers to engage in the verification of research results.

Research in informatics will require profoundly specialized knowledge and immense learning, and will be able to produce meaningful and creative results enough to meet social expectations only when close interdisciplinary cooperation is achieved. According to this fundamental idea, while considering researches by individual as its basis, NII has promoted researches by the Research Areas and their sub-divisions and some cross-organizational research projects. Additionally, NII actively carries out collaborative research with other entities in Japan and foreign countries.

Nevertheless, it is strongly felt that young NII will be faced with many difficult problems to reach its goal. However, thanks to your kind understanding and cooperation, all the staff of NII are now increasing our efforts to reach the goal as far as possible.

NII Monthly Seminar is planned and operated primarily to help researchers mutual understanding in NII. In addition, it is expected that the Meeting will be open to public so that NII can be properly understood and obtain wide range of assistance for its improvement.

It will be our great pleasure if NII Monthly Seminar can provide an opportunity to make mutual exchange for researchers and engineers who are interested in informatics. We will appreciate active participation regardless of your area of specialization.

(NII Monthly Seminar Organizing Committee)

1st NII Regular Study Meeting   September 20, 2000

Multimedia Information Retrieval - Research Trends and Our Activities

Associate Professor, Information Retrieval Research, Multimedia Information Research Division

Norio Katayama

Graduated in 1990 from Dep. of Engineering, University of Tokyo; completed in 1995 the doctor course in engineering of the University; D. Eng; took the present office in October 2000, after a Research Associate at R&D Dept., NACSIS, and at Human and Social Information Research Division, NII; covers specialty in multimedia database systems and multimedia information retrieval.

In the 1st NII Regular Study Meeting, I introduced the activities by our project team and recent trends of the research, with regard to the information retrieval technology applied to pictures, images and other multimedia information. This is, in other words, a technology to find specific information out of multiple multimedia information. The basic process of this type of retrieval, called similarity retrieval operation, is to detect pictures or images that are most similar to those that one needs.

The Group of Katayama and Associate Professor Shin'ichi Satoh is committed to research on index structure and search algorithm, technologies useful for high-speed, more efficient similarity retrieval operation. In the presentation, we took up the issues proposed by us: an index structure called

"SR-tree" and a search algorithm called "significance-sensitive nearest-neighbor search method".

"SR-tree" is an index structure to be used for similarity retrieval efficiently. In case multiple amounts of features (feature vectors) are retrieved from multimedia information, the index prepared using SR-tree will make faster similarity retrieval possible: SR-tree can effectively classify the feature vectors according to tree structure, and therefore searching part of its branches allows us to find the results of the retrieved data. On the other hand, the significance-sensitive nearest-neighbor search method to be used to evaluate the significance of the retrieved information allows more efficient retrieval operation. It is often the

case in multimedia retrieval that retrieved 10 or 100 features only provide similar significance. In such case, there is little sense to make detailed examination of them, and therefore the significance of the operation is very low. The method proposed by us can work to evaluate whether or not they have certain level of significance, allowing us to avoid unnecessary operation when the level is low and to use retrieval systems more efficiently.

Architecture and Spoken Language Interface of an Office Mobile Robot, "Jijo-2"

Visiting Professor, Robotics Research, Intelligent Systems Research Division, NII
Section chief of Research Scientists, Research Planning Headquarters, National Institute of Advanced Industrial Science and Technology (AIST).

Toshihiro Matsui

Graduated in 1980 from Dep. of Engineer, University of Tokyo; D. Eng: took in 1989 the Senior Researcher, Electrotechnical Laboratory; became in November 2000 a Visiting Professor to NII: covers specialty in programming systems for robots, geometric modeling and mobile robots.

Today, many manufactured products are available at low prices because robots placed in factories are correctly doing repetitive tasks. It is expected that demand for service robots of different types will grow in the future, when the economy shifts towards the tertiary industry, rather than manufacturing industry, and the society become aged. In the RWC (Real World Computing) Project of the Ministry of International Trade and Industry, the research on Jijo-2 Robot which provides office information services while moving in office rooms is included.

As for the tasks of Jijo-2 Robot, route guidance, person-finding, delivery service and coordination of schedules have been considered. For this purpose, the Project has focused on research on map learning, distinctive function regarding people and places, spoken language interface and event-driven control architecture that enables these functions to work in an integrated manner. Sonar sensors are used to navigate

Jijo-2 of the latest generation will incorporate laser range finder for will precise localization. Further, the use of omni-directional vision will make it possible to utilize other location cues, for example, the distribution of colors or brightness, in addition to that on distance; robots will be able to sense

people moving around them; In case their sensors have no sufficient capability, the function of spoken language interaction will ask persons as people usually do. We are interested in giving robots diversified and robust functions to recognize and decide action based on various kind of information and developing robots that can actively learn how to respond to dynamically changing environments.

On Fast Approximate Matching Method of String including Errors

Associate Professor, Data Engineering Research, Software Research Division

Atsuhiro Takasu

Graduated in 1984 from Dep. of Engineer, University of Tokyo; completed in 1995 the doctor course in engineering of the University; D. Eng.: Took the present office in April 2000, after an Assistant Professor, Systems Research Division, NACSIS; covers specialty in database systems.

Large amount of information has been accumulated and circulated in the form of printed matters, and document recognition technologies enable to digitize those books and articles efficiently. However recognition error inevitably occurs in the text recognition process and fast and high performance fulltext search technique from those garbled documents is required. This project focuses on the research on fast approximate string matching as a basic technology to process large volume of information containing recognition errors. Although DP matching and some other procedures can be applied to this problem, many of them require linear scanning of the data, meaning that they are not necessarily suitable for large text data. Therefore, we have developed an indexing method with which necessary text data can efficiently be narrowed down, and serves as pre-processing tool for the conventional method of approximate string matching. Because there is a trade-off relationship between the length of the string to be matched and the matching precision and recall in this method, each of retrieved strings is separated to one with proper length before being used. This method has been applied to the matching of a reference data obtained from document images and a bibliographic database that contains about 2 million records. In comparing this method to the case that only DP matching method is used, it has been confirmed that it allows the processing at the rate some sixty times faster in average at the expense of 2% decrease of accuracy. The time required for matching with proposed method is 1.4 seconds on average, a realistic time period.

Introduction to Joint Researches

Joint Research on Extensible Real-time Distributed Operating System

NII is committed to the comprehensive promotion of informatics in cooperation with universities, other institutions and research divisions of private companies throughout Japan. A joint research project led by Prof. Katsumi Maruyama has pursued in cooperation with teachers etc. of International Christian University (ICU), will be introduced here.

What is OS?
It is said that computers are just boxes without software, and this means that their various functions are not materialized without software. Briefly to say, software is classified into two categories: application programs necessary to do what the user wants to do and the operating system (OS) go between application programs and computer hardware.

Members of this Joint Research Project. Many were on duty tours in this week. (left to right) Prof. Maruyama, Dr. Kodama, Research Associate, Prof. Nakamura, ICU, Prof. Hashizume.

Among OSs for personal computers, Windows, MacOS (Macintosh) and UNIX (Linux) (there are many researchers who use this) are well-known.

Although OSs are used for large-scale real-time systems such as telephone switching network, different functions and levels of performance of OSs are required for different applications, and at present, new OS has to be developed for every specific application.

This Project aims at working out real-time distributed operating system with which the addition of functions and the optimization of performance can easily be made according to the requirements of the application.

Reinforcement of Research on OS

Operating system is the most important software, but its research and development is a very difficult task of type of so-called 3-K.

OS's structure tends to be "dirty", because researches have to directly control "Kitanai (dirty)" hardware; The development of OSs is a "Kitsui (hard task)", because, unlike common application programs, it cannot be carried out in sophisticated development environments. Further, the formalization of the contents is a difficult task and "Kibishii (severely)", results are hardly evaluated because this field has small number of researchers.

When I told to a teacher that I needed young researchers who liked research on OSs, he responded that recently young people did not want to do such a difficult work as OS development.

Because OS research has not been tackled so actively in universities despite its importance, the research collaboration system of NII may be helpful therefore.

OS that This Project Aims at

This Joint Project aims at developing an extensive distributed operating system that can cover wide
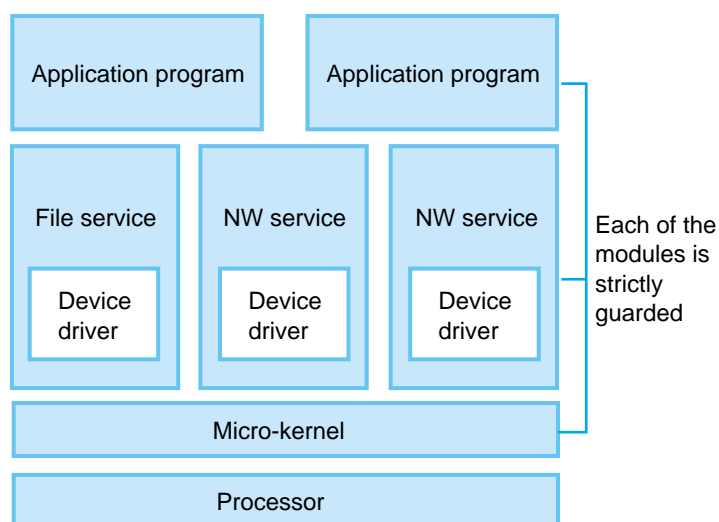
range of applications from small built-in systems, such as household electric appliances and portable apparatuses, to real-time systems, such as telephone switching network. Concretely to say, this OS is given a hierarchical structure of service modules and a micro-kernel that control substrate: on the micro-kernel, functions of the OS required for top of applications are placed in the form of service modules. This OS can be used for an extensive range of applications by changing the modules according to the services demanded.

Another purpose of this Project lies in developing an advanced distributed processing system in which many computers linked to a network can jointly and efficiently carry out a high-level processing. A difficult problem here is involved in the way to attach a robust guard mechanism to the service modules to ensure the safe extension. Going easy way will result in the significant drop of performance.

For this, we have started by employing L4 micro-kernel developed in University of Karlsruhe, Germany as a development base.

(Katsumi Maruyama,
Director, Software Research Division)

Introduction to NII's Services

Catalog Information Service

(1) Union catalog databases
Do you know Webcat?
When you wish to know a library that holds the Serials carrying the document you wish to read or the book that no bookstore. is no longer selling, Webcat, one of services of NII, will answer you.

Webcat is union catalog databases to which everyone can easily access from NII's homepage. It has been used also by many people other than researchers and students. Webcat Database contains data of some 5 million books and some 230,000 serials held by some 1,300 libraries in Japan and its holdings data exceed

52 million, being the largest union catalog in Japan.

To construct this union catalog databases, NII has performed the Catalogue Information Service. This consists of NACSIS-CAT for database construction and ILL System for its use.

URL
http://web.cat.nii.ac.jp/webcat-eng. html

(1) Cataloging system: NACSIS-CAT
NACSIS-CAT, a cataloging system, has been operated since 1985. NACSIS-CAT is based on the online shared cataloging system, and therefore duplication of work to enter catalog by respective libraries can be avoided. Catalog data entered by a library can be used from any other one. It contents are updated every day, as some 150,000 new such data are online-input by some 850 libraries every week. As is exemplified by the fact that NACSIS-CAT has increasingly been used by research libraries on Japan in European, Asian and other foreign countries, it is gaining higher appraisal also in overseas as a system useful for the preparation of catalogues of Japanese materials.

Further, each of the libraries downloads the union catalog of NII to build up its own catalog database, which are effectively used to offer Online Public Access Catalog service, (OPAC) and circulation and other services.

Since the introduction in January 2000 of a set of characters "UCS" for the treatment of multi-language information, NACSIS-CAT has been able to deal with Chinese, Hangul, etc. in addition to Japanese, English, German, French and Russian languages, and the materials written in the languages included in NII's union catalog databases.

(2) Interlibrary Loan System: NACSIS-ILL
Since 1992, NII has operated an interlibrary loan system, NACSIS-ILL, to assist the interlibrary loan services, so that the documents that researchers of universities. wish to read can be delivered. At present, NACSIS-ILL is used for 70% of the inter-university loan service, helping greatly the fast availability of literature.

As stated above, the purpose of Catalog Information Service lies in achieving, in cooperation of libraries in Japan and foreign countries, the shared use of academic information resource by constructing a union catalog databases. NII will make best efforts to reinforce the linkage with corresponding libraries overseas and to internationally expand our services through the cooperation therewith for catalog information cross-reference and interlibrary loan services.

URL
http://web.nii.ac.jp/CAT-IIL/welcome.eng.html
(Contents Division)
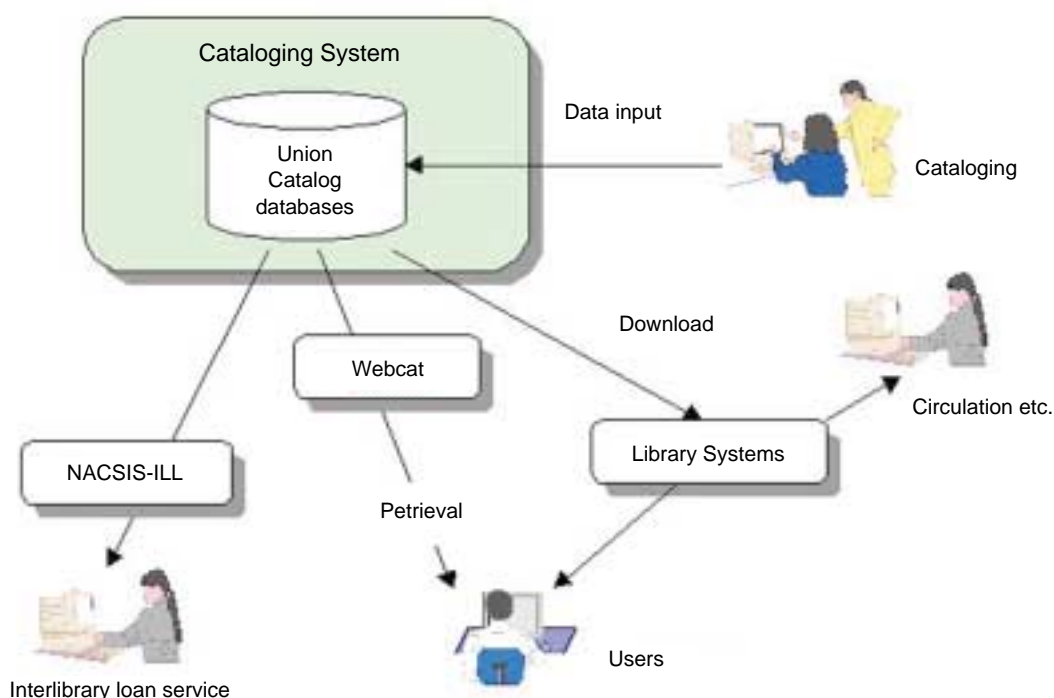
NII Participated in DATABASE 2000 TOKYO

DATABASE 2000 TOKYO was held at the Exhibition Hall, Tokyo international Forum, from Oct. 18(Wed.) to 20(Fri.), 2000, under the sponsorship of the Database Promotion Center, Japan, and the Japan Database Industry Association. This is the biggest event in Japan in which Japanese and overseas organizations and companies participate to show and/or demonstrate their databases.

NII participated in this event to widely introduce its activities and services, making some demonstrations of the Electronic Library Service "NACSIS-ELS", the Information Retrieval Service "NACSIS-IR", and other services accessible via

NII's homepage free of charge: the Retrieval Service for NACSIS-CAT Databases on World Wide Web "WebCAT", the Directory of Search Activities & Resources "NACSIS-DiRR" and the Career Information Service "NACSIS-CIS". Many visitors showed a strong interest therein, making questions one after another.

According to the organizers, 111 companies and organizations participated in the exhibition and there was an attendance of 35,921 visitors in total.

