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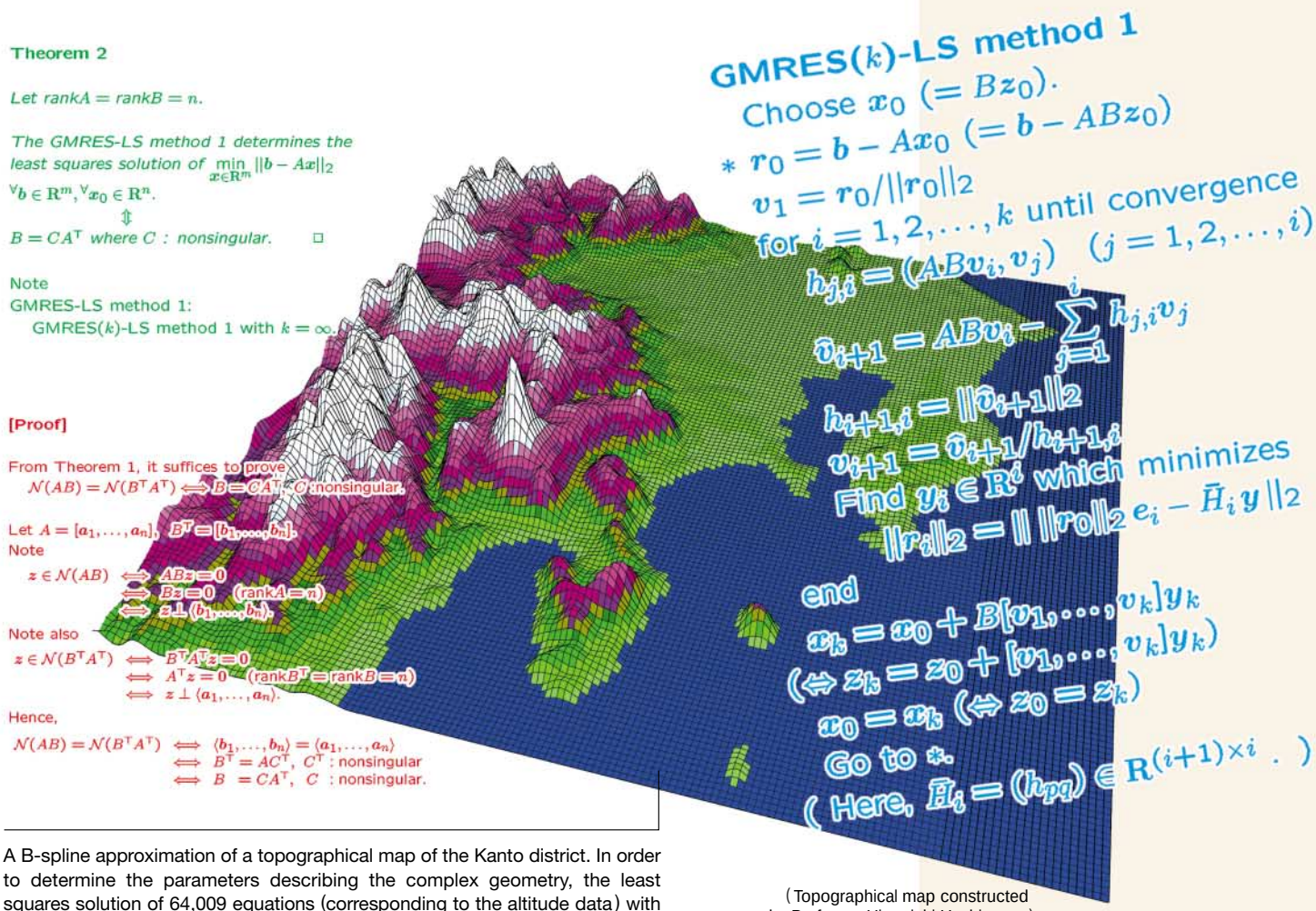


A B-spline approximation of a topographical map of the Kanto district. In order to determine the parameters describing the complex geometry, the least squares solution of 64,009 equations (corresponding to the altitude data) with 4,356 unknowns was computed. The algorithm used for the computation is the GMRES(k)-LS method developped by Professor Ken Hayami and Mr. Tokushi Ito (collaborative research). (for details to p.11).

(Topographical map constructed by Professor Hiromichi Hashizume.)

Joint research No.5

NII Joint Research on Informatics for Chemistry
— Basic and Applied Informatics for Solving Practical Problems in Chemistry

Hiroko Satoh (NII)

Joint research No.5

NII Joint Research on Informatics for Chemistry

— Basic and Applied Informatics for Solving Practical Problems in Chemistry

We are aiming at a wide range of practical applications of informatics to chemistry in a NII joint research titled "Basic and applied informatics for solving practical problems in chemistry". This article reports overview of our joint research with some projects actually running on.

