

NII OPEN HOUSE 2009 PROGRAM

thu. June 11th

Hitotsubashi Memorial Hall	Conference Room	2nd Floor Hall	Special Conference Room
<p>13 : 30~14 : 00 Introduction of NII Masao Sakauchi (Director General at NII)</p> <p>14 : 00~15 : 00 Keynote Speech "Unique, Collaborative, and Competitive Climate of Creation with Tangible Bits" Hiroshi Ishii (Professor at MIT / Associate Director of Media Lab)</p> <p>16 : 00~17 : 00 Keynote Speech "If it would be useless, it wouldn't be Mathematics!!" Noriko Arai (Professor at NII)</p> <p>19 : 00~20 : 30 Public Lecture "Security with Computers: How do We Develop Attack-Resilient Softwares?" Nobukazu Yoshioka (Associate Professor at NII)</p>	<p>14 : 30~19 : 00 Presentation Demos & Poster Exhibition</p> <p>14 : 30~18 : 00 Science Cafe</p> <p>18 : 00~19 : 00 Science Pub</p>	<p>15 : 15~17 : 45 Presentation</p> <p>14 : 30~19 : 00 Demos & Poster Exhibitions</p>	<p>15 : 20~15 : 50 "Open Source Software in Scientific Computation" Dr. Claud Gomez (Director, Scilab Consortium, Dgiteo Foundation)</p> <p>18 : 00~19 : 00 Briefing session about entrance examination of graduate school</p>

fri. June 12th

Hitotsubashi Memorial Hall	Conference Room	2nd Floor Hall	Special Conference Room
<p>11 : 00~12 : 00 Keynote Speech "Message from Ruby; as an open source language." Yukihiro Matsumoto (Fellow at Network Applied Communication Laboratory and Rakuten Institute of Technology / Chairperson of Ruby Association)</p> <p>13 : 30~15 : 30 Kick Off Ceremony of Open Forum for Cyber Science Infrastructure</p>	<p>10 : 30~17 : 00 Presentation Demos & Poster Exhibition</p> <p>10 : 30~17 : 00 Science Cafe</p>	<p>12 : 10~16 : 35 Presentation</p> <p>10 : 30~17 : 00 Demos & Poster Exhibitions</p>	<p>Workshop for Next-Generation Academic Information 11 : 00~12 : 30 "Perspectives on the archive of electronic resources"</p> <p>14 : 00~16 : 00 "Flashing, expanding, the potential of knowledge - Renewal of CiNii and Web API contest"</p>



Introduction of NII

Masao Sakauchi
Director General at NII



Keynote Speech

Hiroshi Ishii
Professor at MIT / Associate Director of Media Lab
"Unique, Collaborative, and Competitive Climate of Creation with Tangible Bits"



Keynote Speech

Noriko Arai
Professor at NII
"If it would be useless, it wouldn't be Mathematics!!"



Keynote Speech

Yukihiro Matsumoto
Fellow at Network Applied Communication Laboratory and Rakuten Institute of Technology / Chairperson of Ruby Association
"Message from Ruby; as an open source language."



Public Lecture

Nobukazu Yoshioka
Associate Professor at NII
"Security with Computers: How do We Develop Attack-Resilient Softwares?"

Inter-University Research Institute Corporation / Research Organization of Information and Systems

National Institute of Informatics

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thu. June 11th

■Conference Room

14:30~18:00 **Presentation** Demos & Poster Exhibition, Science Cafe
18:00~19:00 Science Pub

■Hitotsubashi Memorial Hall

13:30~14:00 **Introduction of NII** Masao Sakauchi (Director General at NII)
14:00~15:00 **Keynote Speech**"Unique, Collaborative, and Competitive Climate of Creation with Tangible Bits"
Hiroshi Ishii (Professor at MIT / Associate Director of Media Lab)
16:00~17:00 **Keynote Speech**"If it would be useless, it wouldn't be Mathematics!!"
Noriko Arai (Professor at NII)
19:00~20:30 **Public Lecture "Security with Computers:
How do We Develop Attack-Resilient Softwares?"**
Nobukazu Yoshioka (Associate Professor at NII)

■Special Conference Room

15:20~15:50 "Open Source Software in Scientific Computation"
Dr. Claude Gomez Director, Scilab Consortium, Digiteo Foundation
18:00~19:00 Briefing session about entrance examination of graduate school

■2nd Floor Hall

14:30~19:00 **Presentation** Demos & Poster Exhibitions

fri. June 12th

■Conference Room

10:30~17:00 **Presentation** Demos & Poster Exhibition, Science Cafe

■Hitotsubashi Memorial Hall

11:00~12:00 **Keynote Speech**"Message from Ruby; as an open source language."
Yukihiko Matsumoto (Fellow at Network Applied Communication Laboratory and
Rakuten Institute of Technology / Chairperson of Ruby Association)
13:30~15:30 **Kick Off Ceremony of Open Forum for Cyber Science Infrastructure**

■Special Conference Room

Workshop for Next-Generation Academic Information

11:00~12:30 "Perspectives on the archive of electronic resources"
14:00~16:00 "Flashing, expanding, the potential of knowledge -
Renewal of CiNii and Web API contest"