URL http://www.dbtokyo.com/
(Dissemination Activities Division)

Cooperative Program for the Exchange of Experience, Expertise, Information in S&T in Southeast Asian Countries

Workshop in Hanoi, Vietnam
Opening session
Discussion session

"The Cooperative Program for the Exchange of Experience, Expertise, Information in S&T in Southeast Asian Countries (CO-EXIST-SEA)" was launched in November 1999 under the auspices of Japan Science and Technology Corporation (JST), with the participation of National Institute of Informatics (NII), Indonesia Center for Scientific Documentation and Information, Indonesian Institute of Science (LIPI/PDII), Malaysian Science and Technology Information Center (MASTIC), Science and Technology Information Institute of Philippines (STII), National Research

Council of Thailand/Research Information Center (NRC/RIC), and National Center for Scientific and Technological Information and Documentation of Vietnam (NACESTID). The purpose of this program lies in building cooperative tie-up among organizations in charge of science and technological information in Southeast Asian countries.

The first workshop of the CO-EXIST-SEA titled "Towards the Development of Information Infrastructure for R&D" was held in June 1999 in Kuala Lumpur, Malaysia and the second workshop, "Towards the Integrated S&T Information in the Asian Pacific; Directory of Directories" was held from October 10 to October 11, 2000 in Hanoi, Vietnam. In this workshop, the present developments of science and technological databases in Southeast Asian countries were reported and the possible challenges towards the shared use of these databases were discussed. NII sent Professor Eisuke Naito, Director of Human and Social Information Research Division and Mr. Kazuo Akiyama, Director of Publicity and Survey Department to the workshop, and they gave a presentation on the outline of scientific information database of NII, focused on the Directory of Research Activities and Resources, "NACSIS-DiRR". Many representatives discussed that the improvement of scientific information databases were urgently required, indicating that they were faced with difficult obstacles such as the lack of needed resources and linguistic problems.

In conjunction with the JST and NII, a manpower-training course was held from November 6 to 10, 2000 for the staff in charge of information services from the CO-EXIST-SEA's member organizations. Participants were two staff from each of the five of the member organizations of the Southeast Asian countries and eight staff from the National Diet Library of Japan and from other Japanese organizations. The JST explained and demonstrated its Directory Database of Research and Development Activities (ReaD) and Dr. Hiroshi Hosobe Research Associate from NII (Programming Language Research, Software Research Division) gave a lecture on Java programming technology, with a focus on the document format standards XML of the next generation.

In attempting to meet the faster progress and wider use of information communication technologies in the world, Southeast Asian countries are faced with critical challenges, the maintenance and dissemination of the information. They are strongly expecting Japan to provide assistance and cooperation through workshops and training courses of this type.

(Publicity and Survey Division)

Training course at NII

NII Participated in Workshop "Information about Japan in the 21st Century"

Workshop at the Japanese German Center Berlin.

Workshop "Japanese Information for Libraries in the German Language Area in the 21st Century" was held in Japanese German Center Berlin (JGCB) from Nov. 2nd to 3rd, 2000, under the sponsorship of the JGCB and the support of NII. Employees of institutes, libraries and other entities that required information on Japan were present at the Workshop, and there was an attendance of 61 in total including the lecturers of the Workshop. Some staff of organizations outside Germany, such as Vienna University, also attended it.

NII sent to the Workshop Prof. Eisuke Naito, Director, the Human and Social Information Research Division, Akira Miyazawa, Director, Research Center for Testbeds and Prototyping, Isamu Fuse, Director, Application Division, the Development and Operations Dep., and Ms. Sawako Kojin, Chief, Network Software Technology Section, Application Division. In addition to the speeches on "Catalog Information Service (NACSIS-CAT) Development in Europe" and on "Advancement of Japanese Scholarly Information Provision: NII Endeavor", they made the introduction to and the demonstration of NII's information retrieval services "NACSIS-IR" and "NACSIS-CAT". In the Q&A session, many participants expressed expectations to NII's services.

Further, it was decided to conduct the use/assessment experiment with regard to NACSIS-IR and the Interlibrary Loan System "NACSIS-ILL" by covering the participants in the Workshop. Then, a questionnaire was made to ask whether he or she wised to cooperate therewith and how well Japanese information was available to them. Those who take part in the experiment will be asked to use the NACSIS-IR and the NACSIS-ILL until March 2001 and to assess how helpful they have been for

obtaining Japanese information.

On Nov. 6th and 7th after the Workshop, Prof. Miyazawa, Mr. Fuse and Ms. Kojin visited the University of Heiderberg located near an old castle and surrounded small hills covered with tinted autumn leaves, demonstrating, at its Library of Department of Japanese Studies, WebUIP, a simplified input system for catalogue information via the Internet, and SPCAT, a catalogue retrieval system of Seleced Package. Here, ten researchers and librarians of the University of Tuebingen and the Munich University were also present, and all of the participants presented questions and answers very actively. It is very happy to report here that, as a result of follow-up negotiation, there is a fine prospect that NACSIS-CAT will actually be used with WebUIP and SPCAT by the University of Heidelberg and the Munich University.

(Application Division)

System demonstration at the University of Heiderberg.

A New Departure of Science Information Network: The Super SINET

There have appeared new trends of research networks in many countries and regions.

First, the governments of developed countries have been assisting leading academic researches by creating high-speed research networks. Owing to public supports, such fields as genetics and vio-informatics, and high-energy physics have been promoting collaborations among research institutes and have strengthened their international competitiveness. The governments have already taken necessary steps to create critical networks to assist the efforts.

Second, the introduction of communication equipment capable of transmitting the Internet at the 10Gb/s trunk line speed has already started in some countries: the CANARIE Project of Canada has already employed this equipment for the trial; Internet2 Project of the United States is to upgrade to this rate this year; some related projects are being promoted in the U.K. and Germany; and the European Commission has announced the plan to apply the 10Gb/s to regional connection of research networks among extended EU countries.

Super SINET that was preliminary indicated in the F.Y. 2001 budget has the same way of doing with these trends. It is to connect with the bandwidth over 10Gb/s core research institutes of the fields of genetics, high-energy physics, space & astronomic science and distributed high-speed computing

(GRID). There is a plan to expand Super SINET to laboratories of nano-technologies and also to increase the collaborating institutes. These institutes all have supercomputers, large-scale database or large-scale experiment / observation equipments, and can provide researchers in Japan with research resources. The equipment for the Super SINET fifers from that for conventional SINET, but necessary steps will be taken as far as possible to allow the transmission via SINET at the rate of Super SINET, ten times fast as the former.

It has been planned to form Super as an optical network. The optical network can transmit information by optical wavelength signals, and therefore is thought to minimize the replacement of equipment inside the network when expected faster rates of transmission between institutes is realized in near future. Additionally, optical network has attracted great attention as a possible tool to realize the world leading network, because it allows us to change the network configuration by using optical switch. Towards the development of Super SINET, a joint R&D will be organized with communication industries that will provide necessary transmission facilities and equipments.

The operation of Super SINET is planned to start in January 2002.

(Prof. Shoichiro Asano, Director, Infrastructure Systems Research Division)

Research for the Future Program
Advanced Multimedia Information and Communication Systems

Professor and Director, Research Center for Information Resources

Jun Adachi

Prof. Adachi received a BE, ME and Doctor of Engineering in Electrical Engineering from University of Tokyo in 1976, 1978 and 1981, respectively. His professional career was largely spent in research and development of NACSIS information systems, such as NACSIS-CAT and NACSIS-ELS. His research interests are information retrieval, digital library systems, and distributed information systems.

Japan Society for the Promotion of Science (JSPS) initiated in 1996 a new subsidy program "Research for the Future Program". As one of the projects under the Committee on the Promotion of

Advanced Multimedia Information and Communication Systems, We began a research entitled "A Study on Ubiquitous Information Systems for Utilization of Highly Distributed

Information Resources". It is to complete in March 2001, and I am preparing its final report of the project.

The term "ubiquitous" is often used in the form of "ubiquitous computing". The research on "ubiquitous computing" aims at incorporating computers in common tools, appliances and machines to make our living more advanced and convenient.

In pursuing ubiquitous information systems, we always think of designing systems available at any place at any time. These days we can enjoy various PDAs as well as PCs for everyday information processing and this requires certain mechanisms to correctly process or visualize information to meet the specific conditions of respective cases. The focal point of our project is placed on multi-faceted study on contents processing, in pursuit of the realization of environments where information can be used in various ways.

Through out five years' research period, about 17 researchers from NACSIS and NII have participated in this Project, and continued the comprehensive study on mutually related subjects as indicated in the figure, including electronic library, information retrieval, user interface, multi-language information processing, corpus, and media integration. These are essential technologies for distributed information systems, and will not effectively be used without high-quality and high-speed communication infrastructures.

Regarding this project, one of the results we have achieved is related to the comprehensive research on the extraction and organization of text and structural information from documents images. Based on the potential needs for digitalization of retrospective conversion of printed material, we covered the following subjects: procedures for capturing printed materials as images, making their structural analysis and extracting elements of documents; methods to retrieve words from erroneous text contained in the texts obtained by OCR-recognition, which may contain recognition errors; and, the location-independent retrieval mechanism for searching distributed information objects.

Another important field of this project concerns with the document information retrieval and the multi-language information processing. In this field, large-scale test collection for evaluation of information retrieval systems has also been constructed. Using large-scale test collection, we have organized a series of NTCIR Workshop
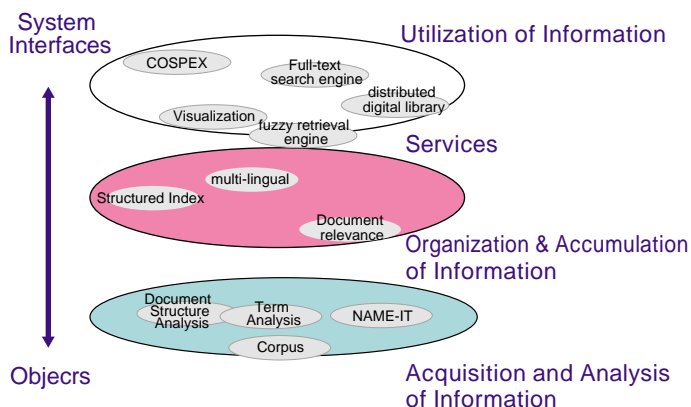
where joint studies on information retrieval have been made with research groups in Japan and foreign countries.

Our proposals on new information retrieval technologies, such as a retrieval method based on context analysis, the application of term clusters and a relavance-superimposition model for feature vectors, have contributed to the performance improvement of systems. Simultaneously, we prepared the corpus necessary for IR researches.

On the other hand, it is important to visualize and display information in an easy-to-understand way. For personal electronic libraries, we developed a graphical retrieval interface and a system to visualize and display the mutual relations among retrieved data. These technologies will make it easier for us to discover information from large volumes of data. By making document clusters, we achived techniques for easy capture of spacial infomation.

Finally, as to the research on media integration, by integrating image processing, natural language processing, and character recognition technology, we have developed a system capable of doing automatic analysis for video data for extraction of human faces, associating them to their names. This is one of examples of advaned techniques we have developed in information retrieval study, since the technologies to correctly detect the information out of massive video information has increasingly been required.

In completing this project, I strongly feel that one of its achievements is the fact that the foundation for informatics research based on digital contents has been constructed in NII, which has led to the establishment of Research Center for Information Resources. The results of the project will be continued by the staff of the Center. Please visit http://research.nii.ac.jp/ for details of the project.

The 7th International Workshop on Academic Information Networks and Systems (WAINS 7) was Held

International Workshop on Academic Information Networks and Systems (WAINS) sponsored by NII was held at Kasetsart University located in the suburbs of Bangkok, the Kingdom of Thailand, for two days from December 7th to 8th, 2000. This was the 7th gathering of WAINS, an event organized annually by NII since 1994 with the intention to provide opportunities for members of Japan-Thailand international research collaboration activities to make discussion and mutual exchange. For our deep appreciation, the President of Kasetsart University and many of its professors and students offered devoted cooperation for the operation of the Workshop. 154 persons in total from universities, research institutions and others participated therein. Four NII's professors who reported their research results were Prof. Kinji Ono, Information Networking Research, Infrastructure Systems Research Division, Dr. Frederic Andres, Assistant Professor, Distributed Processing Research, Dr. Asanobu Kitamoto, Research Associate, Office for Promotion of Research Projects, Research Center for Testbeds and Prototyping, and Vuthichai Ampornaramveth, COE researcher.

Originally, the NACSIS-Thai Project, initiated in 1994, provided the ground of the WAINS. With main members from NACSIS (at present, NII) and Thailand's NECTEC, WAINS was started with the aim of promoting international research collaboration activities in the informatics field among Japan and Southeast Asia countries. Simultaneously with the start of WAINS, NII and NECTEC began operating 2Mbps SINET international link between them. This link has played a critical role as an infrastructure to

Participants in the 7th WAINS at Kasetsart University

support active communications on research subjects among members of WAINS's projects. Then, WAINS has placed an emphasis on activities that requires frequent use of communication networks, achieving successful results through, for example, the following projects on: satellite data exchange over the Internet with the use of high-speed networks; active hypermedia delivery system; multilingual text processing and natural language processing; online dictionary development based on collaboration across the Internet; and, assessment by library staff on NACSIS's services. Parallel with these, a joint research project on basic technologies of informatics has been continued.

It is planned to newly introduce bio-informatics, robotics and other individual research collaboration projects. It is also very important for NII to expand international partnership through joint research activities with other countries in European and Southeast Asia in addition to Thailand. We were very glad that the 7th WAINS was able to become a more international scene because French researchers participated therein and presented their reports. NII intends to make active involvement in such projects in the future.

The coming WAINS8 is planned to be held in October 2001, in Japan, when NII will serve as central organizer.

(Asanobu KITAMOTO
Research Associate, Office for Promotion of
Research Projects, Research Center for Testbeds and
Prototyping)

Dr. Thira Sutabutra (left), President of Kasetsart University, and Dr. Kinji Ono (right), Executive Director of Research, NII, signed the Memorandum on Research Collaboration between the two entities.

## Mulutimedia Information Retrieval-Research Trends and Our Activities

Associate Professor, Information Management Research, Human and Social Information Research Division

Kyou Kageura

Graduated in 1986 from the Dep. of Education, University of Tokyo; received in 1993 Ph.D at Manchester University; became in 1988 an Research Associate, NII; took in March 1994 the present position; interested in terminology and in fundamental theory on information management.

Tables 1 and 2 respectively indicate the basic ways of recognition of documents by pre-modern and modern libraries. The real world is of singular nature, and the basic action for libraries to continue to accept materials for the future make it possible for us to predict that the present document environment will be entering into another one. Based on this fundamental condition, binomial distribution model was defined over considering the number of libraries as against documents that Gutenberg's typography made possible as distribution, and it was explained that a framework of mathematical manipulation corresponds to the change of the environment shown in Tab.1 to one in Tab.2.
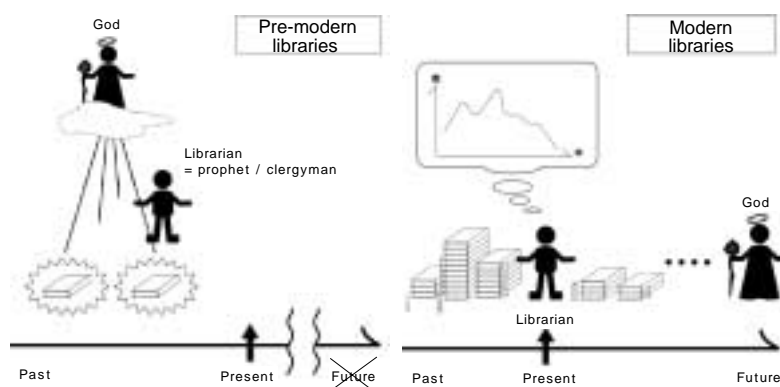
Digital Image System (DIS) on Cultural Heritages: The Picture Scroll of the Tale of Genji, the Map of Old Kyoto, Rare Books, and others.