Application of Informatics to Chemistry

Chemoinformatics is a research field of chemistry and treats several chemical themes on the basis of chemical information and informatics technologies. In chemoinformatics, having chemical viewpoint is very important, because the issues you treat in the field are those in chemistry, for example, design of molecules and syntheses, and prediction of properties, activity, and chemical reactivity. Chemistry does not accept any scheme and model that can not explain experimental phenomena and data, even if the schemes and models are sophisticated or represented with beautiful graphics view. Moreover, chemistry shows the diversity which can be said as the infinity that does not permit easy generalization.

When you practically apply informatics to the chemistry, any informatics method cannot be simply applied in many cases, and researches specific to a chemical domain are needed. Only after this is realized, informatics can be substantially applied to practical chemistry.

Independency and Cooperation of Different Fields

On the other hand, it is also important that independency and cooperation in a joint research between different fields. Namely, the joint research with cooperation between different fields might be successful when they independently advance their own fields and also carry out the joint research with cooperation each other. A role of Inter-University of Research Institute Corporations is providing research environments and opportunities for researchers of universities, institutes, and companies.

Projects in Progress

We have now several six projects as the joint research on chemoinformatics according to the concepts, and utilizing the benefit of Inter-University of Research Institute:

In the chemoinformatics research based on chemical information, quality and quantity of data are significantly important, and we study on the verification and the accumulation of NMR and chemical structures for a NMR chemical shift prediction system CAST/CNMR as a joint research with Dr. Hiroyuki Koshino of RIKEN (Team Reader, Molecular Characterization Team of Advanced Development and Supporting Center) and Dr. Tadashi Nakata of Tokyo University of Science (Prof., Faculty of Science), from a practical point of view of specialists of chemical characterization with NMR and of organic synthetic chemistry, respectively. The development of the CAST/CNMR system is also a subject of the joint research with them. In a joint research with Dr. Nobuhiro Kanomata of Meiji University (Associate Prof., Department of Science and Technology), we study on an application of the CAST /CNMR system to structure determination of hetero cyclic compounds. In a joint research with Dr. Kazuo Nagasawa of Tokyo University of Agriculture and Technology (Associate Prof., Faculty of Technology), we study on the verification and the accumulation of chemical reaction data for a chemical reaction prediction system and for design of molecular structures having novel functions, activities, and properties.

Fundamental informatics researches for the chemoinformatics studies are also important. One of the informatics researches is that the development of fast algorithms for processing molecular information with computer, about which we investigate as a joint research with Dr. Satoru Iwata of University of Tokyo (Associate Prof., Faculty of Engineering) and Mr. Shungo Koichi of University of Tokyo (Graduate School of Information Science and Technology). A project of developing human-machine interface is also in progress with Dr. Kumiyo Nakakoji of University of Tokyo (Prof., Research Center for Advanced Science and Technology). In the project, we are developing an interactive visualization method and to implement a human-centric domain-oriented graphic library for the method to represent molecular information that helps chemists in synthetic design, reaction prediction, and molecular design.

As described above, we have various NII joint projects on chemoinformatics from fields of both chemistry and informational science, and they have been making progresses. We expect that more various researchers are interested in the chemoinformatics research and join our projects.

*(**Hiroko Satoh,** Intelligent Systems Research Division)*

Theory of Programs and Mathematical Logic

Research introduction

We sometimes have difficulty when our personal computers hang up or the bank online systems stop. These are often caused by software bugs. A software bug is an incorrect part of a program which a programmer wrongly writes by mistake. Software bugs are definitely not allowed in socially important software such as aircraft control systems and bank money transfer systems. Computer programs, however, are produced only by hand, and we cannot produce sufficient amount of high quality software our society demands. Consequently we cannot avoid using incorrect software which might have bugs. This fact is well known as software crisis.

To produce correct software which does not have any bugs at all, we need mathematical theory which can guarantee correctness of software. Program verification is proving that a written program is correct by using mathematical theory. Program synthesis is generating a correct program without writing incorrect intermediate programs. Program transformation is obtaining a correct and more efficient program from original correct programs. The mathematical theory for program verification, program synthesis, and program transformation is called theory of programs. I have been concentrating on study of theoretical computer science, in particular, theory of programs, for a long time. Theory of programs is a new kind of mathematics, and a deep subject which can clarify essence of computation, and it is very interesting.