■2nd Floor Hall

10:30~17:00 **Presentation** Demos & Poster Exhibitions

admission free

オープンハウス2009
国立情報学研究所
National Institute of Informatics OPEN HOUSE 2009

研究成果発表

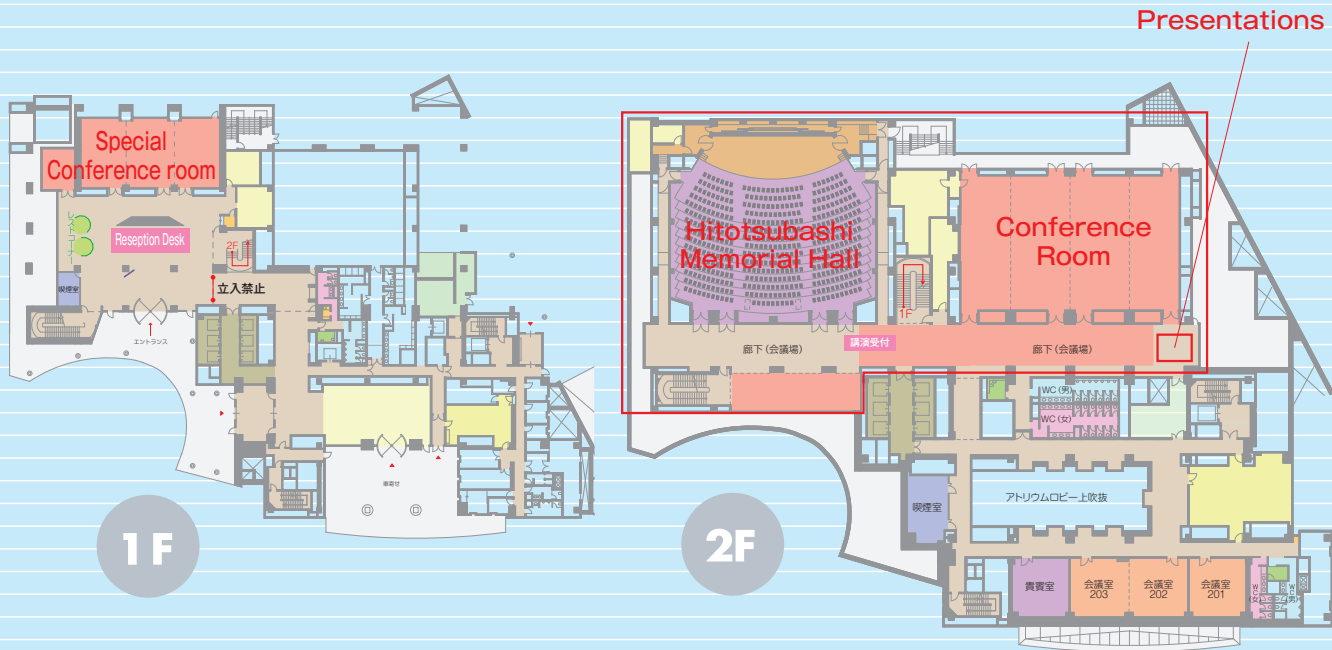
Life
Style
Innovation

社会を変える情報学

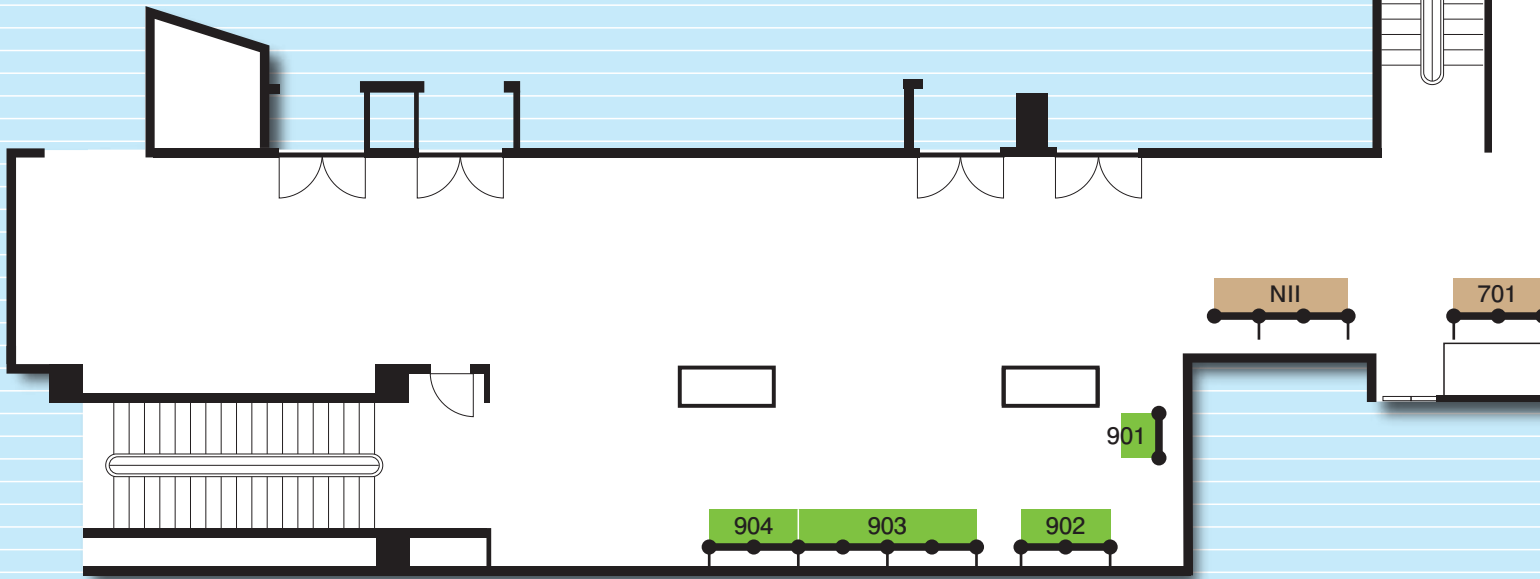
June 11 (Thu) and 12 (Fri) 2009

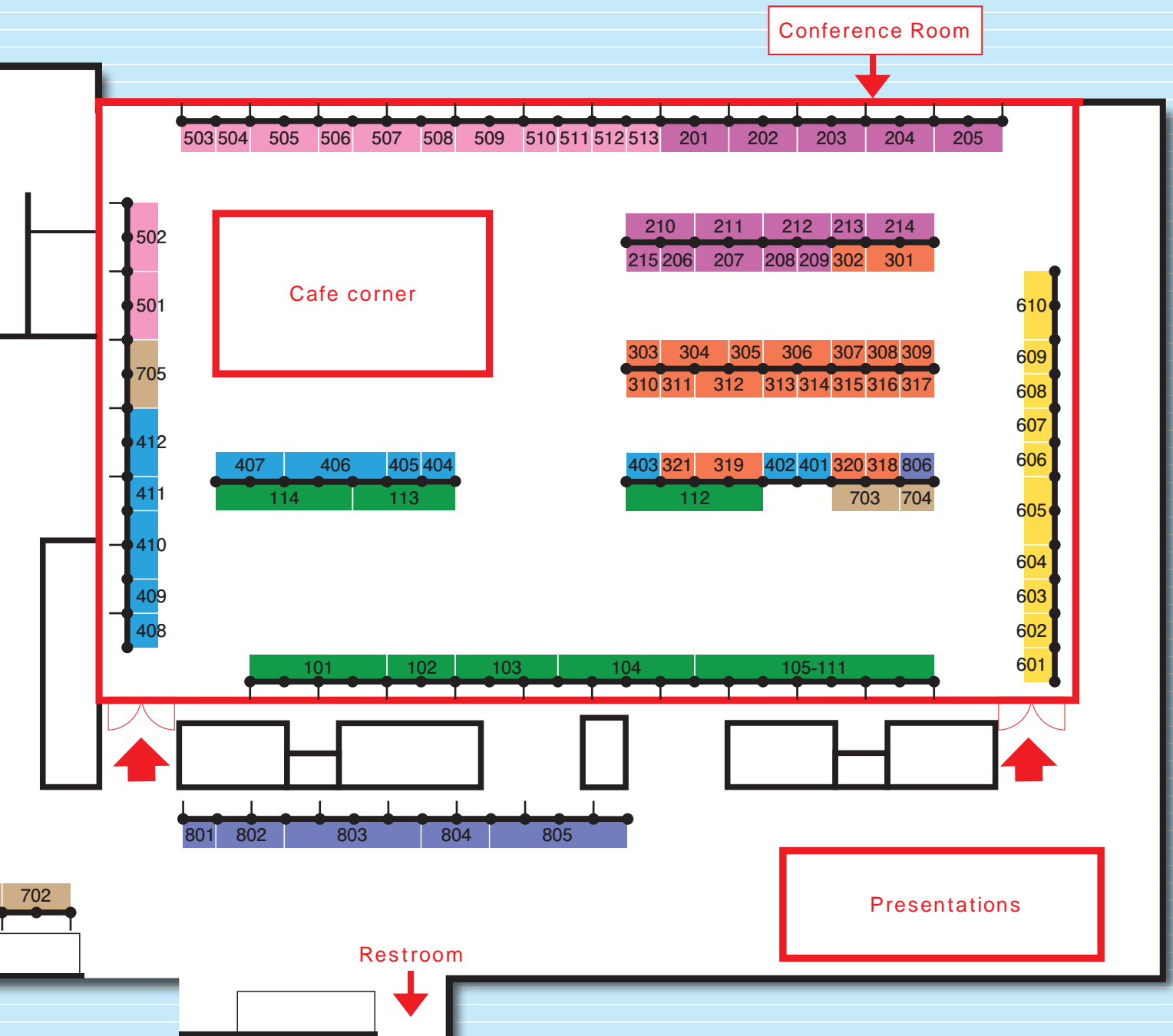


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Hitotsubashi Memorial Hall





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Presentation time

thu. June 11th 15 : 15–17 : 45

fri. June 12th 12 : 10–16 : 35

Place

2nd Floor Hall

Presentation time table

thu. June 11th

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17 : 10–17 : 25	Understand services and compose your ones Fuyuki ISHIKAWA (Digital Content and Media Sciences)
17 : 30–17 : 45	Why can we get very quick updated information from Car navigation systems (using GPS)?? The key is that road may is "map", i.e, plane. Kenichi KAWARABAYASHI (Principles of Informatics)