Visiting Professor, Computer Vision Research, Multimedia Information Research Division, National Institute of Informatics, NII
Visiting Professor, International Research Center for Japanese Studies
General Manager, Strategic Products Development Center, Hitachi, Ltd.

Toshiro Kamiuchi

Graduated in 1966 from the Dep. of Engineering, University of Tokyo. D. Eng. Consulting Engineer (Information Dep.); entered Hitachi, Ltd. in 1968; became a general manager, Strategic Products Development Center in 1991; a visiting professor at International Research Center for Japanese Studies in 1999 and at NII in November 2000; covers specialty in computer systems such as control systems and image data.

In the midst of digital revolution, there have been many developments in the field of digital archives for valuable cultural heritages around the world.

The Digital Image System (DIS) was created to preserve, manage, and utilize the information contents of pictures, manuscripts, and documents.

The past projects include the Picture Scroll of the Tale of Genji, a Japanese national treasure at the Tokugawa Art Museum and the Gotoh Museum, the Map of old Kyoto at the Imperial Household Agency, the rare books such as the Gutenberg Bible, and images of ruins in Pompeii.

In the Project for the Genji, all twenty sections at the Tokugawa Art Museum and the Gotoh Museum

were digitized to build a database. In addition, the DIS integrated the image data with other types of data obtained during researches and analyses, to conduct a trial of the digital restoration. It resulted in more accurate representation that gives us a glimpse of the artwork in its original condition.

 Today DIS researchers are pursuing the better uses of information contents and network technology for the important educational purposes in our society.

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■ 4st NII Monthly Seminar   January 17, 2001
project in Russian Academy of Sciences:
AI in the Institute for Information Transmission Problems

Visiting Professor, Data Collection Laboratory, Research Center for Information Resources, NII
Full Member of Russian Academy for Natural Sciences, Leading Researcher of the Institute for Information Transmission Problems of Russian Academy of Science Vice-president of Russian Association for Artificial Intelligence

Vadim Lvovitch Stefanuk
B   .

Graduated from Moscow State University in 1962, Physics Department, with special orientation towards learning automata. Awarded with the Ph.D. degree in 1968, defended in the Institute for Control Problems, Moscow, Ph.D. Awarded with the Doctor of Technical Science (Dr.Sc.) degree in 1990 defended in Moscow Institute for Electronic Machinery in 1990. Awarded with the Honorary Literacy of Russian Academy of Science (in 1999), awarded with the Academy of Science Stipend for outstanding scientists in 2000.
Scientific interests lie in such areas of Artificial Intelligence as Tutoring and Learning, Intelligent Interfaces, Expert Systems, DNA processing, Collective Behavior, and Applied Semiotics.

The general problems which Russian science comes across with were described. Most of the problems are related to the present transient economical state of Russia. The country remodeling created for scientists both advantages and disadvantages which frequently went together. Thus, some unexpected problems came trough the "Brain Drain" of high level scientists both to abroad and to domestic commercial establishments.

However, certain recovery of basic research and development in Russia does exist partially due to a strong tradition of Russian science of keeping an appropriate level of research despite of low funding.

The recovery is facilitated by a number of grants from Russian Fond for Basic Research, Russian Ministry of Science and Technologies, grants from foreign sources
(Soros foundation, and etc.), from European Community (Esprit, Intas, Networks of Excellence).

This recovery is supported also with a public activity of Russian scientific community through such bodies as Russian Association for Artificial Intelligence, Russian Academy for Basic Research, and International Informatization Academy.

Concerning recent initiatives of governmental support: there is a certain hysteresis loop which makes it difficult to restore the Russian science and

education to its previous high standards. Thus, substantial economical measures are necessary.

In the technical part of the lecture a survey of IT projects related to Artificial Intelligence recently performed in the Institute for Information Transmission Problems of Russian Academy of Sciences was presented.

The projects included Intelligence Man-Machine Interface, Intelligent Computer Tutoring, Dynamic Expert Systems, Representation of Problems, Intelligent Signal Processing for DNA sequencing, Chaotic Memory Model, Locally-Organized Systems, Theory of Category applications to AI.

While answering questions the author actively supported the strengthening of scientific collaboration between Japan and Russia.

Professor Vadim L. STEFANUK, Institute for Information Transmission Problems of Russian Academy of Science, visited Japan upon the invitation of Prof. H. UENO, NII, for three months from January 1, 2001. He engaged in the study on *Advanced Intelligent Systems* at NII as Visiting Professor, actively making opportunities to mutually exchange with many of faculty members of NII.

CNRS: The FRENCH SCIENTIFIC Research Center

Director of the **CNRS** (National Center for Scientific Research)-Japan office

Denis Perret-Gallix

Dr. Denis Perret-Gallix entered CNRS in 1976 and got a State Thesis in High Energy Physics (Paris) in 1979. He becomes Research Director in 1995 and director of the CNRS-Japan office September 1, 2000. He has directed 3 theses, organized 10 conferences and coordinated 5 international collaborations. He is also a member of 3 Int. conference Advisory Committees. His research field is high-energy physics.

CNRS (National Center for Scientific Research), the French number one research center will be presented in some details. The following topics will be covered: the organization, the budget, the scientific departments, the staff, the international relations and the connection with the industry. Some preliminary information will be given about the newly created STIC (Information and Communication Sciences et Technology) department, which will be covering the topics of interest to NII. If time allows, a brief description of INIST, CNRS Institute for Science and Technology Information as well as of the newly created preprint server will be given. CNRS is actively promoting international collaborations in the field of fundamental as well as applied science research with most of the industrialized countries. Japan due to its high investment in science is seen as a priority partner.

International Sharing of Japanese Information

Professor and Director, Human and Social Information Research Division

Eisuke Naito

Prof. NAITO graduated from Faculty of Arts, Keio University in 1968, MA, Graduate School of Library and Information Science, Keio University 1971, MA, Library Studies, University College, London, 1977. After serving as an associate professor at the National Institute of Japanese Literature, and at the Center of Bibliographic Information at the University of Tokyo, and professor at the National Center for Science Information Systems, he was assigned in April 2000 as professor of information management, director of human and social information research at NII. His field of specialization is information management.

"International Sharing of Japanese Information," an international joint research project, started in FY 1998, was concluded in March 2001. Programs in the final year were: cooperation to CO-EXIST-SEA held by the Japan Science and Technology Corporation (JST) in October 2000 in Hanoi; co-sponsoring a Symposium "Information about Japan in the 21st Century" held by Japanisch-Deutsches Zentrum Berlin (JDZB) in November, holding an international workshop on "Authority Control among Chinese, Korean and Japanese Languages" in January and March 2001 with support of the National Diet Library (NDL) and participated by the National Library of China, the National Library

Kyoto University Library From left Schwens, Toyama and Thacker

of Korea and the Korean Education and Research Information Services (KERIS).

In November 2000, a program was carried out by inviting:

Ms Ute SCHWENS, Deputy National Librarian, Die Deutsche Bibliothek
Ms Jane THACKER, National Library of Canada, and
Ms Ryoko TOYAMA, New Brunswick Libraries, Rutgers University.

Ms Schwens had been invited in October 1999 with theme of national digital archives. Ms Thacker had been invited in March 1998 with theme of standardization and libraries (Meta data, standardization in 2000). Ms Toyama was participated to our program within a invitation by the International Christian University Library for its opening of Top Othmar Library, and discussed on roles of university libraries in digital age as well as challenge to university library staff. They delivered lectures at NII on December 1st by participation of 85 audience of Tokyo Chapter of National University Library Association, at Kyoto University Library on December 4th 2001 by participation of 65 audience of Kansai Chapter of the National and Municipal University Library Association. Focusing on information generation, as well as distribution and storage, lectures gave

impacts to the audience within the framework of the project that intends to re-define urgent tasks of scholarly information services in Japan.

On November 30th, a workshop was held as the third of its series since 1999 on international cooperation of library services. Twenty five experts were invited to the INOSE Lodge in Karuizawa. The workshop pursued possibility of cooperation among NDL, JST, Japan Foundation (JF), Japan International Cooperation Agency (JICA), Center of International Cooperation for Computerization (CICC), all of these organizations devoted to international development. There are common demend among projects which each organization operates. However, these projects have been conducted individually according to the original mission and expectation from abroad, and there has not been a joint project among these organization. Individual and independent planning and program still tends to continue. The workshop gave opportunity to exchange views and understanding among organizations.

Activity of the three-year project was published in a form of annual report in orange colour cover. The volume published in March 2001 is the third and the last volume. The challenge to international development, funded by grand-in-aid by the Ministry of Education since mid 1980s, lead by Dr. Hisao YAMADA, and Professor Hitoshi INOUE, has arrived at a stage of technical stability coupled by proliferation of the Internet and the Universal Character Set (ISO/IEC). Now the challenge would focus on social systems and conventions, user behaviour, and organizational principles and policies of information access. It is also recognized that the task of sharing Japanese information needs human resource development rather than technical and organizational development.

The project had been assisted and supported by numerous individuals and organizations both in Japan and abroad including NDL, JST, JF, libraries of the University of Tokyo and the Kyoto University.

"NTCIR" : Joint Research on the Construction of Large-scale Test Collections and the Evaluation of Information Retrieval/Text Processing Technologies:

Introduction
The NTCIR is an international collaborative research project in which Japanese and overseas research groups have jointly been committed on the construction of large-scale test collections for

information retrieval (IR) and related text processing technologies like summarization, text mining, Q&A, etc., research and development of these technologies, and research on their evaluation methods. We also have held a series of Workshops to report research
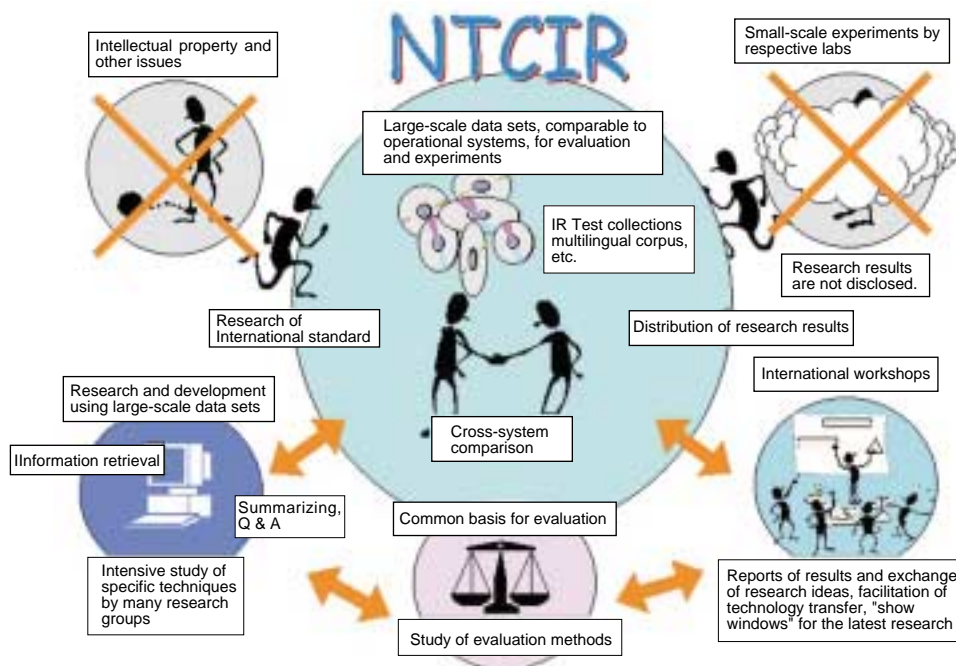
results and exchange research ideas among active participants.

With the prosperity of the Internet, the importance of research in IR and related text processing technologies increased tremendously. Research and development of IR and text processing technologies always require solid evidence based on experiments or testing to show the superiority of the proposed system over previous ones. A test collection is a data set usable for such testing and contains (1) document collection, (2) description of research tasks (for example, a set of written users' search requests of IR systems), and (3) right answers for the tasks. The importance of the large-scale re-usable test collections is widely recognized.

The right answers or relevance judgments must be created by human analysts. To create right answers or relevance judgments for large-scale test collections, collaboration of various research groups is inevitable. For example, in a retrieval testing using a large-scale collection containing more than millions of documents, it is impossible for human analysts to assess the relevance of every documents in the collection. It is however known that candidates of relevant documents can be collected more exhaustively and efficiently by pooling the retrieved results by various IR systems. This is because IR systems using different models and algorithms can retrieve different relevant documents. Further, in the evaluation of information extraction or Q&A systems, the standard right answers can be decided only through the discussion and consensus among researchers. In 1990's, the research on the construction of large-scale test collections with English documents and the evaluation of IR and text processing sharply progressed especially in the United States, having supported the advancement of above-mentioned technologies.

IR or text processing however contain many language-depending processing, and therefore test collections in Japanese or other Asian languages are necessary as well as the ones in English or other European languages. In the Internet environment, researches in IR and text processing with these languages have attracted international researchers as well. Additionally, the continuous research efforts for the appropriate evaluation methods and experimental data sets are needed to meet social or technological progress.

NTCIR Workshop
The NTCIR Workshop is a new type of joint research called "evaluation workshop". Test collections, research tasks and common evaluation procedures for experimental results are provided, and the participating research groups perform the research and experiments using these data sets by employing their own approach. Then, the results are gathered for relevance judgments or creating right answers, which allow cross-system comparison of performance, effects and characteristics of respective systems to be made based on a common basis. Evaluation workshop provides the forum of researchers for discussion and exchange of research ideas, being very useful to find out the future direction and the ways to evaluate and the issues to be evaluated.

In the 1st NTCIR Workshop, the process was started with the distribution of training data set on 1st November 1998, and ended with the meeting held at KKR Hotel from Aug. 30 to Sep. 1, 1999. Twenty-eight research groups from six countries completed the tasks and submitted their research results. The 2nd NTCIR Workshop, initiated in June 2000, is to have the meeting in NII, Tokyo, from Mar. 7 to 9, 2001. 46 research groups from eight countries have registered one or more tasks of this Workshop, and

the tasks of Chinese text retrieval, Japanese and English information retrieval and text summarization have been tackled.

In addition to the construction of large-scale data set for experiments and testing and the formation of forum for researchers, the achievements of the Workshop include some proposals on novice retrieval models such as Flexible Pseudo-Relevance Feedback, Segmented Latent Semantic Index and Super Relevance Imposition Model. Multiple number of approaches have been proposed which specifically concern with the retrieval in Japanese and other East Asian languages, including the automatic construction of Japanese-English lexicons for cross-lingual information retrieval and the utilizing transliteration in retrieval of Japanese scientific and technical documents.

With regard to the issue of evaluation, this Project follows two lines, the traditional laboratory-type testing and the challenge to newer issues. For the former, which, at present, is a "gold standard" as an evaluation procedure essential for the research results to be acceptable in the international research community, the emphases placed on (1) retrieval of text in Japanese and other East Asian languages and (2) cross-lingual information retrieval. For the latter, the issues covered include (3) from document retrieval to the support for information detection and utilization and (4) research on more realistic evaluation methods, in particular, on characteristics and the ways to use of the documents of specific type and of the users who usually use the documents of the type. This is because, document of differed types are used for different purposes, different user groups, different criteria for relevance judgment. The technology of multigrade relevance judgment of retrieval results has also been proposed.
Please visit http://research.nii.ac.jp/ntcir/ for the detail of the project and Workshops.