Mathematical logic is analyzing how we can think about mathematics, by formalizing the process how we can think about mathematics, and objectifying it. Mathematical logic has been studied since old times before computers appeared, and we recognized it is very useful for theory of programs soon after we began the study of theory of programs. By using the method of mathematical logic, we can formalize the computation of software, objectify it, and analyze it. Moreover, it is well known that a functional programming language and a logical system are essentially the same, and it gives a rigorous relation between theoretical computer science and mathematical logic. I also have been studying mathematical logic, especially its aspect of application to computer science, for a long time. Mathematical logic is itself an interesting subject, and I think it is more interesting when it has important application to computer systems which are running in front of us in the real world.

Recently I am working on strong normalization of logical systems with permutative reductions. Only the first order logic with permutative reductions has been studied well, and the second order logic with permutative reductions is not well known, even though both the second order logic and permutative reductions are common in textbooks. I have given a simple and clear proof of strong normalization of the second order logic with permutative reductions. Moreover, I have proved strong normalization of Martin-Lof's type theory with permutative reductions. I am completing the proof of strong normalization of the second order classical logic with permutative reductions.

*(**Makoto Tatsuta,** Professor, Foundations of Algorithms, Foundations of Informatics Research Division)*

How Japanese Universities are dealing with e-Learning — Trends based on overviews and examples —

National Institute of Informatics
Informatics Open Forum
3rd < August 6, 2004 >

Associate Professor, Research Center for Information Resources, Office for Research Coordination and Promotion

Keiko Watanabe

Keiko Watanabe spent over 10 years, as a planner of Japanese educational system at the Ministry of Education, Culture, Sports, Science and Technology after her graduation from Law Department, University of Tokyo. Then she joined NII as an Associate Professor in May 2003. Her research subjects include how universities and schools introduce e-Learning and the impact of expanding e-Learning on the current management system of universities and/or schools.

She reported her study on how Japanese universities are introducing e-Learning based on the data in relation to e-Learning in Japan and the interviews that she had with the faculty who are in charge of e-Learning in several universities that are active in this area.

In her study, she classified practices of universities into 3 categories; (i) correspondence course; students can get a degree mainly based on e-Learning, (ii) on campus course;

students can get some credits based on e-Learning, (iii) on campus course; Teaching staffs use e-Learning tools as a measure of their classes. She tried to figure out each category's feature.

MIT's OpenCouseWare and the Role of Universities

Professor of Linguistics, Massachusetts Institute of Technology;
Kochi-Manjiro Professor of Japanese Language and Culture.

Shigeru Miyagawa

Professor Miyagawa teaches linguistics and also courses on media and culture at MIT. In linguistics he has published fifty articles and three books. In media, he has produced a multimedia study of Japan called StarFestival, which received a Distinguished Award from Multimedia Grandprix 2000 and Best of Show at the 1997 MacWorld Exposition. For his work in innovative educational content, he was awarded the Irwin Sizer award for the Most Significant Contribution of MIT Education in 1995, and was chosen in 2002 as one of twenty national Shapers of the Future by the educational technology magazine Converge. He and his collaborator, John W. Dower, were recently selected to receive the MIT Class of 1960 Innovation in Education Award. He is on the OCW Advisory Board and was a member of the original committee appointed by the provost that proposed the OCW concept to the president.

OCW is making available without charge course materials from virtually all 2000 courses taught at MIT. When announced in April 2001 by President Charles Vest of MIT, the news of OCW was reported on the front page of the New York Times and in other major publications around the world, including the Nikkei in Japan. Funded with an initial $25 million in grants from the Mellon Foundation and the Hewlett Foundation, OCW was officially launched in September 2002 with fifty courses. Within 48 hours of the launch, the OCW site was accessed over 4 million times, and the analysis of these hits showed that there were some 650,000 unique users who viewed at least nine pages on the average, indicating that most were not random users.

In March of last year, OCW course number reached 700. The access to OCW continues to be enormous, and world-wide. OCW showed interest in Visualizing Cultures from the beginning because of its rich visual content and the ground-breaking methodology, and seeded the project at its initial stage.

JSPS Asian Science Seminar Jointly Held between the NII and the Japan Society for the Promotion of Science (JSPS), "Seminar on Advanced Digital Technology-Assisted Cultural and Artistic Heritage Archiving and Preservation Along the Maritime Silk Roads"

This seminar was jointly held between the NII and the JSPS from July 14 through July 24, 2004.

The seminar was intended to introduce to the young researchers in the "Maritime Silk Roads" regions the sophisticated information technologies required for digital collection, storage, and management of cultural heritages, which comprises one of the major activities of the "Digital Silk Roads Project" promoted by the NII with the support of UNESCO.