fri. June 12th

12 : 10–12 : 25	Can computer perform legal reasoning? Ken SATOH (Principles of Informatics)
12 : 30–12 : 45	International Comparison of IPTV Masashi UEDA (Information and Society)
13 : 00–13 : 15	What can we do with the gird? Kento AIDA (NAREGI)
15 : 40–15 : 55	Constructing network on a chip Tomohiro YONEDA (Information Systems Architecture)
16 : 00–16 : 15	Information hiding for fair use of multimedia content Isao ECHIZEN (Digital Content and Media Sciences)

Presentation

Presentation

thu. June 11th 2F Hall

15 : 15 – 15 : 30

Noboru SONEHARA (Information and Society)

■ Governance of Ubiquitous Society

● EC Site Risk Rating Service

Japan has overcome serious socioeconomic crises through various efforts such as Meiji Restoration and the postwar reconstruction. Today, it faces a challenge of surviving fierce Information Wars caused by the global advancement of Information and Communication Technology (ICT).

In Japan, the government's multimedia strategy was launched in the late 1940s. In particular, "e-Japan Strategy" accelerated diffusion of the Internet, broadband, cellular phones and digital broadcasting, through which the country has achieved unprecedentedly high growth of information infrastructure. Such advancement remarkably improved information transmission by companies and individuals over the Web, Blog and SNS. They are generally called "social media" and have become indispensable to our lives together with mobile and fixed-line telephones.

However, the social media have also brought a problem of information explosion. Unlike traditional media such as television

and newspapers, social media transmit various kinds of information remaining their credibility and reliability unclear. People and the society are exposed to vast amounts of information including unwanted one and are not able to select appropriate portions to maximize their benefit. With the emergence of a more information and knowledge-intensive industrial structure, it is necessary to enrich the quality of information over the quantity of information.

This paper presents a method to ensure the security of e-commerce over social media. Next section explores the social needs for information reliability. In section 3, the users' abilities for information judgment are analyzed. Section 4 proposes IdTM (Identity Trust Management) to verify the information on Web sites. Then in the final section, it proposes institutional design for enhancing reliability of e-commerce through the introduction of "Web Site Risk Rating Service for e-Commerce".

15 : 35 – 15 : 50

Zhenjiang HU (Information Systems Architecture)

Masato TAKEICHI (The University of Tokyo), Yingfei XIONG (The University of Tokyo), Hong MEI (Peking University), Haiyan ZHAO (Peking University), Keisuke NAKANO (The University of Electro-Communications), Soichiro HIDAKA, Hiroyuki KATO

■ Bidirectional Transformation Makes Software Evolvable

● Research on Software Development based on Bidirectional Model Transformation

Model transformations are a key element in the OMG's Model Driven Development agenda, providing a standard way to represent and transform software artifacts such as requirements, design models, program code, tests, configuration files, and documentation in software development. However, after a transformation is applied, the source and the target models usually co-exist and evolve

independently. How to propagate modifications correctly across models in different formats and guarantee system consistency remains an open problem. This work aims to solve this problem based on bidirectional model transformation. The success of the project would lead to a novel formal method for evolutionary software development, and a trusty tool for artifact synchronization.

17 : 10 – 17 : 25

Fuyuki ISHIKAWA (Digital Content and Media Sciences)

■ Understand services and compose your ones

● Management of Contracts and Policies in Service-Oriented Computing

Service-Oriented Computing (SOC) involves computer-based selection, consumption and integration of services as well as their implementation, delivery and management. This talk gives an introduction to SOC, noting relationships with other visions such

as Cloud Computing and Pervasive Computing. This talk also presents our work focusing on contracts and policies in SOC, which investigates their verification and design and implementation of their management.

17 : 30 – 17 : 45

Kenichi KAWARABAYASHI (Principles of Informatics)

■ Why can we get very quick updated information from Car navigation systems (using GPS)?? The key is that road map is "map", i.e. plane.

● Analyzing planar networks

Why can we get very quick updated information from Car navigation systems (using GPS)?? This is partially because road map has a planar structure. In this talk, we will survey recent progress on

theoretical aspect of planar network, and its applications to date update.

fri. June 12th 2F Hall

12:10–12:25

Ken SATOH (Principles of Informatics)

Can computer perform legal reasoning?**● Legal reasoning with burden of proof by logic programming**

In this presentation, we show a formalization of burden of proof in legal reasoning.

The burden of proof is a way of reasoning for uncertainty in legal

domain. We use “negation as failure” of logic programming to formalize a burden of proof and give a short demonstration of practical legal reasoning example.

12:30–12:45

Masashi UEDA (Information and Society) Yuishin PAKU, Shelly CHEN

International Comparison of IPTV**● Extended five force model analysis on IPTV**

Why IPTV is not so popular in Japan while she is famous for her high speed and reasonable fare for broadband access? We figure out diffusion condition and disincentive factors through analysis

on IPTV-developed countries by using extended five force model. Then we consider the business condition of IPTV in Japan.