(Noriko Kando, Associate Professor, Library and Information Research, Human and Social Information Research Division, NII)

Introduction of Prof. Henri Angelino as Visiting Professor (Visiting Research Scholar) at National Institute of Informatics (NII)

It was just one year after my arrival as Visiting Professor here that I was asked to prepare that paper. My background is not in "informatics" but in Chemical Engineering and, just for those who are not informed, it is not chemistry but the main word is "Engineering" and nowadays more and more people are speaking of "Process Engineering" as the basic knowledge of that science and all its paradigms can be applied to any process involving any sort of transformation of raw materials into final products: chemical, biochemical, physical, nuclear,.. During my research activities in France I have done modeling of heat, mass, and momentum transfer, or of heat exchangers or of "unit Operation" like distillation, liquid-liquid extraction, drying,.. I have also worked on optimization of process in pharmaceutical industry, chemical

industry, and gas industry or in nuclear industry. As far as responsibilities, the most important position in the Academic field has been President of the *Institut National Polytechnique de Toulouse* from 1991 to 1996. At the end of my term I was appointed Scientific Counselor to the French Embassy in Tokyo until September 2000. During my position I have had the opportunity, and the privilege, to collaborate with Prof. INOSE on various matters. In July 2000 he proposed me to joint NII as a Visiting Professor and to work with him on science policy and to use part of my knowledge on international affairs for the benefit of NII. After some discussion I agreed to his proposal and I presented my application which was accepted.

I had many talk with Prof. INOSE to decide what would be the best manner to work in the most efficient way for NII. We agreed that I would use my contacts in South East Asia to help the implementation of new collaborations, specially with Vietnam and Thailand. At last but not least my plan is to develop the contacts with France. I have had some talk with Prof. ONO and Prof. UENO concerning their projects of Ph.D. program, of Virtual University with electronic learning and distance learning, of biosynthesis and of Bio-informatics: all theses topics are very interesting and my successor as Science and Technology

Counselor to the French Embassy, Prof. Michel ISRA L, whose background is in informatics, is very willing to develop the contacts between NII and French universities and research laboratories.

I would like also to mention that during the second seminar between Japanese and French Presidents of Universities, which took place in Strasbourg in May 2001 the question of establishing a Japanese-French doctoral school using multimedia facilities, and distance learning was discussed. This topic is very important for the future in connection with a special system which exists in France of co-supervision of Ph. D. thesis and that I already promoted while working in the French Embassy. The Ph. D. candidate will work on a specific subject under the control of two supervisors, one in

France and the second one in Japan and will register for Ph. D. thesis in Japan and in France. At the end the candidate will be awarded by the two universities. I think this system is very interesting for NII to develop its relations with French universities and research centers.

These the targets for my staying at NII, I hope I will succeed in some of them.., but in case you have more idea in using my links, including in others countries like Mexico, Brazil or of course Europe don't hesitate and drop into my room 1402, I will be delighted to practice my Japanese, in that case be ready for a long break !!!

(Prof. Henri Angelino)

Prof. David J. Farber Visited NII

Prof. Farber is exchanging ideas with NII's researchers on the future networking

Prof. David J. Farber, the Alfred Hitler Moor, Professor of the University of Pennsylvania and Chief Technologist, the FCC, visited NII on Dec. 1st, 2000. Prof. Farber is well known as the founder of the US Internet and as a policy advisor of the former Clinton Administration, who greatly contributed to open up the Internet, which was then used as transmission network among universities and research institutes only, to the public. At NII, he eagerly exchanges opinions with its researches and explained in detail the present communication measures and the future directions of R&D activities in the United States.

(Prof. Hirotatsu Hashizume, Multimedia Processing Research, Multimedia Information Research Division)

Assistance for Information Support at the Library of the Beijing Center for Japanese Studies

NII sent Mr. Kenichi Tomita, Assistant Director, Dissemination Activities Division, International and Research Cooperation Department, to the library of the Beijing Center for Japanese Studies from October 7, to December 16, 2000. This project is one of the activities planned under the cooperation with the Japan Foundation and it aims to provide information support to the Library of the Center. He helped to create the database of books and journals owned by the center, to guide the usage of NACSIS-CAT, and to give an advice to general library systems. Because of the project, the arrangement of operating library systems was almost completed as planned.

Mr. Miao HuaJian, Deputy Director of the Library of the Beijing Center visited Japan from January 10 to 19, 2001 by invitation of the Japan Foundation. The

Ms. Nagano, Director, ICU Library (left), is explaining a system to Mr. Miao (center) and Prof. Cao (right).

purpose of his visit was to investigate facilities and services of libraries in Japanese universities and research institutes as a reference for establishing a new center to be open soon. Together with Professor Cao DaFeng, a visiting professor of the National Museum of Ethnology, he visited ten universities and institutes, such as the Libraries of Tokyo Institute of Technology and of the International Christian University, etc.

"The Project of Science Information Exchange with China" Meeting was held on January 18, 2001 at NII with the participation of Dr. Xu Yping, Chief, and Dr. Yan AnSherg, Advisor of the Center. Mr. Miao reported the result of the investigation of the libraries.

There was discussion of several issues regarding building the new center, such as strengthening the function of information dissemination, necessity of collaboration with researchers, etc. The participants evaluated the result of the activity that spanned 3 years from 1998 and discussed the goals for the future.

The Center is planning to strengthen and expand its function as a base of dissemination of scientific information, centered on Japanese studies, in China by computerization of the catalog records of the library and completion of a new center by 2002.

(Publicity and Survey Division)

Looking Back On The Year
The National Institute of Informatics (NII)

Deputy Director General of NII and Director of the Institute of Economics Research Kyoto University.

Takamitsu Sawa

Takamitsu Sawa received his bachelor's degree in 1965 from the Department of Economics at the University of Tokyo. In 1967, he successfully completed his master's degree from the Department of Economics Graduate School of Research at the said university. Since then he was awarded a doctorate degree in Economics, elected as assistant to the Department of Economics at the University of Tokyo, and further appointed as assistant professor of the Institute Economics Research Kyoto University. In 1980, he became a faculty professor at the same institution and succeeded as director in 1995. In the meantime, he was a research associate at Stanford University and a visiting professor at the University of Illinois. In April 2000, he accepted a position as assistant director of NII. From October 2000, to March 2001, he filled as provisional director. His areas of expertise are econometrics, energy and environmental economics. Since 1995, he serves as president of the Society of Environmental Economics Policies. His many published works include "The Fundamental of Econometrics," in which he received the 1970 Nihon Keizai Shinbun Cultural Publication Award.

At present, my area of specialty revolves around economics, but my true expertise is in statistics. While attending the Department of Economics Graduate School of Research at University of Tokyo, I minored in statistics. It may sound somewhat unorthodox, but I had the fortune of spending part of my academic years studying statistics with colleagues from the Department of Mathematical Engineering and Information Physics. As a result, I have a knack at getting along fine with scientist and researcher types. As a matter of fact, I had been blessed with an opportunity to nurture a close relationship with the late Dr. Hiroshi Inose over the course of 15 years.

Last year soon after New Year's, I received a call from Dr. Inose. He informed me that the National Institute of Informatics (NII) will commence operation in April and asked whether I was interested in the Deputy Director General's position. He went on to explain what kind of discipline informatics is, that it is an interdisciplinary study involving statistics and economics, and that it is indeed my area of expertise.

Encouraged by Dr. Inose, I was convinced that I could fill the role as Deputy Director General and accepted the offer. On 1 April 2001, I accepted a dual role of becoming Deputy Director General of NII while remaining as Director of the Institute Economics Research Kyoto University.

Around the same time, former Prime Minister Keizo Obuchi past away unexpectedly. This is when Yoshio Mori Administration came to power. The Mori Administration was a strong advocate for "IT

Prof. Sawa and Visitors from Thailand on courtesy visit.

Revolution." The economic recession in Japan all throughout 1990's is attributed to the lack of response in embracing the era of information technology, according to many economists. They are convinced that IT Revolution will undoubtedly revitalize the Japanese economy. Economic recession came underway in March 1991, and we have heard countless speculations on how to rebuild the economy since then. While unable to find a remedy, we consistently heard speculations but the deciding factor on what revives the economy remained inconsistent and ephemeral. IT Revolution just happens to be the latest deciding factor. In a way, NII established itself in the most appropriate time when politicians, employers, and government officials started to bestow undeserving significance to the impact information technology brings to our economic system. Needless to say NII raised a voice of caution.

Information technology brings positive as well as negative social change, as such is the nature of technology. Technology will not only contribute to economic growth but also permanently alter the cultural foundation we stand upon. Looking at the automobile industry for example, it is no exaggeration to state that well over half of the economic growth Japan attained during the post-war era can be attributed to the automobile industry. The

automobile industry made major contribution by generating work among related industries as raw materials, oil, construction, insurance, and commerce.

On the other hand, we see negative social/ environmental impacts as air pollution, traffic accidents, and excessive carbon dioxide released in the air. We cannot ignore cultural changes brought on by automobile either. I make myself responsible for evaluating the totality of impact by identifying all changes, whether positive or negative, information technology will bring upon us.

One topic of interest is the greenhouse gas effect. It is worth studying whether level of energy consumption related to IT Revolution will ultimately affect the greenhouse gas effect. Distribution of electronic products will unquestionably increase energy consumption and distress energy source. On one hand, teleconference will alleviate the burden of traveling. However, it is uncertain whether e-commerce will increase or decrease the amount of transportation of goods. Thus, we are yet to discover the impact information technology will have on the transportation industry, as this industry is a major polluter. As presented here, there is an intricate correlation between environmental concerns and IT.

These sentences were translated by the editorial office from the article published in the NII Journal written in Japanese.

IWS 2001:
International Workshop on Next Generation Internet and its Applications

Professor and Director, Infrastructure Systems Research Division

Shoichiro Asano

Graduated in 1970 from Dep. of Engineering, University of Tokyo; Dr. of Engineering from University of Tokyo in 1975: took the present office in April 2000, after serving as Research Associate at the Computers Centre, University of Tokyo, Lecturer at the Space and Aeronautical Science, University of Tokyo, Associate Professor at the Institute of Interdisciplinary Research, University of Tokyo, and Professor & Director, Systems Research Division, NACSIS; covers specialty in digital integrated communication and high-speed communication architecture.

There have appeared some changes in the area of research network. First, photonic network, a possible solution to realized next generation Internet, are now planning in Northern America, Europe and Asia. Second, the efforts to assist advanced researches have increasingly been focused on the development of networks of the next generation.

The 4th Internet Workshop 2001(IWS2001) was held in the NACSIS from Feb.21 to 23, 2001, by

mainly taking up these topics in the new Century. The fact that this Workshop was co-organized by NII and the Japan Science and Technology Corporation (JST) might reflect the start of the Ministry of Education, Culture, Sports, Science and Technology (the MEXT).

Photonic network is structured by applying optical wavelength signals (signal), used for fiber cables, as the transmission media with realizing rate over 10Gb/s. There are two critical reasons for

this: first, the router of the Internet is approaching to the bound of its processing capability, and, therefore, a configuration that has cut-through pass without packet forwarding via router be employed; and second, this is a realistic method to improve the communication security of high-speed networks. NII plans to start in January 2002 the operation of Super SINET having the said structure. It has been reported that the similar structure is employed for Canadian research network CA*net4, Géant that connects European countries, and a local network called STARLIGHT in Chicago area, the U.S.

On the other hand, new research activities for which certain networks can effectively be utilized have been proposed: geophysical observation; vio-informatics and other life sciences; astronomical sciences studies using radio telescope; high-energy physics; nano-techology based on the inter-disciplinary studies; and, systematization of basic physics. Throughput these researches, there is a common feature that, data obtained during any experiment or observation have to be inter-nationally transmitted at the rates over 1Gb/s. Certain organizations responsible for the primary processing and the database formation of the data will be designated, and many of appropriate
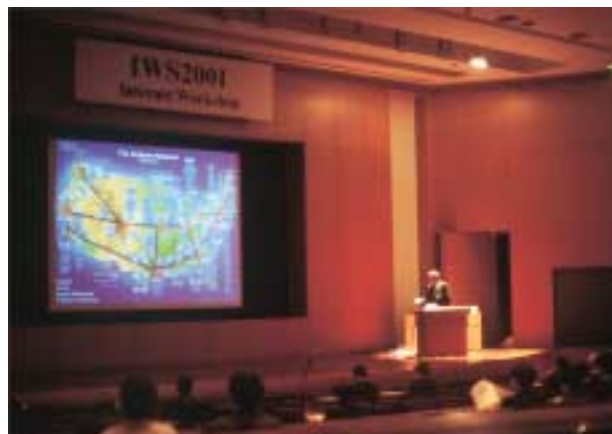
Japanese organizations are expected to cooperate with this initiative. Because super computers are used in these organizations for data analysis, a super computer network to connect them, which is to be called "Data GRID", will be build. To the IWS 2001, the initiative on "Data GRID" was reported.

Organizations that will become main operators of the 21st Century international photonic network participated in the IWS 2001. During the Workshop, some preliminary consultation on the future tasks to materialize the initiative was also made. In particular, all of the participating organizations recognize that their national budgets have to be effectively used to reach the goal and that, therefore, close attention is required for the selection of international connection sites and for the positive evaluation of international connection methods.

The consultation will be continued in the annual meeting of the Internet2.
I would like to add that you should visit http://iws2001.jp.apan.net/ for details of the Workshop, http://www.canarie.ca/ (for Canada's initiative), and http://www.dante.net/ (for Europe's).

The 2nd NTCIR Workshop Meeting "Evaluation of Chinese and Japanese Text Retrieval and Automatic Text Summarization

The *Second NTCIR Workshop Meeting* was held at the Hitotsubashi Memorial Hall of the National Center of Sciences, March 7-9, 2001. It was hosted by the NII's Research Center for Information Resources and co-sponsored by the NII and the Japan Society for the Promotion of Science as part of the *"Study on Ubiquitous Information Systems for Utilization of Highly Distributed Information Resources* (JSPS-RFTF96P00602)" under the *"Research for the Future"* Program.

As stated in an article in this issue (p.19), **NTCIR Workshop** is a series of evaluation workshops which is designed to enhance research in information retrieval and related text processing techniques, such as summarization, extraction, by providing large-scale test collections, evaluation setting and a forum of researchers. This is a new type of joint research, so-called *data collection-based workshop-type joint research*, in which many participating research groups conduct their own research using the common data set, and each participant will learn each other through the cross-system comparison based on the common evaluation settings provided by the workshop. Various implications are expected, including construction of re-usable large-scale test collections, encouraging research idea exchange and technology transfer, providing a "showcase" of brand-new technologies, motivation of research, encouraging intensive discussion and research on evaluation methods and showing the model of experimental design, attracting new comers and so on.

The Second NTCIR Workshop hosted three tasks; Chinese Text Retrieval (CHTR), Japanese-English Information Retrieval (JEIR), and Text Summarization (TSC). 45 groups from eight countries registered to one or more tasks and started their research using the common data set in June 2000. Among them 36 groups listed below completed their tasks and submitted the results. Of the above, 11 groups submitted the results to CHTR, 25 to JEIR and nine to TSC.

ATT Labs & Duke Univ. (US), Communications Research Laboratory (Japan), Fuji Xerox (Japan), Fujitsu Laboratories (Japan), Fujitsu R&D Center (China PRC), Central Research Laboratory, Hitachi Co. (Japan), Hong Kong Polytechnic (Hong Kong, China PRC), Institute of Software, Chinese Academy of Sciences (China PRC), Johns Hopkins Univ. (US), JUSTSYSTEM Corp. (Japan), Kanagawa Univ. (Japan), Korea Advanced Institute of Science and Technology (KAIST/KORTERM) (Korea), Matsushita Electric Industrial (Japan), National TsinHua Univ. (Taiwan, ROC), NEC Media Research Laboratories (Japan), National Institute of Informatics (Japan), NTT-CS & NAIST (Japan), OASIS, Aizu Univ. (Japan), Osaka Kyoiku Univ. (Japan),, ueen College-City Univ. of New York (US), Ricoh Co. (2 groups) (Japan), Surugadai Univ. (Japan), Trans EZ Co. (Taiwan ROC), Toyohashi Univ. of Technology (2) (Japan), Univ. of California Berkeley (US), Univ. of Cambridge/Toshiba/Microsoft (UK), Univ. of Electro-Communications (2 groups) (Japan), Univ. of Library and Information Science (Japan), Univ.

of Maryland (US), Univ. of Tokyo (2 groups) (Japan), Yokohama National Univ. (Japan), Waseda Univ. (Japan).