30 young researchers in the fields of IT, archeology, and database technology, etc., selected in advance by the Program Committee, were participated in the seminar. They were primarily from the "Maritime Silk Roads" and surrounding regions, including Iran, Sri Lanka, Nepal, Thailand, Vietnam, Cambodia, China, Korea, and Japan.

On the first day, the opening ceremony and reception were held, attended by Dr. Kenichi Iga, Executive Director of JSPS, Specially Appointed Professor Kinji Ono, and other NII personnel. Form the second day, lectures and practices concerning the management of cultural heritage resources, construction of digital contents from cultural heritages, metadata management, and application of GIS systems, etc. were given by lecturers including specialists from Thailand, Cambodia, Vietnam, and the United States, followed by evening sessions primarily for discussions. During the

Practice at the Computer Room

seminar, technical tours to related companies (Hitachi and Toppan) and a tour Kamakura historical area were also conducted.

Despite the demanding schedule, participants actively took part in lectures and discussions until late at night, and seemed to deepen their exchanges day by day. They are expected to utilize the skills acquired in the seminar to actively contribute to the "Digital Silk Roads Project" in their respective countries as the central figures in the field.

Participants and Lectures

Kamakura Tour

Last but not least, we would like to express our gratitude to all participated companies and lecturers for their enthusiastic cooperation despite their busy schedules.

(International Affairs Division)

NII MESSAGE FROM NII RESEARCHER

Project Researcher, Human-Machine Symbiosis,
Intelligent Systems Research Division

Ampornaramveth Vuthichai

1992 Chulalongkorn University (Thailand) graduation
1995 Tokyo Institute of Technology Master's degree
1997 Tokyo Institute of Technology Ph.D.

After receiving a B.Eng. degree in Electrical Engineering from Chulalongkorn University, Thailand, Vuthichai Ampornaramveth came to continue his graduate study at the department of Control and Systems Engineering, Tokyo Institute of Technology with the Monbusho scholarship. At TIT, he was working on applying genetic algorithms to automate cooperative motion generation of a group of autonomous actuators connected to form a wheel shape robot.

After joining NII, he first worked on a collaborative development of online dictionary project called SAIKAM, which he had started as a volunteer project with his friends. SAIKAM was designed to be a portal site for collaborative Thai-Japanese dictionary authoring. Currently he is a member of Prof. Ueno's intelligent robot group where he is doing research on two main projects: Symbiotic Robot and Web-based Learning System.

For symbiotic robot project, he is developing a software platform called SPAK for realization of symbiotic robots that interact intelligently with human in symbiosis manner. Such robots require proper combination of various technologies on a common platform that allows them to work co-operatively. SPAK has been developed to serve this purpose. It is a Java-based software platform providing Frame-based knowledge processing and co-ordination of tasks among several software modules and agents representing the robotic hardware connected on a network. Beside the robotic applications, SPAK can be used as a general-purpose frame system as well. For example, it was used for developing a gourmet advisor system in a research project supported by NTT Docomo in 2002.

Web-based learning is becoming an important tool in education. However, the cost of producing an on-line course is high. Together with part-time research assistants, Cholwich Nattee and Worawut Sae-Kok, he is developing WebLS system which is aiming to assist traditional instructors to archive their learning materials on the web. WebLS features web-based authoring tools, portability on various platforms, and flexibility of XML-based storage allowing the learning materials to be delivered in many different ways. Currently, WebLS system is being used and extended by both external and internal collaborative partners: OHM-Sha, and Digital Silk Road project (Deuff Dominique).

MESSAGE FROM FOREIGN RESEARCHER

JSPS fellow, Foundation of Informatics Research Division

Research Scientist, Quantum Information Processing Group,
Hewlett Packard Laboratories, Bristol

Bill Munro

1994 Waikato University (New Zealand) Ph.D.
1997 University of Queensland (Australia), Research Council Fellow
2000- Hewlett Packard Laboratories in Bristol as a research scientist.

Bill came to NII for 3 months under the JSPS fellowship program as a post-doctorate researcher in June. His background is in theoretical physics (Quantum Optics) having graduated with a Ph.D. from Waikato University in New Zealand in 1994. Following his graduation he accepted an Australian Research Council Fellowship at the University of Queensland, Australia. In late 2000 Bill joined the quantum information processing group at Hewlett Packard Laboratories in Bristol as a research scientist. His work there has focused on various issues within quantum computation, including

- the practical implementation for optical and solid state quantum hardware,
- the generation of optical nonlinearities,
- the characterization of quantum states and processes,
- novel quantum communication and cryptography protocols