13:00–13:15

Kento AIDA (Center for Grid Research and Development)

What can we do with the grid?**● Grid Middleware Development and Deployment**

The grid is a technology enabling advanced services, e.g. computing, data sharing and collaborative experiments, by sharing/federating resources. The goal of the exhibition is to answer the questions: What can we do with the grid? Where is the grid infrastructure we can use? This talk presents an overview of the

grid middleware developed in the National Institute of Informatics and advanced computing services enabled by the middleware. This talk also introduces the status of the grid infrastructure being constructed in collaboration with Japanese universities.

15:40–15:55

Tomohiro YONEDA (Information Systems Architecture) Masashi IMAI (The University of Tokyo), Atsushi MATSUMOTO (Tohoku University), Hiroshi SAITO (The University of Aizu)

Constructing network on a chip**● Dependable many core systems based on Network-on-Chip**

In order to obtain large and complex VLSI systems using advanced semiconductor process technologies, problems of how to increase utilization of collected many cores and how to tolerate delay variation due to process variation, delay faults caused during operation, changes of environmental parameters, and so on should be solved. This project will develop several core technologies to

overcome those problems and propose a design methodology to construct highly dependable, adaptable, and efficient network-on-chip platform. It is also planned to demonstrate the proposed methodology by implementing some concrete automotive applications on a prototype NoC platform.

16:00–16:15

Isao ECHIZEN (Digital Content and Media Sciences)

Information hiding for fair use of multimedia content**● Research on safe and smooth distribution of digital media using information hiding**

Digital content-such as pictures, movies, and music-is being made widely available because of its advantages over analog content. However, copyright infringement, information leaks, and alteration remain issues on the digital content because it can easily be modified, copied, and sent illegally over the Internet. Thus, we are

developing technology of information hiding that embeds attributes (e.g., copyright info.) into content by slightly changing its data value so that system can adequately control content flow based on the embedded information. Our goal is to establish security systems and technology for fair use of multimedia content.

Demos and Poster Exhibitions

Demo

101 Hiroko SATOH (Principles of Informatics) Makoto SATOH (Tokyo Institute of Technology · Precision and Intelligence Laboratory)

Touching for Knowing Chemistry

Feeling the Molecular Force with 3D-Mouse for Chemical Education

We demonstrate here a “haptic” molecular model system, HaptiChem. This system enables to move molecular structures in the 3D-space with virtually feeling attractive and repulsive inter-molecular force. The haptic device that we use is SPIDAR-G.

The current version has basic functions to display van der Waals molecular interaction between rare-gas atoms, which is designed for chemical education. We started with some pilot attempts of adopting it in a chemical education program of a high school.

102 Haruki UENO (Principles of Informatics) Zheng HE, Ajulie Joham VERENA, Nobuo SHIMAMOTO, Masaki MORI, Hideomi KOINUMA, Too ZHANG, Vathichai AMPORNARAMVETH

WebELS: Easy-to-Use e-Learning Platform to Support Globalization of Education and Business

Globalization of society requires flexibility and internationality of higher education as well as business activities by means of Internet-based e-Learning platform. WebELS, designed by NII, is used in such as Sokendai, Tsinghua University, Chalongkorn University, UNESCO and companies, to support flexibility of education as

well as business communications in a global situation. Latest version of WebELS is refined for use in universities, companies, lifelong education, business communications, with strong authoring function, on-line meeting function and easy-to-use multi-language user interface in a low-speed Internet.

103 Kensuke FUKUDA (Information Systems Architecture)

Finding malicious activities in the Internet

Statistical anomaly detection in Internet traffic

The Internet is a fundamental infrastructure in our daily life. Though the effort to be secure the Internet, computers connected to the net have been exposed by a large number of malicious activities. The aim of our research is on how to measure, detect, and quantify such

malicious activities. We demonstrate an effectiveness of our multi-resolution anomalous traffic viewer and that of our recent proposed anomaly detection algorithm based on edge detection.

104 Shinichi SATOH (Digital Content and Media Sciences) Norio KATAYAMA, Hiroshi MO, Duy-Dinh LE

Let's enjoy video retrieval!

Challenge to Bridging the Semantic Gap via Video Media Content Analysis

Video content-based retrieval is indispensable to access necessary information from broadcast videos or video archives in the internet. We are addressing video content-based retrieval for large-scale video archives via automatic extraction of video content information using video semantic analysis. This requires to solve so-called the

bridging the semantic gap, which is known to be very challenging task, and we are tackling this issue using several techniques including image analysis, machine learning, and information retrieval. We will demonstrate our video search engine enabled by our research outcome.

105 Helmut PRENDINGER (Digital Content and Media Sciences) Alena NEVIAROUSKAYA, Mitsuru ISHIZUKA

Live Collaboration in the Global Lab

EmoHeart: Automatic Emotion Expression in Second Life

With EmoHeart, avatars in Second Life can visually express the emotions which the users convey in their Instant Message text. It is well-known that emotions play an important part in human-human communication. EmoHeart is the first system to automatically recognize and express emotions in Second Life, by

using an intelligent text analysis technique. In this way, it makes communication in Second Life more natural and convenient for the user. Users don't have to select emotional expressions by hand, EmoHeart does it automatically. You can download your own EmoHeart from the Global Lab website!