The first day of the Meeting was held as an open forum of the evaluation of information retrieval and text summarization and anybody who are interested in the topic could participate. The overview of each of the above tasks was reported. Prof Stephan E. Robertson, who developed Okapi algorighm that many groups in the NTCIR have used, provided keynote speech on "On laboratory testing of text retrieval systems", Invited talks were made by Donna Harman, National Institute of Technology Standards and (Co-) Chair of TREC and DUC) and Daniel Marcu, University of South California, Co-Chair of DUC. In the Panels, presentations and discussion were made on the evaluation of cross-lingual information retrieval (CLIR) and the future directions of researches in information retrieval and text summarization. The speakers were selected speakers of active participating groups, Martine Braschler, Eurospider, Organizer of European CLIR Evaluation CLEF, Sung Hyun Myaeng, National Chungnum University, Organizer of Korean IR Evaluation HANTEC, Mun-Kew Leong, BIGontheNet.The Program Committee continued

Prof. Stephan E Robertson is making the keynote Speech

Participants are discussing the research results reported in the posters.

intensive discussion on the experimental design of the NTCIR.

For the second and third days of the Meeting, participation was restricted to the active participants who submitted the task results. Many interesting results with various approaches were reported with active discussions on them in an informal atmosphere were followed. Most of participating groups from the First NTCIR Workshop in particular reported significant improvements or renewed algorithms for the online proceedings and detailed results, please visit the NTCIR Web site at;

http://research.nii.ac.jp/ntcir/

The test collections used at the Second NTCIR Workshop, NTCIR-1 & -2 for Japanese-English

text retrieval and NTCIR-2 Summarization for automatic text retrieval research of Japanese texts are available for research purpose even for the researchers who did not participated. The NTCIR Workshop 2000/2001 plans to host CLIR of Chinese, Korean and Japanese, Patent Retrieval, Question Answering, Automatic Text Summarization and Web Retrieval tasks. For the details, please visit the NTCIR Web site at the above URL. NTCIR has been supported by various people both in Japan and outside Japan in many ways. We greatly appreciate their continuous support.

(Noriko Kando, Associate Professor, Library and Information Research, Human and Social Information Research Division)

5th NII Regular Study Meeting February 21, 2001

On the Evaluation of Information Retrieval Systems -- Laboratory-type Testing and Real-life Use

Associate Professor, Library and Information Research, Human and Social Information Research Division, NII

Noriko Kando

Graduated in 1994 from PhD Course, Graduate School of Library and Information Science, Keio University; received in 1995 PhD in Library and Information Science; took the present office in April 2000, after serving as Research Associate, Scientific Information Research, NACSIS, Visiting Researcher, Syracuse University, NY, USA and Denmark's Royal School of Library and Information Science, and Associate Professor, NACSIS; covers specialty in library and information science and information retrieval.

The issue of information retrieval has become to have close relations with many people, as both of users of the Internet and of electronic documents are increasing. Information retrieval is a technology to find document(s) containing the information relevant to users' information needs out of huge document collection. Test collections designate datasets for experiments and testing with which the retrieval effectiveness of the search engines, the most important element of information retrieval systems, is evaluated, and therefore are essential for research and development of information retrieval technologies.

Test collections have made significant contribution to the improvement of information technologies, because they can be re-used for retrieval experiments

in laboratories. Actually, there are however various kind of conditions that have influences on the task other than the functional state of retrieval engines, such as: interface; properties and purposes of the document to be retrieved; purposes for which the user makes retrieval, his or her task, or his or her interest; and, whether or not the user correctly know what is needed to solve the problem, if any. In general, it is possible to make retrieval experiments subject to more practical conditions by incorporating possible factors on the user side, but the control becomes complex and the generalization of the results difficult. Therefore, we proposed the framework for evaluation that was structured as a spectrum with laboratory-type testing and user-oriented evaluation on its both ends, without treating them as separated ones.

Activities towards the Development of Mobile Software Systems Based on Mobile Codes

Visiting Professor, Large-scale Software Research, Software research Division, NII
Professor, Interfaculty Inifiative in Information Studies, Graduate Course, the University of Tokyo

Akinori Yonezawa

Completed in 1978 the Doctor's Course in Computer Science, MIT; Ph.D. in Computer Science; took in 2000 the office of Professor, Interfaculty Inifiative in Information Studies, Graduate School, the University of Tokyo, after serving as Assistant Professor, MIT Computer Science Institute, MIT Artificial Knowledge Institute and Tokyo Institute of Technology, and as Professor, Information Science Section, Dep. of Engineer, the University; became in Nov. 2000 Visiting Professor, NII; covers specialty in parallel distributed software systems.

Research activities of Prof. Akinori Yonezawa's Seminar covers wide range of areas, including studies necessary for the development of parallel distributed software systems such as those on linguistic theories, design and actual assembly of processing mechanisms. Software security is also one of our research targets.

At present, almost of all software are written on the assumption that they are used for one computer. There are many environments however that plural number of CPU can simultaneously be used, for example, large-scale parallel computers with shared-memories, parallel computer environments where many computers are connected via high-speed networks, and wide-area distribution environments with WWW as sites. In addition, these environments have increasingly become important, as the functions of applications diversify and the use of data is globalized.

My Seminar's members have already challenged the studies on the implementation and on basic theories of programming languages to be operated mainly in an environment consisting of large-scale parallel computers (those having CPUs from several hundreds to over 1,000) or in one covering very broad distribution like the Internet, since the earlier period before the present matured environment was achieved with regard to parallel/distributed computers.

Recently, we have added to our challenges an issue of mobile object computation. The conventional concept of object-orientated computation is that an object is a module of software that is activated when any message arrives at it and (able to) performs the task designated by the message. A mobile object, devised on an extension of the concept, has a function to autonomously go around in the network. One example of its simple applications is search robots of the Internet, which actually move from homepage to another in the world to gather effective information. Concretely to say, the subjects we have covered include design, processing systems, performance time systems and innovative application programs of programming languages used to write such computation/information processing.

Outline of our research
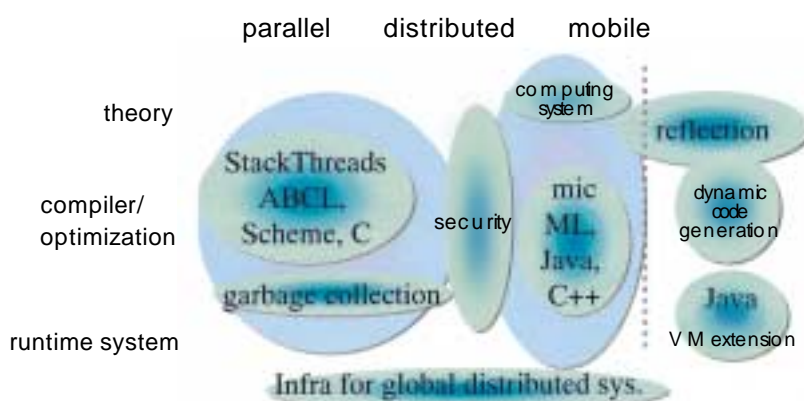
"Science and Technology higher Education in Europe: does the European model exists? "

Visiting Professor, High-Speed Network Laboratory, Research Center for Testbeds and Prototyping, NII

Henri Angelino

Chemical Engineer, National School of Chemical Engineering, Toulouse (E.N.S.I.G.C.) in 1958, Petroleum Engineer, National School of Petroleum and Engines, Paris (E.N.S.P.M.) in 1959, *Docteur es-sciences* in 1964, "Member" of the American Institute of chemical Engineers (AIchE) in 1985, "Fellow" of the Institution of chemical Engineers, London in 1986, "Corresponding member" of the *Real Academia de Ciencias*, Madrid in 1989, *Docteur Honoris Causa* of the Chemical Technology and Metallurgy University, Sofia in 1995.
Assistant Professor, Associate Professor Faculty of Sciences Toulouse then National Polytechnical Institute of Toulouse (INPT) (1962-1974), Full Professor of Chemical Engineering, INPT in 1974.
Scientific Counselor to the French Embassy in Sweden (1977-1980), Scientific Counselor to the French Embassy in Spain (1981-1983), Director of the School of Chemical Engineering (E.N.S.I.G.C.Toulouse)(1983-1991), President of the University, National Polytechnical Institute of Toulouse (1991-1996), Counselor for Science and Technology to the French Embassy in Japan (1996-2000), Visiting Professor of NII in Nov. 2000
Elected member of the special "National Council of Universities"(*Comite National des Universites*) in charge of recruitment and promotion of teaching staff working in the French higher education system (Universities and Engineering schools)(1976-1991)…etc.

A general survey of the science and technology education in the European Union is presented .At first the different schools system and certificates giving access to higher education have been introduced showing the differences. Then the engineering studies and Science and Technology studies in different European countries are described and some case study presented, Italy, Germany, UK, Sweden and France. The differences in Europe exist in length of studies - 3 to 6 years-, annual number of contacts hours -600 to 1000-, the type of studies -under strict supervision or flexible system-, the awarding of the degree-academic, professional-, etc. At the level of postgraduate studies there are less differences between the various systems and almost in every country there is a master program (one or two years, with a thesis or without) before the Ph.D program but some time the Ph.D program includes some exams before the thesis. All the differences are very much dependant on the culture of the nation but nevertheless recently in La Sorbonne in Paris on May 25th 1998 four ministers in charge of higher education system (France, Germany, Italy and United Kingdom) made a statement for an harmonization of the architecture of the European higher education system introducing two cycle undergraduate and postgraduate with two possibilities short postgraduate and a long postgraduate. This declaration was then taken into consideration and discussed in Bologna Italy in June 1999.A new text was signed on the 19th of June 1999 by 29 European ministers including some of non European Union States. The architecture will be the same in all the countries: 3 years to obtain an undergraduate degree, then 2 years more to obtain a Master degree and then 3 years more for a Ph.D degree . They engaged in co-coordinating their policies to reach within the first decade of this century the following objectives;

1) adoption of a system of easily readable and comparable degrees

2) two cycles, undergraduate (minimum three years) and graduate; access to graduate require successful completion of first cycle

3) Establishment of a system credit (ECTS) to promote student mobility

4) Promotion of mobility students, teachers, researchers and administrative staff

Promotion of co-operation in quality insurance to develop comparable criteria and methodologies

6) Promotion of the necessary European dimensions in HE (curricular develop, inter institutional coop, mobility scheme, integrated programs of study, training, and research

The vitality and efficiency of any civilisation can be measured by the appeal that its culture has for other countries . Europe needs to ensure that the Higher Education System acquires a world-wide degree of attraction equal to its extraordinary cultural and scientific traditions. The path is open but it will take some time to establish this unique architecture.... but at least that shows that Europe is also the Europe of knowledge!

Reaction Prediction Study Using Database - Formal Computer-simulation of Thinking Way of Chemist

Research Associate, Information Retrieval Research, Multimedia Information Research Division

Hiroko Sato

Graduated in 1990 from Dep. of Chemistry, Faculty of Science, Ochanomizu University; Dr. Sc.; took the present office in Dec. 2000, after serving as a staff member of Toray Industries Inc, a research student of Toyohashi University of Technology, Special Researcher of the Basic Science Program in RIKEN, and a researcher of PRESTO of Japan Science and Technology Corporation; covers specialty in computer chemistry and chemical information.

Our concept with several studies toward the goal of predictions of organic reactions is presented. Formal computer-simulation of thinking way of chemists is the concept of our approaches, including reaction characterization, classification, and modeling using a reaction database. The characterization is performed by physicochemical features of molecules. The classification and the modeling are investigated based on the features with the help of neural network and statistical methods. According to the concept, several reagents were characterized by features of FRAU (Field-characterization for Reaction Analysis and Understanding) system that calculates electrostatic and steric interactions with pseudo-substrates. The reagents were classified based on the features and a reagent-function correlation model was constructed with the help of a counter-propagation type of Kohonen neural network method. The results from predictions of the potential roles of reagents by the model and verifications by experiments were demonstrated.
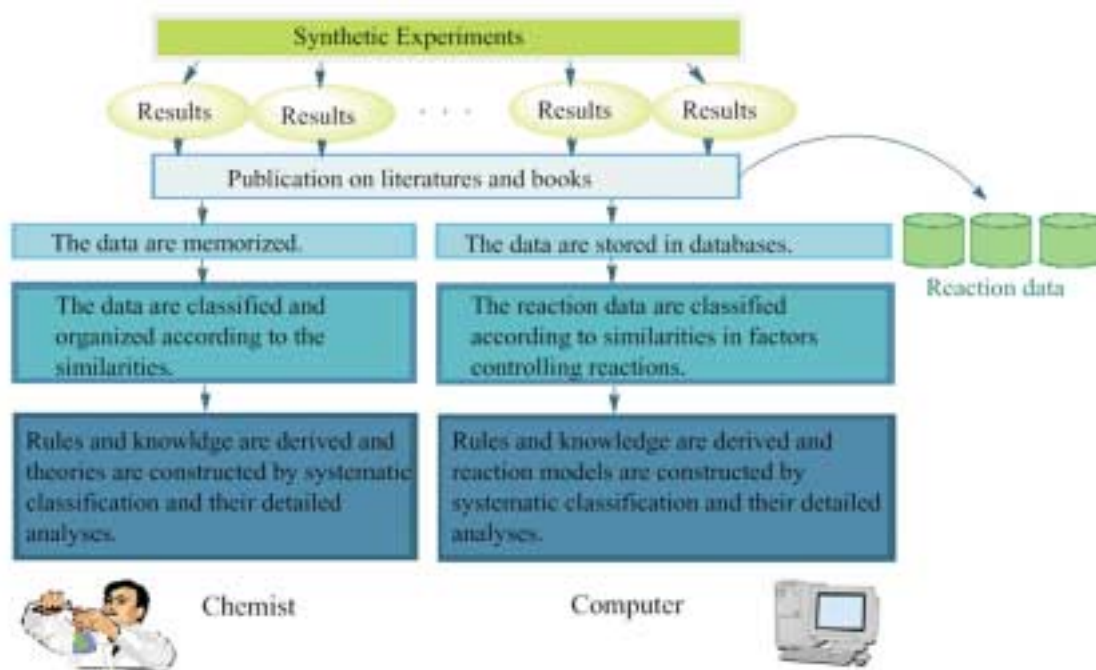
Construction of neural network model by formal-simulation of thinking way of chemist

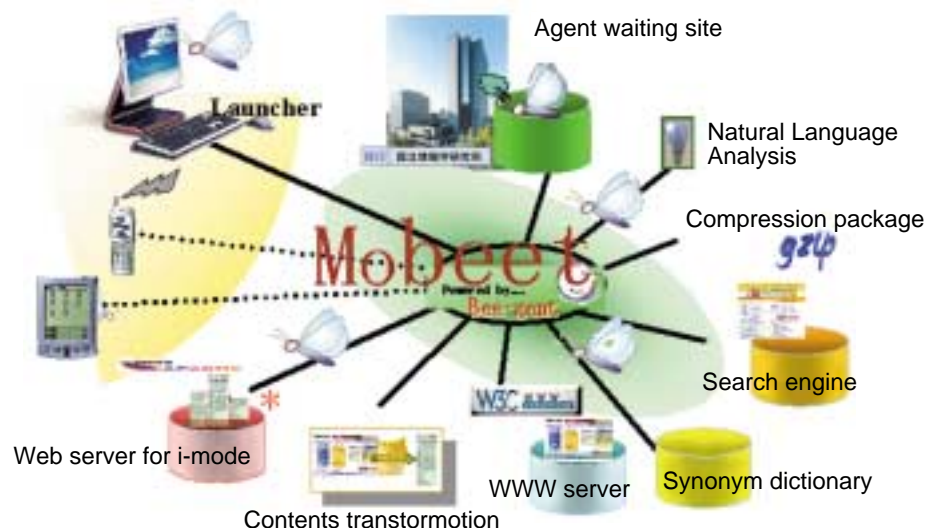## Public Release of WEB Information Gathering Agent, Mobeet

Mobeet (Mobile Environment Enhancement robot) is an agent, which gathers information the user wants to know by accessing the Internet from PC, PDA and mobile phone. The user gives an instruction to the agent via tool of his choice in a natural language, and the agent retrieves and gathers the information in the Internet on his behalf while the power of selected tool is turned off or communications line is off-line. The user is able to access his agent from any tools most convenient to him for the results at any time. Mobeet is a product of collaborative research with Toshiba. Mobeet operates under Bee-gent (http://www2.toshiba.co.jp/beegent/), a WEB service affiliated agent. Therefore, use of Internet services of

any combination of user's choice is possible such as requesting for information retrieval in voice command by utilizing a natural language analysis service, and receiving only the outlined information by utilizing a contents summary service.