It is well known that as devices become smaller the principles of quantum mechanics become increasingly more important and critical. It enables a new computing paradigm with radically different architecture and properties. A quantum computer can process a superposition of many different classical inputs and produce a superposition of outputs, and quantum entanglement means that the number of superposed states can be increased exponentially by linearly increasing the physical resources. In theory, this quantum parallelism can be utilized for solving problems which are intractable on any classical computer. In recent years we have seen signs of this new technological revolution, caused by a paradigm shift to information processing using the laws of quantum physics. One natural architecture for realising quantum information processing (QIP) technology would be to use states of light as the information processing medium. A key requirement for scalable optical quantum computation becomes the design of efficient single photon detectors. The research Bill has undertaken at NII has focused on methods for improving single photon detector inefficiencies and their application with the quantum gates. It has been based on the pioneering work by [Imoto, Haus, and Yamamoto] who showed that it was possible to measure the presence or absence of a photon without directly measuring it. This is known as a quantum non-demolition (QND) measurement and in principle allows for extremely efficient single photon detection. We have proposed an implementation of this QND measurement by using the giant Kerr effect achievable with AC Stark-shifted electromagnetically induced transparency (EIT) and the majority of Bill's research at NII has focused on a detailed study of how feasible this is.

My fellowship at NII is at an end, but it has given me the opportunity to interact and work with the Quantum Information Science group at NII. This is the beginning of a long term collaboration and I hope to be a regular visitor back to NII.

NAREGI Workshop was held by HPC Asia2004

HPC Asia2004 (http://www.hpcc.jp/HPCAsia2004/): 7th International Conference on High Performance Computing and Grid in Asia Pacific Region was held in Omiya Sonic City on July 20-22, 2004.

HPC Asia is an international conference series held every 18 months on an Asia-Pacific regional site. It provides a forum for HPC researchers, developers, and users throughout the world to exchange ideas, case studies, and research results related to all issues of high performance computing.

NAREGI Workshop was held in this international conference, and the lecture about NAREGI overview, grid middleware, grid networking, and grid application and the demonstrations were performed.

Grid middleware reported the concept of the NAREGI server grid. Grid networking reported the network of the

The lecture and demonstrations in NAREGI Workshop

next generation. Grid application reported the grid coupled simulation which suggests the future method of research using a grid.

Activity of NAREGI and the progress situation were advertised by these reports, demonstrations, and exhibition.

(Center for Grid Research and Development)

Graduate Education

Message from Graduate Students

Koai Takayuki

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

In 2001 I became a frequent visitor to the National Institute of Informatics to receive the continued guidance of Professor Makoto Tatsuta, the faculty supervisor of my master's course, who was transferred to the Institute. A year later, I enrolled in the Ph.D. course in Informatics at the Department of Informatics in the Graduate University for Advanced Studies. I have since continued my research under Professor Tatsuta.

The topic of my thesis is the correspondence relationships between programs and proofs, program verification systems, and proof assistance systems. Systems to assist in the proofs of mathematical propositions as well as program verification systems have recently been constructed, their theoretical bases derived from the strong correspondence between the programs' type theory and logical system design. In my master's course, I studied program verification systems relating to basic type theories. In the course of my Ph.D. program I continued this theoretical research, advancing to the point where I was able to begin working on practical applications of existing systems.

The National Institute of Informatics is able to provide students with a wide variety of computer facilities and software, including the software I used in my study. The Graduate Students' Center and Seminar Rooms are well organized, and provide an excellent educational environment. And the insightful, enthusiastic lectures were given by the professors and lecturers. An institute of this caliber participating in and pouring resources into student education will doubtless lead to wonderful learning opportunities for all the students here.

Alexander I. Kovács

Born 12 July 1975 in Leipzig, Germany, Graduate of Leipzig University
Department of Informatics, School of Multidisciplinary Sciences
Graduate University for Advanced Studies

After I obtained an MSc in Artificial Intelligence from Leipzig University in 2003, I decided to take up a Ph.D. in Japan, mainly because I had minored in Japanese Studies and also because I had visited the country before as an exchange student to Waseda University. Incidentally, I just recently got married to the Japanese girl I fell in love with while at Waseda. I chose The Graduate University of Advanced Studies for NII, which is not only their computer science department but also on the forefront in computer science research in Japan. The graduate course at the institute benefits from excellent facilities as well as an international and interdisciplinary environment; the program also instills in its students an independent research style. Having a Hungarian father I grew up in an international environment and being a rather self-reliant person myself this seemed like the perfect choice for me. I carry out my research under the supervision of the redoubtable Haruki Ueno. The topic of my dissertation is computational substrates for what Descartes called cogito, or in plain words: minds for robots. Without endowing robots with the cogito, I see no way how intelligent symbiotic robots could be realized. I am driven by the question whether a fabricated artifact like a robot could ever become a veritable cognizer. Therefore I also inquire into the Theory of Cognitive Systems and the philosophy of cognition. One of my hobbies is karaoke; I am also active in the Seieikai karate club.