106 Helmut PRENDINGER (Digital Content and Media Sciences) Werner BREITFUSS, Mitsuru ISHIZUKA

Live Collaboration in the Global Lab

● AuGe: Automatic Gesture Generation in Second Life and Intercultural Study

The AuGe system adds gestures to a user avatar's message automatically! This is a very useful and important feature for Second Life users. Gestures play a key part in conveying information in

human-human communication. The AuGe system automates this non-verbal behavior generation in Second Life. You can download AuGe from the Global Lab website!

107 Helmut PRENDINGER (Digital Content and Media Sciences) Mostafa Al Masum SHAIKH, Magalie OCHS

Live Collaboration in the Global Lab

● In-World Communication in the Global Lab

We demonstrate intelligent methods to automatically generate avatar behavior in Second Life, based on everyday sounds, text

from web sources, and general knowledge.

108 Helmut PRENDINGER (Digital Content and Media Sciences) Wisut HANTANONG, Songpol ATTASIRILUK, Arturo NAKASONE

Participatory Science in the Global Lab

● Participatory Agriculture

The virtual rice and grape paddies can serve as a platform for online decision making and wisdom sharing. Here we use the field server from the National Agricultural Research Center (NARC) in Japan as our information source. In this scenario of the Global Lab, experts and layman farmers from all over the world can exchange their expertise about growing plants, and pass on agricultural

wisdom from the old to the young. Furthermore, a field server from Shinshu University is used to obtain many types of useful information about fields, such as live image, temperature, humidity, CO2 level, etc. The special feature of this research is that more users, as avatars, can co-experience the view on the environment. This is not possible with a web-based interface.

109 Helmut PRENDINGER (Digital Content and Media Sciences) Arturo NAKASONE, Simon HOLLAND, Piet HUT, Jun MAKINO, Ken MIURA

Participatory Science in the Global Lab

● Participatory Astrophysics

In AstroSim, the Global Lab is used as a platform for synchronous collaborative visualization of a particular phenomenon in astrophysics, a Globular Star Cluster. We can meet in the Global

Lab, and experience the visualization by playback, zooming, and manipulation of the position of the stars. The data are provided by the National Astronomical Observatory of Japan (NAOJ).

110 Helmut PRENDINGER (Digital Content and Media Sciences) Arturo NAKASONE, Andreas BUDDE, Valentin CASTAN, Tiago da SILVA, Vincent DREANT, Damon REGIS

3D Internet Technologies

● The Open Library Project

The Open Library project is a software project initiative currently being under development to create a framework for 3D virtual worlds. The main objective of the framework is to provide programmers and non-programmers with a simple, flexible, and fully functional interface to combine virtual worlds with their applications. The project is based on the OpenSimulator, a 3D virtual world server similar to the Second Life server, with the essential difference that it is Open Source. This framework provides functions for different areas of interests inside 3D virtual worlds,

like object, avatar and environmental manipulation up to sensor data integration and visualization. Currently many potential users and non-programmers are not making use of this leading edge technology because it requires programming experience and a lot of background knowledge to adapt it for its own needs.

This framework offers common users and content creators to profit from the advantages of 3D virtual worlds like collaboration, 3D visualization and multi-user experience.

Live Collaboration in the 3D Internet

● Towards Democratization of e-Science

We demonstrate how the 3D Internet allows us to bridge the gap between the complexity of large-scale data and human understanding. Sensor and simulation data are projected into a 3D shared space, where users, as graphical avatars, can meet, communicate, and collaborate in a natural manner. We will show examples of live collaboration in agriculture, astrophysics, and other sciences. In one case, the simulation data in astrophysics were computed by NAREGI grid middleware, and in another case, they

were computed at the National Astronomical Observatory of Japan, and transferred to the virtual world server using SINET3 ultra-fast network. The integration of 3D Internet and Cyber Science Infrastructure emphasizes the new trend of "participatory science", which allows common users, not only experts from dedicated institutes to engage in scientific discovery and innovation. We call it the democratization of e-Science.

Connecting the Digital Earth and the Real Earth

● Database Integration Projects on Earth Environmental Data

To offer solutions to problems related to the environment of the Earth, it is necessary to design an adaptive information infrastructure that provides earth observation and social data chosen to follow the change of the real world. For this purpose, this presentation

summarizes three projects for the integration of earth environmental data -- 1) Digital Typhoon, 2) Vertical Earth, 3) Data Integration and Analysis System (DIAS), and shows demonstrations focusing on how we can connect the digital Earth with the real Earth.

Let's study internet security with Hikari & Tsubasa

● A research on interactive educational material for information security learning

It is necessary for the safe and comfortable internet life to have the accurate knowledge about information security. This educational material provides 14 chapters of Flash made interactive stories with 4 university boys and girls characters to learn the appropriate solutions for information security measures with fun. The Working Group for Information Security Policy Promotion for National

Universities and Institutions at NII are providing these educational materials for universities across the nation. Throughout the activities of publishing and promoting the Sample Policies for Information Security Measures, we are contributing for the improvement of information security.