(Professor Shinichi Honiden,
Knowledge Systems Research,
Intelligent Systems Research Division)

URL http://mobeet.ex.nii.ac.jp/

This research work was introduced on Asahi Shimbun dated April 5, 2001.

Agent waiting site
Natural Language Analysis
Compression package
Search engine
Synonym dictionary
WWW server
Contents transtormotion
Web server for i-mode
Launcher

■ Introduction to Joint Researches
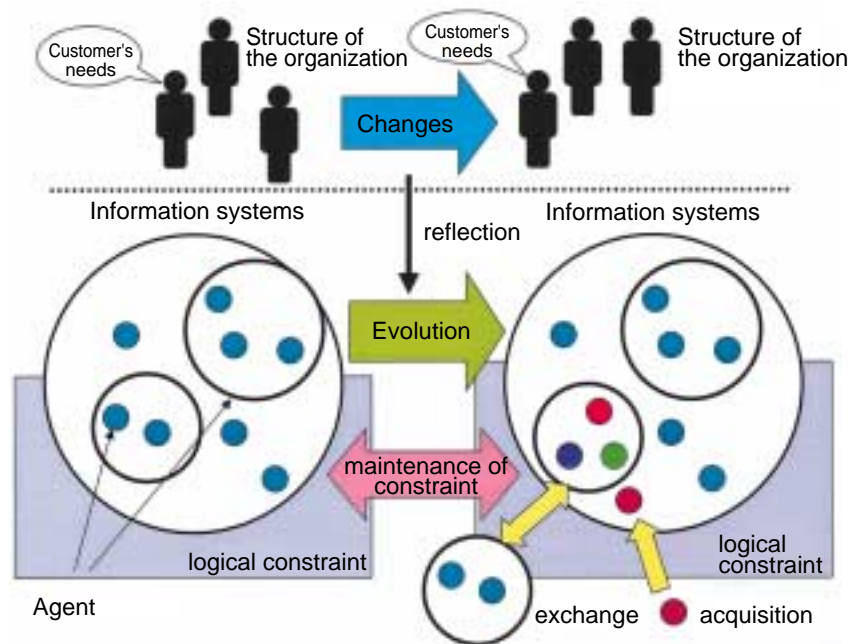
Evolutional Software Architecture with Safety

1.Evolutional Software Architecture

As users of the Internet are increasing in recent years, it becomes more common for plural organizations to mutually operate some information systems via the Internet, not limited to inside a company. Different organizations have different composition of information systems. Nevertheless, there are many companies, recently in particular, which often carry out restructuring to meet the rapid social fluctuation and to survive. It has increasingly become important to meet changes of customers' needs to satisfy them. These trends will increase in the future, but usually, there will be no time and money to remake the software from scratch. This means that the existing

software has to be changed to satisfy the user's needs. If software has certain evolutional, or developmental, functions to cause, even if partially, any change according to the needs of users without applying any manual operation, it will certainly be very helpful for a significant cost reduction. Typical structures and concepts based on which software is formed are called architectures, and the software architecture having the said function is specifically called evolutional architecture.

2.Evolutional Safety

There are many factors to be considered in developing evolutional software. Even if it is able to

Structure of the organization / Customer's needs / Changes / Information systems / reflection / Evolution / maintenance of constraint / logical constraint / Agent / exchange / acquisition

do a new, required function, there is a possibility that this impedes the existing ones. It is also the case that, when software is improved manually, new problems are often caused as a result of applying some treatments to the original program. For example, if you give a critical damage, or a security hall, to security function of the software, it will mistake the means for the end. The property to exclude any defective factors during the software evolution is called evolutional safety.

This joint research project focuses on the study on evolutional software architectures with such safety and their uses. The long-term purposes of this project lie in identifying the general properties and necessary functions of evolutional architectures, but, as a concrete and socially-needed target, the issue of keeping security of information systems while companies etc. take necessary steps to meet fluctuations of needs is covered as well.

3. Towards the Development of Evolutional Software

First, the structure of the organization to be changed, as well as the users of its systems, are modeled as agents. Agents, in particular agent models having evolutional architecture, are suitable for modeling not only such organization but also access to appropriate information systems from various information platforms, such as portable terminals, portable telephones and information home appliances. Second, to give the evolutional safety to evolutional software, or more concretely, to realize the dynamic development of information systems without

producing any security hall, technologies are required which, first, detect the possibility that damage of safety may be caused during the evolution, second, identify any impeding factor, and thirdly, exclude it. For this purpose, the ways for expression, modeling and treatment in computers have to be established with regard to security. We have attempted to apply constraint expression with Solver system, deontic logic, process logic or process algebra. Process logic and deontic logic are kind of modal logic. Modal logic, with functions for reasoning and verification, can be used to express time, possibility, duty and other various features concomitant to our daily life. The use of such logical expression has an advantageousness that the synthesis can be made easily. Respective constraints of an agent and of another agent are logically synthesized when they are combined. The features of process logic and deonic logic to be given to the information system are expressed as their constraint conditions, and a system, structured as a set of the agents, satisfies the conditions. Proper agents are automatically selected or added even when the agents of the system are changed or added in later days in a way no to conflict the conditions. This will help the remarkable reduction of maintenance costs. The current members of this project include Prof. Doi and Dr. Iijima(Keio University), Dr. Ohmaki and Dr. Isobe (National Institute of Advanced Industrial Science and Technology), and Dr. Hosobe (NII) and me.

(Prof. Shinichi Honiden, Knowledge Systems Research, Intelligent Systems Research Division: honiden@nii.ac.jp)

Introduction of Operation Activities

Outline of Education Training Programs at National Institute of Informatics (NII)

NII carries out various Education Training Programs.

(1) Advanced Training Programs
NII carries out various education and training programs designed to provide opportunities to catch up specialized and advanced technologies for staffs dedicating to support academic researchers at universities and research institutes.

NII Seminar
This seminar trains leading staffs for supporting academic researchers by providing hands- on experience performing actual research work.

Network Training Course
This course provides opportunities to catch up recent and advanced network technologies for staffs administering and operating network services at universities and research institutes.

NACSIS-CAT Advanced Training Course
This course trains leading staffs of NACSIS-CAT service in the participating university libraries.

NACSIS-IR Advanced Training Course
This Course trains instructors of guidance or training courses on how to use the NACSIS-IR service held at their institutions.

(2) User-Training and Guidance Program
NII offers user-training courses and guidance courses in NACSIS services.
Regional courses are also offered in conjunction with university libraries in order to expand the range of opportunities.
The following types of user-training courses and guidance course are offered.
NACSIS-CAT Training Course
NACSIS-ILL Training Course
NACSIS-IR Guidance Course

(3) Provision of the Self-learning System
NII offers a self-learning system (NACSIS-SL) to enhance the user's learning experience, with which the user can learn our services through the Internet. NACSIS-ILL study course is the first production of NACSIS-SL.

(4) Support for User Training Sponsored by Universities
In order to support guidance or user-training course of NACSIS services sponsored by universities and academic societies, NII offers some support programs, such as to provide training text or materials, to advice about curriculum, and to assign of user-ID.

(5) International Training
In cooperation with related organizations, NII carries out training for staffs dedicating to support researchers at academic research institutions in foreign countries.

Research results at NII should be returned to the society. NII plans to carry out the dissemination of information by conducting training courses for a wide range of users.

(Dissemination Activities Division)

NII Seminar

Catalog System (NACSIS-CAT) Training

Please access our Home Page for details on Education and Training Programs available for 2001.

URL http://www.nii.ac.jp/hrd/index.html

Cooperation to the Training program for "Japanese studies librarians" in 2001

NII conducted a training program on Tuesday, February 6 and Wednesday, February 7, 2001 for 17 librarians from 13 countries. This program was organized in cooperation to the Training program for "Japanese studies librarians" held in the period of Monday, January 22 to Friday, February 9, 2001, in conjunction with The Japan Foundation and National Diet Library.

The Training program for "Japanese studies librarians" invites librarians who handles Japanese related book collections at universities and research institutions overseas. The program's object is to build the foundation for research of Japan and providing information related to Japan at concerned countries through improvement of information gathering skills, enhancement of IT to handle information available in Japanese, sharing of individual experiences, and building-up networking with each related organizations. NII has been participating in meeting for the plan of training since 1996 when the education and training program was first conducted, and been in charge for two days of 3 week-program.

The training programs at the NII facilities include briefings and operation experience of Catalog Information Service (NACSIS-CAT, NACSIS-ILL, Webcat), Information Retrieval Service (NACSIS-IR), and Electronic Library Service (NACSIS-ELS) provided by NII. Also included are introductions of Directory of Search Activities and Resources (NACSIS-DiRR) and Academy Society Home Village, and opportunities for exchanging comments among the participants.

The participants showed very strong interests in each service, and were eager to ask questions regarding the use of the service in their country.

(Dissemination Activities Division)

Holding of Chinese, Korean and Japanese Author Names Authority Workshop

NII conducted "Chinese, Korean and Japanese Author Names Authority Workshop" twice this year, on January 10 - 11, and March 28 - 29, 2001.

Recorded knowledge in Chinese, Korean and Japanese languages are cross-referenced and increasingly used among these three countries and other regions. There is a need for standardized handling and processing of author names in computerization and network use of national bibliographies and national union catalogs in these nations. At this workshop, present status of author name authority data and description rules at JAPAN MARC (National Diet Library), NACSIS-CAT (NII), China MARC (National Library of China), KOR MARC (National Library of Korea) and KERIS-CAT (Korea Education and Research Information Service) were reported by specialists from each organizations. Data comparison of identical names in Chinese, Korean, and Japanese language was made, and the participants deeply recognized the current situation on the handling of author name authority at each

country. Also, Marie-France Plassard, officer of UBCIM-IFLA reported on the "UNIMARC authority format", the results of authority regulations in the international environment. The participants discussed common problems and solutions on handling of author names in Chinese, Korean and Japanese languages, and agreed to pursue an accumulation method for standard or regulated author name authority data in future.

(Contents Division)

Evaluation Workshop on NII/NACSIS Services in Thailand

As a part of Thai-Online-Project headed by NII, "Evaluation Workshop on NII/NACSIS Services in Thailand" was held on March 13 and 14, 2001 by inviting researchers and specialists from Chulalongkorn University, Kasetsart University, Thammasat University, Technical Information Access Center (TIAC) and the Japan Foundation Bangkok Language Center. Comments on usability and issues of NACSIS-IR services in Thailand were discussed in the workshop.

(Publicity and Survey Division)

"IT" and Scientific Information: A View through the Recent Studies at the Research Information Research Division, NII

Professor and Director, Research Information Research Division

Masamitsu Negishi

Graduated in 1968 from the Faculty of Economics, the University of Tokyo; completed in 1976 the doctoral course at the university; took the present post in April 2000, after serving as an associate professor at Research Center for Library and Information Science, the University of Tokyo, and a professor of National Center for Science Information Systems (NACSIS); specializes in research on scholarly information databases, and research trends through bibliometric approaches.

Recent progress in distribution systems of scientific information is remarkable. Now, "IT (Information Technology) revolution" is frequently quoted everywhere, and this reminds us that the internet, the key element of which, had been initially developed as a telecommunication system among researchers. In its second stage, the internet was applied to businesses, and then the applications were widened to include personal usage so as the internet having got high popularity. The Web, often used synonymously to the internet, has also its origin in research community as was devised as an information sharing method among researchers. In view of this history, scientific information appears to be the mother of the IT revolution. Further, the scientific information is still keeping its initiative role in IT development today.

In Japan, the idea of the Science Information System was proposed by the Science Council to the Minister of Education, Science and Culture in 1980, which was to realize efficient production, distribution and acquisition of scientific information for researchers, and various programs along this line had been devised by the government. The National Center for Science Information Systems (NACSIS), the predecessor of National Institute of Informatics (NII), was established as the central organ of the system, and it had been working for research, development and operation of the science information network, the scientific database service and the online cataloging system for university libraries. NII was established by reforming and expanding NACSIS with the mission of comprehensive promotion of informatics. It also inherits the NACSIS mission of furnishing the science information infrastructure as a key element of informatics research. Here, the research topics such as to investigate the most effective form of science information system and its future structure, based on the analysis of IT trend, would be included as the important ones.

In the Research Information Research Division of NII, relations of scientific information to scientific research are analyzed and the efficient systems for conducting research are investigated, where systems for effective production and distribution of research information and the environment for promoting research are the important research themes. Though they should extend over a wide area, the present studies include the following topics.

(1) Future direction of information infrastructure for scientific research and the Information Society

Browsing through the discussions at the Science Council and the other committees for these 10 years makes us to realized that the following two points had been put emphasis as the important factors; 1) internationalization which is to increase international competitiveness, and 2) inter-disciplinarity in research which is to combine a wide range of fields of research to cope with complex problems of contemporary society. For the realization of these goals, they made recommendations for an effective research assessment system.

In order to investigate the situation of international circulation of research results, attributes of prominent scientific journals like the place of publication, field covered, number of papers etc. are analyzed for the journals cited in the ISI's citation index databases. The results show the general concentration to USA in all of these attributes though some variations are observed among research fields. While most of these journals have been published in conventional paper media, electronic publishing is in progress for many of those.

As is already touched upon, the leading role of scientific information in IT is still significant, and we now see various trendy trials in preparing and circulating electronic information such as preprint servers, electronic journals, paper databases and cross-referencing services. The USA's position as the center of scientific research appears to continue for years to come. In this circumstance, IT like in electronic journals and databases should be utilized as the effective tool for Japan to strengthen international presence of its scientific activities.[1] In developing governmental policies towards the direction, the progress of societal informatizaion in general would work as the crucial element. Thus, the studies on business environment for informational commodities including scientific papers are also conducted. [2]

(2) Research in informatics and inter-disciplinarity

In viewing the issues of inter-disciplinarity, the total reconstruction of organization of scientific fields should be important as one of the most basic problems to be resolved. Though the classification scheme for the Grant-in-Aid for Scientific Research of the Ministry of Education, Culture, Sports, Science and Technology now includes "Compound Area," total re-organization of classification seems to be necessary, which should be based on an analysis of actual situation of research trends covering all areas including humanities and social sciences. As the Researchers Directory Database of NII holds research fields and research themes for each researcher, relations among fields designated by the present scheme can be analyzed. We have been making the study for information-related fields utilizing statistical methods for measuring similarity, aiming to systematize fields in the informatics. The study is to be expanded to cover all the areas of sciences including humanities and social sciences. [3]

(3) Research assessment and originality

Construction of an effective research assessment system is now an important problem in making national policies for science and technology. Though the necessity of quantitative indexes has been pointed out as the basic data in making research assessment, they have not sufficiently been prepared so far. The statistical processing on databases of scientific papers reveals number of papers and citations in breakdowns into countries, institutions, fields and years.[4] We have been conducting studies on these basic indexes, and the results were recently compiled and published in a book. [5] The study is further continued.