2004 Explanatory Session on the "International Scholarly Communication Initiative"

On Wednesday, July 7, the National Institute of Informatics held an explanatory session on the "International Scholarly Communication Initiative" in the National Center of Science.

This Initiative is a project commenced in fiscal 2003 to realize the globalization of Japanese academic journals in English by assisting the publication efforts of scholarly journals in English issued by Japanese academic societies in electronic formats, and to spread news of research achievements across the globe.

In the explanatory session, a summary of the activities and an invitation for participation of new academic societies were presented, and the activity reports for fiscal 2003 from the participating academic societies were also made. In the session, in which 51 academic societies participated, a number of questions about the activities of the Initiative were put to existing members.

The major points of information provided at the session are accessible at the following URL.

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

(Contents Division)

Explanatory Session on the "International Scholarly Communication Initiative" (Professor Sakauchi, Deputy Director General)

Meeting with European Member Libraries Participating in NACSIS-CAT

From Thursday, August 5 through Friday, 13th, discussion sessions were held in Germany and Sweden on operational assistance for NACSIS-CAT member libraries in these countries, including system conversions and intersystem linkages of cataloging, whose bibliographical utilities affect data links, etc.

Participants from the National Institute of Informatics were Professor Akira Miyazawa (Director, Research Information Research Division), Mr. Hiroshi Ogiwara (Chief of Academic Information Service Section; Contents Division, Development and Operations Department), and Mr. Naoto Kawase (a staff member of the Cataloging Information Management Section, Contents Division, Development and Operations Department).

In relation to the operational assistance to NACSIS-CAT participating libraries, question-and-answer sessions concerning operations, assistance for construction of automatic registration functions and SPCAT (selected package OPAC), and for conversion to a new system were conducted in the Japan Cultural Institute in Cologne (Japanisches Kulturinstitut), Germany, and the Asia Library, Stockholm University, Sweden.

For intersystem linkages of cataloging, opinions were exchanged with an eye toward coordinating systems for data exchanges. In Germany, consensus were reached with HBZ to make concrete efforts to start shared data cataloging in the next fiscal year. In Sweden, in the meetings with LIBRIS, it was agreed that study and review works would be continued in prospect of implementation.

(Contents Division)

A review meeting on intersystem linkage (with LIBRIS in Sweden)

Operational assistance to NACSIS-CAT member libraries (at Japan Cultural Institute in Cologne)

CiNii: Starting Trial Release of Citation Information by NII

On August 12, 2004, a trial release of CiNii, Citation information by NII (a component of the academic contents portal "GeNii"), was commenced. CiNii searches both academic journals published by academic societies and research bulletins issued by universities, etc., enabling users to find related citation information (articles both cited by and citing the article) as well as navigate the full texts.

Self-contained databases

The following databases are self-contained. The same data is displayed collectively as one result.

* Electronic Library Service (National Institute of Informatics)
  Pages of papers published in Japanese academic society journals accumulated as image data, the text of which has been made available for browsing.
* Citation Database for Japanese Papers (National Institute of Informatics)
  Related citations (article cited by or citing the article) have been made available for Japanese academic journals and papers in natural science.
* Current Contents of Academic Serials in Japan = Research bulletin portal (Contributed to jointly by individual universities)
  Information from articles published in research bulletins published by Japanese universities, etc. has been made available as a database. The research bulletin portal service was terminated upon the trial release of CiNii.

Improvements on GeNii components are now in progress for the official release in 2005. *(Contents Division)*

Topics

Award

IEICE Outstanding Paper Award Granted to Paper by Associate Professor Uno and His Colleagues

At the 15th Institute of Electronics, Information and Communication Engineers (IEICE) Workshop, the Outstanding Paper Award was granted to the following paper, written by Mr. Takeaki Uno and colleagues:

- "Efficiently Discovering Unordered Tree Patterns from Large Semi-Structured Data"
  By Shinji Fusanobu (Kyushu University), Tatsuya Asai (Kyushu University), Hiroki Arimura (Kyushu University), Takeaki Uno, and Shin-ichi Nakano (Gunma University)

Relevant Website: http://www.dl.kuis.kyoto-u.ac.jp/DEWS2004/

Fuminori Yamagishi Wins FIT2003 Young Researcher Award

Mr. Fuminori Yamagishi (participant in the Cooperation Program Between AIST and Graduate Schools: Grad. School of Information Science and Technology, University of Tokyo) won the FIT2003 Young Researcher Award on September 8, 2004. The Information Processing Society of Japan (IPS) granted him this award for his paper entitled "Implementation of a News Video Browser Based on Identical Video Segment Detection" (by Mr. Yamagishi and Prof. Shin-ichi Satoh), which he presented at the 2nd Forum on Information Technology (FIT2003) held September 10 to 12, 2003.