Welcome to Science2.0

● Researchmap.jp: an information sharing platform for the researchers

National Institute of Informatics launches a new web service, Researchmap. Researchmap is an information sharing platform for the researchers. The user of Researchmap obtains three virtual spaces of the different access levels. The first one is called "My Portal" which can be used as his/her homepage. The second one is called "My Room" which is meant for his/her virtual private space which is not accessible by anyone else. The last one is

called "Community" which can be used as collaborative working/learning space with other member researchers. Researchmap provides more than 30 portlet applications including Curriculum Vitae, Weblog, Cabinet and Video Sharing. The user can arrange the portlet applications on a given page by drag-and-drop manner: the user can arrange them intuitively just as he/she arranges his/her room to express himself/herself

Poster

Principles of Informatics

201 Takeaki UNO

Compute much faster without purchasing new computers

- High speed and high quality algorithm for similarity detection on huge scale data
- High speed algorithm for large scale frequently appearing pattern mining problems

Data such as Web documents and POS data grows rapidly, so that we need much more time for the data analysis. Especially, for combinatorial ones, similarity or frequently appearance, needs 4 times, or often 10 times longer time when data size will be double. In this research, we developed algorithms for such data analysis;

find similar pairs or group of similar records from large scale data quickly, and find frequently appearing/characteristic patterns. In the booth, we show the real world efficiency of our algorithm by some graphical/non-graphical experiments.

202 Ken HAYAMI

Masaaki SUGIHARA (Graduate School of Information Science and Technology, The University of Tokyo)

The Geometry of Iterative Methods

- The Analysis of Krylov Subspace Iterative Methods on Singular Systems

Iterative methods are indispensable for the numerical solution of large and sparse systems of linear equations which occur in science and engineering. Krylov subspace methods are a group of fast iterative solution methods. Sometimes, we want to solve

singular systems of linear equations, which may have many or no solution. In this presentation, we will analyze the behaviour of Krylov subspace iterative methods on singular systems by the use of a geometric framework.

203 Makoto KANAZAWA

Open Problems in Formal Language Theory

- The Pumping Lemma for Multiple Context-Free Languages

There is an important family of theorems in Formal Language Theory called “pumping lemmas”. A pumping lemma expresses a property common to all languages belonging to a certain class, and its statement depends on the particular class of languages in question (e.g., the regular languages or the context-free languages).

The pumping lemma for the “multiple context-free languages”, an important class with applications in linguistics and bioinformatics, has not been proved yet. I give a partial solution to this open problem.

204 Yoshihisa YAMAMOTO

Tim BYRNES, Michael FRASER, Kenichiroh KUSUDO, Naoyuki MASUMOTO, Natsuko ISHIDA, Yan LIANDA, Kai YAN, Nobuyuki TAKAHASHI

Using quantum mechanics to solve difficult computational and physical problems

- Properties and applications of a polariton Bose-Einstein condensate

When many Bose particles enter a single quantum state, a Bose-Einstein condensate (BEC) is formed. A BEC has the properties of a microscopic state, while being a macroscopic phenomenon. Due to many particles sharing the same state, it is also resistant to noise. Our group is investigating the properties of BECs formed

in a semiconductor quantum well. We have also proposed methods of using such a BEC to attack complex information and quantum physics problems. The posters will explain some experimental results and potential applications.

205 Kae NEMOTO

Simon DEVITT, Todd TILMA, William J. MUNRO

How would a quantum computer look like?

- High Performance Quantum Computing

A truly scalable quantum computer is the long-sought goal from the advances and developments of quantum information technologies. However, until recently, no one knew what such a large-scale quantum computer would look like or how it would operate. Here we consider the quantum analogue of High Performance Computing, where a dedicated server farm is utilized by many users to run algorithms and share quantum data. The scaling structure

of photonics based topological cluster computing leads to an attractive future for server based quantum information processing, where dedicated mainframes can be constructed and/or expanded to serve an increasingly hungry user base with the ideal resource for individual quantum information processing. We call this the HPQC.

206 Keiichi KUMA

Naoyuki IWABE (Graduate School of Science, Kyoto University), Kazuki KATOH (Digital Medicine Initiative, Kyushu University), Hiroyuki TOH (Medical Institute of Bioregulation, Kyushu University), Takashi MIYATA (JT Biohistory Research Hall), Asao FUJIYAMA (NII)

■ The evolution of multicellularity in animals : a study based on comparative genomic analyses.

● Whole genome comparison of choanoflagellates and animals reveals the evolution of multicellularity in animals.

All living organisms are composed of cells. The organisms that consist of a single cell, like Paramecium, are called unicellular organisms. All extant animals, on the other hand, are multicellular organisms that consist of many different types of cells. It is widely accepted that, in the early evolution of animals, the multicellular

common ancestor of animals was originated from a unicellular organism. Our research group has recently sequenced the genome of a unicellular choanoflagellate, *Monosiga ovata*, which is one of the closest relatives to animals. We are now comparing the genome sequence of the choanoflagellate with those of several animals.