In order to promote science, original research themes and methods of potentiality should be identified. Research proposals with originality would early be distinguished and promoted, and the environment bearing originality should also be analyzed and built. Though the importance of originality in research has long been pointed out, identification and evaluation of the originality still remain to be a difficult problem. A study on R&D teams in companies shows that teams demonstrate unique characteristics which are different from characteristics of the individual team members, and they may yield originality in R&D activities.[6] Based on the study, we plan to investigate the nature of originality in scientific research.

It should be noted that the various scientific information databases developed and operated at

NII were used as effective resources and tools for those studies of the above. The feature of NII maintaining these databases will continue to be applied to the positive research projects incorporating bibliometric and data mining approaches.

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<3> NISHIZAWA, Masaki, Yuan SUN and Masaharu YANO "A Study on Informatics-Related Research Fields at Japanese Universities, " NII Journal, No.2, pp.45-58 (2001) [in Japanese]
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7st NII Regular Study Meeting   April 18, 2001

Present Conditions of Bioinformatics

Visiting Professor, Bioinformatics Research, Foundations of Informatics Research Division, NII
Professor, Bioinformatics /DDBJ Research Center, National Genetics Institute

Hideaki Sugawara

Completed in 1973 the doctor's course in engineering, the University of Tokyo; D. Eng.: took in 1996 the office of Prof., Informatics Research Center, National Genetics Institute, after working for Life Science Information Section, Institute of Physical and Chemical Research etc.; became in Nov. 2000 Visiting Professor, NII; covers specialty in bioinformatics, in particular the development of biological databases and their intensive use.

Broad concern has been attracted to enormous biological diversity since the conclusion of the Convention on Biological Diversity in 1992. In 1995, *Haemophilus infuluenzae* genome of 1.83 mega base pairs was sequenced, which was the first achievement regarding autonomous organism, and in February 2001, human genome sequences (approximately 3.000mega base-pairs) were published by two research groups. To acquire, evaluate, manage and use these explosively increasing biological data, research activities on bioinformatics have strongly been pushed recently.

This is because quick determination of gene or genome sequences has become possible on experimental scene, making the identification of their biological meanings (knowledge) a critical issue. Further, more advanced experiment methods to comprehensively measure phenomena in cells and bodies have been devised, and therefore the development of some excellent procedures to analyze volume of results of such experiments has been expected for. Technologies to visualize these results in combination will greatly useful for discovering new knowledge. Great attention has

been paid to broad range of bioinformatics research subjects, from the improvement to the new development of functions, and participation of fresh manpower from biology, informatics or other fields is earnestly expected:

1. Support for large-scale projects such as genome research: process management, assembly of fragments, and annotation (which means to find out biological meanings of genome sequences).
2. Shared use of information
   1) Construction and provision of databases: comprehensive primary databases, secondary databases containing the analysis results based on the procedures stated in 3
   2) Use of different integrated databases: CORBA, XML, ontology, etc.
3. Data analysis
   1) Sequence analysis: homology search, multiple alignment, phylogenetic analysis, pattern recognition, gone prediction, control region prediction, etc.
   2) Prediction on protein: 3D structure prediction, functional prediction, localazation prediction, interaction prediction, etc.
4. Simulations:
   Development of models of dynamic behavior of protein and gene networks, cells, organs, etc. and simulations of phenomena of life using the models.

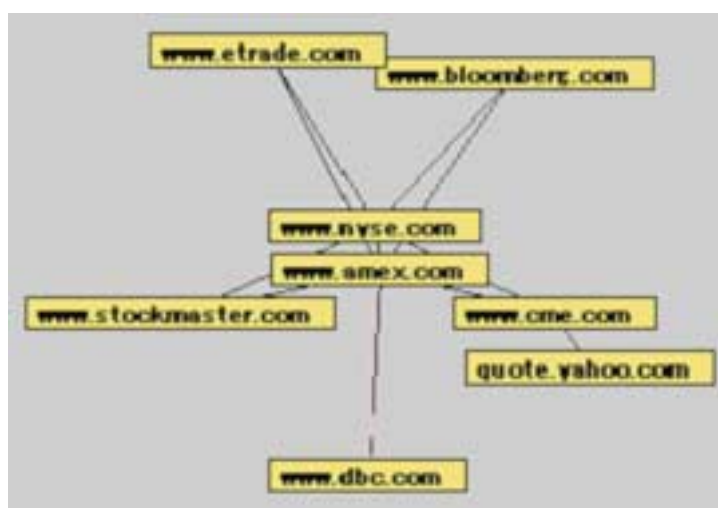## Discovery of Web Communities Based on Graph Structure of Hyperlinks

Associate Professor, Cognitive Science Research, Foundations of Informatics Research Division

Tsuyoshi Murata

Graduated in 1990 from Dep. of Science, the University of Tokyo; completed in 1992 the master's course in Science, the University of Tokyo; took the present office in Jan. 2001, after serving as Research Associate, Dep. of Engineering, Tokyo Institute of Technology, and Research Associate and Lecturer, Dep. of Engineering, Gunma University; D. Eng.; covers specialty in Web mining, machine discovery and diagrammatic reasoning.

It is estimated that the number of Web pages all over the world exceeds 2.1 billion as of July 2000, and the development of systems for discovering related pages and showing them to users will significantly help their information acquisition from the Web. As an approach of Web structure mining based on graph structure of hyperlinks, I introduced and demonstrated a system that have abilities of visualizing relations among Web pages as graphs based on co-occurrence of hyperlinks. Further, another system was also explained with which Web communities, or a set of Web pages regarding the same topic, can be discovered by obtaining data from a search engine. The figure (right) shows a visualized Web community that the system actually discovered in genre finance. This is a star graph with Web pages of stock exchanges such as www.nyse.com and www.amex.com as its center, and very interesting as a good example to show the structure of this genre. Some researches have shown that macroscopically, the Webs' graph structure looks like a bow-tie, but this problem has not sufficiently been explored and further researches will be required.

Mobile Agents

Associate Professor Programming Languages Research, Software Research Division

Ichiro Satoh

Graduated in 1991 from Dep. of Engineering, Keio University; completed a doctor's course of the Department; D. Eng.; took the present office in April 2001, after serving as Special Researcher, Japan Society for the Promotion of Science (JSPS), Visiting Researcher, Rank Xerox research Center, Research Associate and Associate Professor, Dep. Information Sciences, Ochanomizu University, Researcher, Japan Science and Technology Corporation's program "SAKIGAKE Research 21"; covers specialty in distribution systems and programming languages.

I presented mobile agent technology, which is promoted as an emerging technology that makes it much easier to design, implement and maintain distributed systems. Each mobile agent is an autonomous program that can travel from computer to computer. When it migrates to another location, its state and code also is transferred to the location and it can continue its processing from just before the migration. In the cases of processing via networks, transmission from a computer to another can be localized inside computers by employing mobile agents as programs for one of the computers. This procedure can minimize the functional bottlenecks of distribution processing, transmission delay and its frequency. Further, no transmission with the computer where it was becomes necessary after the mobile agent have reached to another, which has a very useful effect for mobile computing in which unstable transmission tends to occur. In the lecture, I also introduced several practical applications of mobile agents, and demonstrated typical applications using a Java-based mobile agent system, called AgentSpace, which is available from

http://research.nii.ac.jp/ichiro: reduction of transmission cost of remote data retrieval; load distribution by agent rearrangement; round maintenance/ management of machines on networks; work flow management system where each workflow and mail is implemented a mobile agent; and, active networks that allows dynamic changes of communication protocols. As one of new directions of application, I demonstrated a system for following and supporting patients in a hospital. When a user moves, the system can automatically track the current location of the user and migrates his/her agent to the nearest computer from the location in order to intimately support him/her from the computer.

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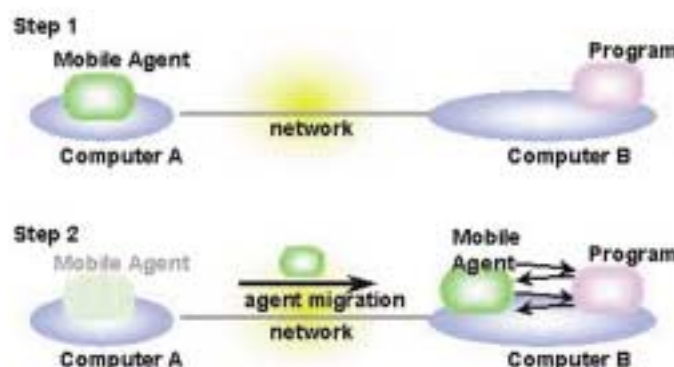
Development of Natural Language Interface (NLI)

Visiting Professor, Virtual Library Laboratory, Research Center for Testbeds and Prototyping, NII
Professor, School of Engineering, Tokyo Denki University

Hiroshi Kinukawa

In 1970, graduated from Faculty of Science, the University of Tokyo, received the degree of Dr. Sci., and joined Hitachi, Ltd.; after serving as Director, the Company's System Development Laboratory and Visiting Professor, Graduate School, Tokyo Institute of Technology (Titech), took the office of Professor, Dep. of Information and Communication Engineering and Gradate School of Engineering, Tokyo Denki University; receive in Nov. 2000 the present office of Visiting Professor, NII; covers specialty in natural language processing and information retrieval.

We are now entering into advanced information society, and therefore it is prerequisite that common equipment and systems made so that anyone can use easily and perfectly. One of tools to meet this requirement is natural language interface (NLI), with which one can give operation instructions with natural languages used in usual conversation.

After having started from the operation instruction by natural languages in the simple robot world of toy blocks, NLI has marked rapid advancement: studies on its use for database retrieval were tackled in the first half of 1970s; different proposals on NLI for respective systems presented in 1980s; and now, a new trend to try to realize its portability to DB systems has already appeared. Our activities has first been focused on the development of tools to construct NLIs for DB retrieval, while proposing the development of NLI tools for computer systems capable of receiving multiple computer operation commands, and the expansion of functions of NLI to the extent that multiple computer systems can be controlled therewith. Based on studies on these issues, we have made a proposal on domain knowledge representation through the situation transition-based modeling. With semantic network knowledge representation called Complex Chained Function Structure (CCFS) that is based on the said modeling, we have succeeded in integrating meaning structures of DBs, Computer operation commands, thesaurus, etc. and in realizing situation-transition-based production and exclusion of knowledge, interpretation of ellipsis and anaphora parsing.

One of our future challenges is to develop multi-modal user interface (MMUI) in which NLI is based upon for the integration of phonetically expressed natural languages, gestures, etc. In connection with this, we have realized a MMUI as indicated in our proposal on drip-drop model processing method with which meanings of data that are simultaneously input in parallel and in multiple modes are integrated and combined.

In the speech, the basic processing methods mentioned above and their applications were stated.

Report of Laval Virtual

Our research group made a visit to Laval, France, a week from May 15, 2001. We were invited to the international conference and exhibition on virtual reality held in the town.

Prof. Sugimoto, Information Infrastructure Center, the University of Tokyo, Prof. Kusunoki, Information Design Dep., Tama Art University, and I were the member of the reserch group, which is applying computers to elementary school education: a board like a large shogi board is placed on desk of approximately 1m x 2m large; pupils, perhaps noisily chattering, put side by side pieces of house, forest, factory, etc.; then, these pieces are synthesized at once to the scenery of a town by the computer, and simultaneously, indexes of its population, environmental contamination, industrial vitality, etc. are displayed. The intention that we devised this is to make pupils learn about good design of towns without expressed guidance.

The aim of our research lies in collaborative learning, not virtual reality, but we were invited because, according to them, our method to synthesize a virtual town might be seen as such.

On our side, we jumped at this offer, because we were engaged in a study called "Application of Education Systems to Museum Exhibition" under the governmental research budget, and it was a good chance to make a practical exhibition.

Laval, located some 250km west of Paris, is a small town near the Mayennaise River where the Government of Mayennaise Prefecture, one of some 95 Prefectures in the country, and has a population of 100,000 or so. This Bretagne Region is not so famous, and historically, its name is only referred to in connection with the Hundred Years' War between France and England in the 14th Century. However, Laval is the birthplace of Henri Rousseau (1844-1910). Far from the coastal area with fishing as its key industry, the town, located in the depth of Bretagne Peninsula seems to have no other noticeable industries than dairy. It has a third sector called Laval Technopole working for the promotion of the region, which organizes Laval Virtual, the conference and exhibition event we attended. They said that Laval Virtual was so popular last year that attracted over 10,000 visitors. This year's assembly was its 3rd.

We were told that, this year, Laval Virtual was scheduled to have a closed assembly for invited guests on the first 2 days, May 17(Thu.) and 18(Sun.) and then to be publicly opened for the following 2 days. I never expected that such a many visitors were crowded in the event.

Large part of some hundred booths opened in the round City Hall on a hill represented those of companies in European countries. Other invited overseas organizations included Dep. of Engineer, University of Tokyo, Tokyo Institute of Technology and University of Gifu. It seemed that our colleague Prof. Andres, born in a town near Laval, was a member of the Programming

TLI's reporters in the booth of this group

Committee of Laval Virtual and endeavored to introduce to visitors to the event many activities in Japan as far as possible. In addition, Mr. Planas, leader of the executive team of the organizer, was a fair pro-Japanese since he was in Keihanna for several years for research, which probably also helped them place a focus on Japan. Laval and Gifu Prefecture are in a sister-city affiliation, and some information firms located in the Prefecture and Sega Co., Ltd. were invited as well.

Our exhibit was rather plain among many other fashionable ones, but I didn't know the reason why, TV reporters of TLI, the largest TV station in France, selected our booth as a representative one in the event and came to collect news. It was broadcast in nationwide news program in the evening. Western France Newspaper also reported exhibits from Japanese organizations.

It might be due to these reports that Laval Virtual was crowded with so many visitors on the open days as if all the residents in the Prefecture gathered there. Our booth attracted many, many children, and because they were so reluctant to

Laval City Event Hall was the site of Laval Virtual.

City of Laval has a beautiful old castle.

leave, we were put in a pretty sweat from 9.00 a.m. to 6.00 p.m. for two days.

We accepted this invitation with pleasure, because we heard that, together with the beautiful scenery in early summer in local areas in France, good conditions were offered, as travel cost and living expenses there were born by the Embassy of France in Japan and the Laval City, respectively.

We are glad if we made a little bit contribution to friendly exchange between Japan and France, and would like to thank you to all the persons who gave us this opportunity.