Relevant Website: http://www.ipsj.or.jp/01kyotsu/award/fit_young/index.html

Professor Katsumi Maruyama Receives Title of Fellow from IEICE

At the IEICE Society Conference 2004 on September 22, the title of IEICE Fellow was given to Professor Katsumi Maruyama for his contributions to the development of digital switching system software.

Relevant Website: http://www.ieice.org/jpn/fellow/ichiran16.html

Participation in a Parallel Exhibition at the Third Research Convention of the Japan Society for Information and Media Studies

The third Research Convention of the Japan Society for Information and Media Studies was held at the Sanjo Conference Hall at the University of Tokyo on Saturday, June 26, 2004. From the National Institute of Informatics, Professor Takeo Yamamoto was invited to make a presentation on the theme of "Construction of a Digital Archive of Toyo Bunko Rare Books" in the "Exhibition and Poster Presentations" format provided in parallel with the Convention.

The exhibition covered the construction of a digital archive of the rare books on the Silk Road held at Toyo Bunko, one of the five most prominent research libraries on the Orient in the world, in a multimedia database format —the multilingual annotation support system (MASS), which enables multilingual access via the Web — and the engineering requirements for the system.

The "Exhibition and Poster Presentations" was participated in by a total of 17 entrants, including the National Institute of Informatics, the Japan Science and Technology Agency (JST), and Toppan Printing Co., Ltd. They had keenly interested and enthusiastic visitors from among the participants at the Convention, promoting exchanges of opinions and research findings.

The Convention itself was a large-scale event composed of a keynote address and symposiums on new perspectives of how recipients receive information and media, and process it, based on the latest research achievements in basic informatics, media theories, cyber-literacy, etc.

(Publicity and Dissemination Division)

A Visit by the Delegate from the Department of Science, Technology and Environment, Ho Chi Minh City, Vietnam

On July 22, 2004, the NII was visited by Dr. Hoang Le Minh, Deputy Director of the Department of Science and Technology of Ho Chi Minh City, and Dr. Nguyen Trong of the Vietnam National Steering Committee on ICT visited NII.

While Ho Chi Minh City is now promoting a series of measures focusing on IT development and its applications, the government representatives visited the NII in a tour of IT-related research institutes in Japan and Taiwan under the auspices of the Center of the International Cooperation for Computerization, the body founded by the Ministry of Economy, Trade and Industry.

A general summary of the NII was presented by Professor Negishi, Director of the International and Research Co-operation Department, followed by an introduction the research findings by Professor Takeo Yamamoto, Associate Professor Nigel Collier, and Mr. Le Duy Dinh, a Ph. D. student from Vietnam who studies in NII.

(International Affairs Division)

Karuizawa Saturday Salon 2004

On July 3, 2004 and July 31, 2004, the third and the fourth lectures of the Karuizawa Saturday Salon were held at the International Seminar House for Advanced Studies in Karuizawa, Nagano. The lectures given will appear on the NII website at a later date.

● The Third Lecture : July 3, 2004

Foreign Countries' Views and Reactions on the Kabuki

Chairman of the Japan Theatre Arts Association
Professor Emeritus, Waseda University

Toshio Kawatake

Professor Kawatake is a great-grandson of Kawatake Mokuami (1816-1893), the great Kabuki playwright of the late Edo Period and the Meiji Period. He has supervised many Kabuki performances and introduced Kabuki to overseas. Based on his experiences, he delivered lecture as below.

"By the response to the overseas performance, Kabuki proved to have universal dramas in the innermost of unique beauty of form which impress everyone. Since the first performance in the US in 1960, based on the experiences as dramaturge accompanying to performance, I analyze universality and specialty of Kabuki concretely and think of international status of Kabuki or traditional beauty of Japan.

(Excerpt from the material delivered at the Seminar)

● The Fourth Lecture: July 31, 2004

Carbon Nanotube — Science, Discovery and Industrial Applications

Professor, Shinshu University

Morinobu Endo

Professor Endo was born in Nagano Prefecture. He is called as an originator of carbon nanotube and received the American Carbon Society Medal immediately before the third lecture of Karuizawa Saturday Salon. In this lecture, he gave explanations on carbon nanotube's growth mechanism, structure, physical and chemical characteristics. He gave a clear-cut lecture on the creation of new industries as cutting-edge materials of the 21st century.

(Publicity and Dissemination Division)

National Institute of Informatics Public Lectures 2004, "Eight words to deepen Informatics"

The First Lecture : Thursday, July 15, 2004

" Robots — Towards Symbiosis of Robot and Human "

Professor, Intelligent Systems Research Division

Haruki Ueno

Ph.D. in Engineering at Tokyo Denki University, 1971
1971 Lecturer, Aoyama University
1981 Professor, Tokyo Denki University
1998 Professor, National Center for Science Information System
2000 Professor, National Institute of Informatics
2001 Professor, The University of Tokyo
Research fields Intelligent System, Intelligent Robots, Distance Learning

In Japan which leads an industry robot in the world, as the rapid progress of aging people society happens, the social need for welfare robots is going up. A welfare robot is the one that lives together and helps us, human, in our daily life. We call the robot a symbiotic robot. It is to be desired that they can do heartful exchange with human in addition to talking with human with their own eyes, ears, hands and mouth, because they should keep company with human as naturally as possible to some extent.

Humanoid robots at present can walk and move like a human being to some extent

However, it is the research into intelligence or heart that counts next, we, NII, make use of the outcome of artificial intelligence "AI", furthermore, we are working on a new research necessary for human and robots to live together. In a circumstance where a originality is requested, the concept of 'symbiosis", in which human and robots do heartful exchange, is identical to the Japanese and we are looking for a new way rooted in a Japanese culture.

The Second Lecture : Thursday, August 26, 2004

"Search Engine"

Professor, Software Research Division, National Institute of Informatics

Akihiko Takano

Received his BA in Mathematics from Univ. of Tokyo in 1980 and his Ph.D in Computer Science from Univ. of Tokyo in 2000. He was a Senior Research Scientist at Hitachi Central Research Laboratory before joining NII in 2001. He is also an Adjunct Professor at Dept. of Computer Science at Univ. of Tokyo since April 2002. His research interest lies in Functional Programming, Program Transformation, and Informatics of Association.

Virtually any documents become available in digital form over Internet. The effective access to this information is crucial to our intelligent life. We need a swift and reliable method to collect relevant documents from millions of a kind. In this lecture, a brief overview of the primary tools such as search engines was given. The effective uses of Google and Yahoo! were demonstrated. The new style of information access, which is based on similarity between documents or words, was also discussed. The new book guide service called "Shinsho Map" was introduced as a live example of a directory service with association function.

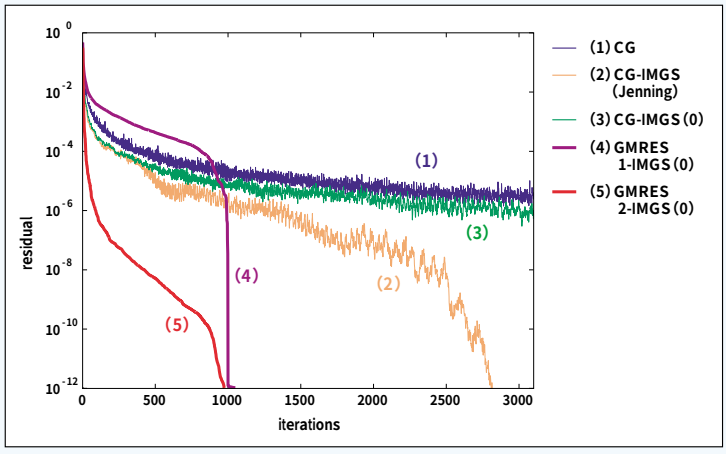
(Publicity and Dissemination Division)

Description of a cover

A new iterative method for least squares problems

Ken Hayami, *Professor, Mathematical Informatics, Foundations of Informatics Research Division*

Least squares problems arise in many areas of science and engineering. Especially when one wants to treat a large scale problem, iterative methods become useful. The common practice is to solve the normal equation, which is equivalent to the least squares problem, using preconditioned conjugate gradient (CG) methods. We developped methods of applying preconditioned generalized minimal residual (GMRES) methods directly to the original least squares problem, and gave theoretical justifications for them. We also showed by numerical experiments that the proposed methods (GMRES1, GMRES2) converge better and especially the GMRES2 is computationally more efficient than the conventional approach, for ill-conditioned problems.



Reference : Ito, T. and Hayami, K., Solution of least squares problems by preconditioned GMRES methods, Proceedings of the Japan Society for Industrial and Applied Mathematics, pp. 210-211, 2004.

Ito, T. and Hayami, K., Preconditioned GMRES methods for least squares problems, NII Technical Reports, National Institute of Informatics, Tokyo, NII - 2004 - 006E, pp. 1- 29, May, 2004.

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