(Prof. Hirotatsu Hashizume, Multimedia Processing Research, Multimedia Information Research Division)

## Introduction to Joint Researches

Research on Internet-Based Distributed Computing Networks

1 Advent of Ubiquitous Computing Networks
The networks of the next generation will evolve into a ubiquitous computing network in which an extraordinarily large number of computers are worn by human beings or embedded in various objects and are able to work cooperatively in sustaining the social activities of human beings. The ubiquitous computing network is considered a globally distributed large-scale computing network that efficiently supports these human-computer interactions. The ubiquitous computing concept includes several key ideas, one of which is invisibility. Invisibility here indicates the belief that computers will recede into the background of our working environment and disappear below the threshold of our awareness, leaving us to feel as though we are actually doing without them.
To clarify this concept of invisibility, consider a conversation between two people over the

telephone. Their desire is to have a conversation that is, regardless of their locations, as natural as if they were meeting and speaking face to face. This is not, however, a reality. The caller must call despite the fear that the called party will not be in. If the called party is out, the caller must use some other means of communication, such as e-mail to contact the receiver. To receive this e-mail, the called party must set up his computer so that it forwards the received e-mail to an e-mail device, which he will be carrying. Users must perform a number of complicated manual operations on their computers and other devices to switch between means of communication in this way. Users want to concentrate on communications and not on such manual operations, so the manual operations should be eliminated. Invisible computing allows the computers and communications devices to recede from being the central focus of the user's
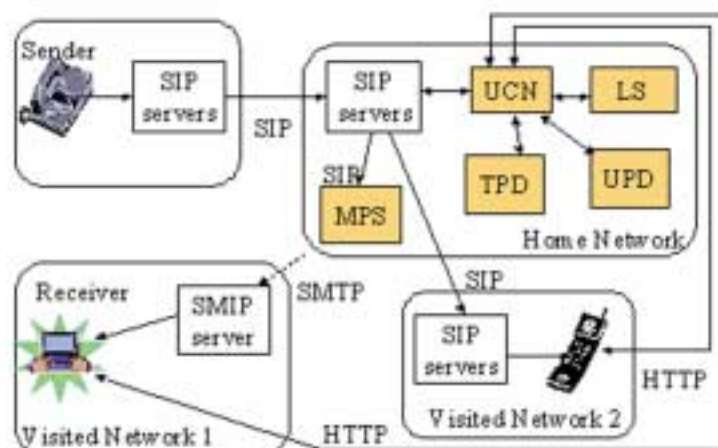
UCN: Universal Communication Navigator, MPS: Media Processing Server,
LS: Location Server, TPD: Terminal Profile Database,
UPD: User Profile Database, SIP: Session Initiation Protocol

Networks for Environment-Adaptive Personal Communication
Architecture, EAPEC

attention into the invisible computing world, so that they work in the background without being noticed by users.

We believe that the embodiment of this invisible computing concept is indispensable for realizing the next-generation internet-based distributed computing networks.

2 Environment-adaptive personal communication architecture, EAPEC

Environment-adaptive personal communications, EAPEC that we propose is a new architecture for communications that embodies the concept of invisible computing. The EAPEC system accepts messages from senders and automatically selects the communications device, medium, and service that is appropriate to receive each message, converts the message into a form that is acceptable to the receiver, and forwards the result of conversion to the receiver.

As an example of a service scenario, suppose that a caller has called a called party on an IP-phone but the called party has already moved from his home network to the vicinity of another network and is carrying a hand-held e-mail device. The EAPEC system checks the communications devices, media, and services that are currently available to the called party and decides that the call should be forwarded to an agent because the called party is unable to directly answer a phone call. The agent stores the caller's voice message, converts it to text, and then forwards the text as e-mail to the called party's e-mail device. In this scenario, the caller simply has to call the called party without having to worry about the called party's current context. Manual operations to switch the means of communication from IP-phone to e-mail are not required of the called party. The EAPEC architecture thus provides users with a seamless and stress-free environment for communications. The ultimate aim of the EAPEC is to automatically configure communications facilities so that they are adapted to the user's environment, and thus to completely eliminate the need for complex manual communications-related operations by users.

Based upon the above-notions, we have been studying the detail of EAPEC and its communication mechanism. For quick deployment of EAPEC systems into existing networks, we base the EAPEC on the 3GPP (Third Generation Partnership Project)-compliant IP-network architecture in which the SIP (Session Initiation Protocol) is combined with the CC/PP (Composite Capability /Preference Profiles) framework, as discussed in W3C (World Wide Web Consortium). Here, SIP is an IETF (Internet Engineering Task Force)-standard signaling protocol for telecommunications services, and the CC/PP is a framework used for describing device capabilities and user preferences. As shown in the figure, the EAPEC can be implemented by adding functional components of five types to the 3GPP-based IP network. These functional components include a universal communication navigator (UCN), a media-processing server (MPS), a location server (LS), a terminal profile database (TPD) and a user profile database (UPD).

3 Related Research Issues

The ubiquitous computing network may will use the Mobile IP and IPv6 technologies to efficiently interconnect a huge number of mobile computers and communication devices. The ubiquitous computing network also requires a wide range of research issues from network architectures to communication devices and components, and from engineering to social sciences to be resolved. Therefore, we plan to have a joint research project with university researchers from various research areas.

(Written by Shigeki Yamada, Professor of Functional Network Research, Infrastructure Systems Research Division)

Introduction to NII's Activities

Academic Research Activities Survey

Annually, NII carries out the Academic Research Activities Survey in order to collect data on research activities of universities and scientific institutes in Japan and to create a database for public.

Background of the Project

Originally, the survey was launched as a statistic by the Ministry of Education. The ministry carried out the Survey five times since 1961, with the aim of obtaining the information regarding the status of research activities of universities, and research institutes in Japan and for using the information as a basic data for the policy of promoting the

scientific research. NACSIS, the predecessor of NII, succeeded the project and creates the "Directory of Researchers" based on the results of the survey, and disseminate it with "NACSIS-IR" since 1992. Furthermore, the "Survey for the Compilation of Database Providing a Conspectus of Research Activities at Universities and Other Institutes" has been carried out since 1998, to collect information on different research resources of the universities and research institutes (researchers, research institutes, research subjects, facilities, materials) and from the results of the survey, the "Directory of Research Activities and Resources" (NACSIS-DiRR) is created. It is accessible via the Internet (www) without any charge.

Importance of the Research Information Database

It is of a great importance for collecting information concerning the research activities of universities and research institutes in order to create a database and to disseminate it widely, which is indispensable for the advancement of the research, promotion of collaboration and of exchange among universities, research institutes, the industrial sector and communities, and reinforcement of information dissemination internationally. Simultaneously, it also has a great significance in the area of research evaluation, which is essential for the achievement of distinguished results, disclosure of information regarding the research activity, accountability and urging a deeper understanding of the people, and the social feedback of research achievements. The "Science and Technology Basic Plan" was adopted by the Cabinet in March 2001 and it points out that the necessity and importance of the development of the database of research information.

Outline of the Survey

The aim of the "Academic Research Activities Survey" is to collect the data on research subjects, achievements of research, etc. through each university and other organization targeting the researchers in universities, junior colleges, colleges of technology, inter-university research institutes, and other institutes. The distribution and collection of the survey to and from the universities and institutes is carried out every year from July to October. After collecting the survey, the operations of inputting and loading the data, etc. were performed and the resulting updated database is provided to the public around May of the following year. In recent years, universities and other institutions have been making efforts to compile

their own information on researchers in the form of directories or databases. To promote collaboration and cooperation with the universities and institutes, NII offers the "data return service" to the proper university and research institute in addition to receive the electronic data compiled by them.

Usage of the Survey Data

The data obtained through the survey is consolidated as the "Directory of Researchers" and it is offered to the researchers and scientists through NACSIS-IR. In addition, that data is published as the "Directory of University Professors and Researchers in Japan" almost every five years. NII makes that information available to the public via the Internet site "NACSIS-DiRR", and in addition to the above-mentioned information, it also contains information on research institutes, research resources, and research subjects. Furthermore, the Research Information

Research Division of NII analyzes the data in order to conduct studies in the area of academic research status and its trends (See p.35). These activities and services have widely contributed to the effective use of the results of the survey as basic information of the planning policies for science & technology and higher education in Japan.

NII works hard to improve and enrich the contents of research activity information, the "Directory of Researchers" and the "Directory of Research Activities and Resources", whose data is originally collected through the "Academic Research Activities Survey" with the cooperation of universities, research institutes and researchers.

(Publicity and Survey Division)

NACSIS-DIRR
URL http://dirr.nii.ac.jp/

Recorded data	
Directory of Researchers	
	161,961
Directory of Research Activities and Resources (NACSIS-DiRR)	
Research institute/subject	13,448
Researcher	117,567
Research resource	2,187

Data published in F.Y.2001 based on the results of F.Y.2000 Survey.

Experimental Service of Overseas Electronic Journal: OUP

Recently many libraries provide gateways to electronic journals in their sites. Most of them are provided as a part of conventional subscriptions the libraries made and provided via Internet. But a new trend has appeared that libraries form a region- or field-based consortium to make license agreements as a consortium to maximize the opportunities for their members, and make as many electronic journals available as possible. On a wide scale, a nation wide consortium could be made to enable all members in the consortium to use the contents. The license agreement with such a nation wide consortium is called nation site license.

On April 2001, NII made a nation site license agreement with Oxford University Press (OUP) and make OUP journals available to almost all the educational institutions in Japan. In the previous year (Japanese fiscal year 2000: from April 2000 to March 2001) NII has already provided nation-wide institutions with electronic journals published by the Institute of Physics (IOP), UK with nation site license. The aim of both services is to substantiate electronic library service in NII.

OUP Electronic Journal has the following features:

1. The number of Oxford University Press journals available on the web is currently 171. It covers life science, medical science, economics, law and many other fields, and match the needs of many advanced researchers in many fields.

2. Each Institute can apply for the membership of the consortium organized by NII for OUP electronic journals. The user verification is based on IP addresses.

3. OUP and NII set a mirror server in NII to improve the efficiency for searching.

The scope of the consortium for OUP journals is universities, junior colleges, colleges of technology, inter-university research institutions and facilities under the Ministry of Education, Culture, Sports, Science and technology and the Agency of Culture.

(Contents Division)

Visiting NII for 3 Months

Visiting Associate Professor, Data Collection Laboratory,
Research Center for Information Resources, NII
Assistant Professor, Department of Computer and Information
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Vincent Oria

Ph.D., Computer Science, Ecole National Supérieure des
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d'Etudes Approfondeies/ course part of the Ph.D. Program) from the
Universite Pierre et Marie Curie (Paris VI), Paris, France, 1990.
Jan. 2000-Present, Assistant Professor, Department of Computer and
Information Sciences, New Jersey Institute of Technology (NJIT). Jun.
2000-Aug. 2000, Invited Researcher, GMD-IPSI, Darmstadt, Germany.

In 1999, I co-chaired the Multimedia Information Retrieval and Management (MISRM) Workshop held in Orlando in November in conjunction with ACM Multimedia together with Prof. Shin'ichi Satoh from NII, Japan and Prof. Brigitte Kerhervé from UQAM, Canada. That was the first time I heard about this research center. It was then called NACSIS. With the success of the 1999 workshop we organized the Multimedia Information Retrieval (MIR) the next year. Prof. Satoh and I discussed about my visit to NII at the MIR workshop actually.

I have already visited all the continents in the world but this was my first stay in Japan. I was a bit worried to feel like an analphabet. I knew the stay will be a challenge from different points of view (scientific, social, etc.) but I was excited to come as this will give me the opportunity to see, learn and compare with what all I heard about Japan. But things went smoother than I thought. The people at NII were very friendly and helpful and I would like to take this opportunity to thank them all. The Japanese people are the most polite people I have ever met and they are always willing to help. Several times, I could not find my way in the subway and people I did not know proposed to take me to the right track.

Three months are not enough to conduct a complete research. And that was not my intention. The goal of my visit was to start some work that can be carried on and to establish some long-term research partnerships with researchers at NII. We discussed a lot and have defined at least three research topics of common interest. The topics are news video modeling using for content-based search using the MPEG-7 standard, automatic annotation of course videos and multidimensional data indexing and hashing. NII provides some research facilities that are seldom seen elsewhere and this makes a big difference. During my stay I go to interact with researchers in Japan. I gave an invited talk at Hakodate on July 17th during the Database Summer Workshop (DBWS) Workshop. This workshop regrouped researchers from the whole country. After that I was invited to visit research laboratories and give talks at the following Universities: Osaka University, Ryukoku University, Nara Institute of Technology, Keio University and University of Tokyo. The talks were about the DISIMA image databases prototype we built while I was working in Prof. M. Tamer Ozsu' group at the University of Alberta Canada and on the new project Courseware-on-Demand (how to generate new courses from existing ones) I have started at NJIT, USA. So from the scientific point of view I can say that my visit was successful. I also took some time to visit some nice historical and cultural sites in Japan and enjoy the fine Japanese cuisine.

Dr.V.Oria (right), and Dr.S.Satoh

The Science and Technology Counselors Diplomatic Club (S&TDC) Meeting was Held

Dr. T. Philip Hicks (center) who managed the Meeting, Counselor S&T, the Canadian Embassy, and Prof. H. ANGELINO (left)

On July 10, 2001, NII held the Meeting of Science and Technology Counselors Diplomatic Club (S&TDC) at the Institute, to which the members in charge of the services of the foreign embassies in Japan were invited.

Prof. Henri ANGELINO, Visiting Professor, NII, and the former Counselor for Science & Technology, the French Embassy in Japan, and some colleagues had worked upon the foreign embassies in Japan etc. for cooperation for the Meeting, and some fifteen members from 14 countries participated therein. In the Meeting, Y. SUEMATSU, Director General, NII, made the Welcome Address, which was followed by presentation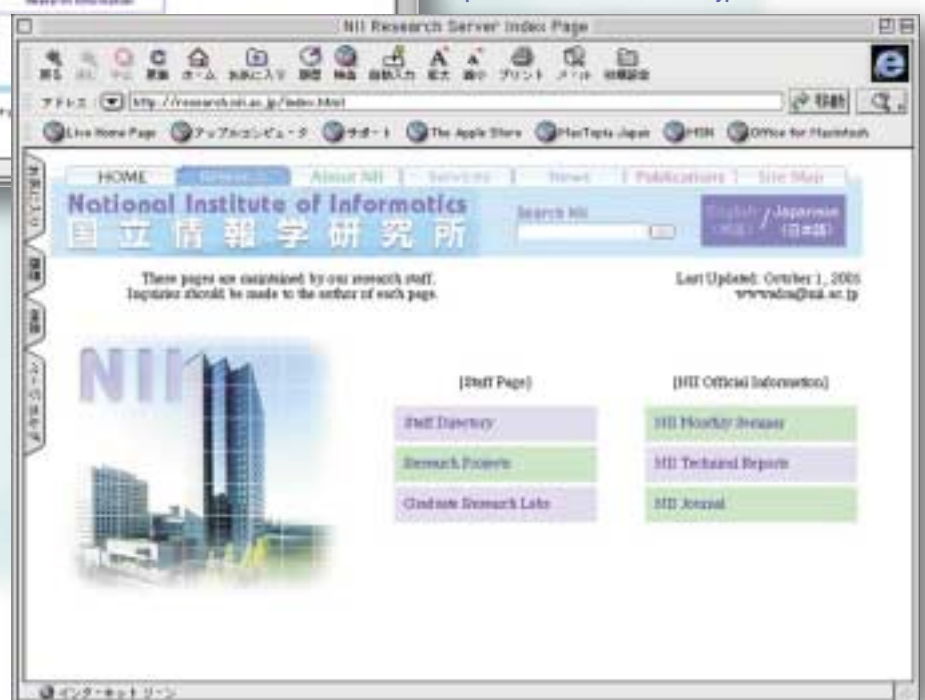s by NII's professors and other members as follow: "Overview of NII" by K. ONO, Executive Director of Research; "Introduction of the Graduate School of Informatics of *Sokendai* (The Graduate University for Advanced Studies)" by H. UENO, Prof.; "Contribution of Super SINET to the Science Community" by S. ASANO, Prof.; "Outline of NACSIS-CAT, NACSIS-ELS, NACSIS-Dirr, etc." by M. HATORI, Deputy Director, Development and Operations Department; and, "R&D of Video Indexing Technology" by S. SATOH, Associate Professor. Then, the participants had the discussion session, together with other professors and researchers of NII.

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

http://research.nii.ac.jp/index.html

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