207 Asao FUJIYAMA

Satoshi KOBAYASHI, Hiroshi KANDA, Keiichi KUMA (NII)

■ Let's measure the size of Antarctic Moss by 3D.

● One example of integrated data base including 3D

The specimen concerning Bryophyta in Antarctica has the accumulation of 50 years.

In this research, the map data that shows the collection point and 3D image of the moss are added to the specimen data base, and,

in addition, it aims at the integration of the data base including genetic information.

In this exhibition, it introduces Antarctic Bryophyta and it introduces the system that can measure it on 3D image.

208 Asao FUJIYAMA

Taeko KOMODA, Satoshi KOBAYASHI, Shoko KAWAMOTO, Jiroh ARAKI, Keiichi KUMA (NII)

■ Biology and biotechnology portal site

● Bio-information interface for both non-specialists and specialists, "Japanese biotechnology portal site -Jabion-"

Today's scientific education is facing tough problems, that is, we are exposed to so many new and unknown terms through the media reports. Our website is designed to meet the needs of both the 'non-specialists' and the 'specialists' in different ways.

For the non-specialists, biological knowledge is provided through

the description of biological terms and column articles, whereas for the specialist, practical tools such as genomic information search and document retrieval service are offered. Here we introduce our recently renewed website "Jabion". URL (<http://www.bioportal.jp>).

209 Ryutaro ICHISE

Kazuhiro SATOH (Osaka University), Satoshi KURIHARA (Osaka University), Masayuki NUMAO (Osaka University), Akiko AIZAWA (NII/JSPS)

■ Elucidating Relationships among Research Subjects from Grant Application Data

● Knowledge Discovery from Grant Application Data

In this study, we proposed the use of grant application data to acquire knowledge of the relationships among scientific research subjects. We modeled grant application data to construct a method of capturing the relationships among research subjects,

then conducted experiments using actual grant application data. The results indicated that our method successfully elucidated the relationships among research subjects.

210 Tetsunari INAMURA

■ Research Platform for development of robots with social intelligence

● A Simulator for research on Intelligent with physical and social Intelligence : Socio-Intelli-Genesis Simulator

To develop high-level intelligence like human beings, integration between cognitive science, developmental psychology, brain science, machine learning, evolutionary computation and so on, is required. We propose a software platform that combines physical

behavior, cognitive perception and social communication in virtual environment to promote that integration. In this presentation the proto-type simulator SIGVerse is proposed.

211 Katsumi INOUE

Takehide SOH (SOKENDAI), Yoshitaka YAMAMOTO (SOKENDAI/University of Yamanashi),
Andrei Doncescu (Univ. de Paul Sabatier/LAAS CNRS)**Let's Hypothesize and Reason!****● Inference-based Hypothesis-Finding for Systems Biology**

We show a framework to discover unknown patterns, laws, and information from databases using logic-based Artificial Intelligence. Given a new observation, it is necessary to make a hypothesis that is accommodated to the existing knowledge. If such a hypothesis can, together with the background theory, logically derive the observation, we can consider it as a possible explanation. In this

research, we will clarify the principle of hypothesis formation and apply it to discovery of scientific knowledge. In particular, we aim at finding new rules in systems biology. Here we solve the challenging problem to find out the master reactions in metabolic pathways, which are involved in the physiological states in the growth of *Saccharomyces cerevisiae*.

212 Hideaki TAKEDA

Ikki OHMUKAI

Community Generated Web**● Creative Metadata Sharing and Distribution**

To reuse a huge amount of information on the Web, there has to be an editorial process. Recently community-based editorship has attracted attention for its affinity with Web communication process.

In this presentation we demonstrate our proposal systems based on metadata and social networks, and discuss how to encourage editorial activity in the community.

213 Nigel COLLIER

Ai KAWAZOE, Son DOAN, Mike CONWAY, Reiko MATSUDA-GOODWIN, Hutchatai Chanlekha,
John McCrae, Qi Wei**Detecting public health threats utilizing information on the Web****● Towards global public health surveillance with BioCaster**

We are developing a web-based infectious disease surveillance system that can filter early reports of disease outbreaks news in various regional languages and present a summarized translation in the local language, with an aim to provide a solution to the real social problem utilizing the latest text mining technology. In

BioCaster portal, we made some tools available based on the previous research results, including news search, global health monitor (a tool to display disease reports on Google Map) and the BioCaster ontology version 2 which contain experts' knowledge in multiple languages

214 Makoto TATSUTA

Lambda-Calculus and Type Theory**● TLCA Open Problem 20**

This paper answers TLCA Open Problem 20, which is finding a type system that characterizes hereditary permutators. First this paper shows that there does not exist such a type system by showing that the set of hereditary permutators is not recursively enumerable.

Secondly this paper gives a best-possible solution by providing a countably infinite set of types such that a term has every type in the set if and only if the term is a hereditary permutator.

215 Kunihiko SADAKANE

The Ultimate Data Compression Method**● Large-Scale Data Processing with Succinct Data Structures**

We use some data structures for efficient processing of large data. However, as the data size grows, there arises a problem of huge size of the data structures. Succinct data structures are the ones whose sizes are negligible compared to data sizes. For

example, suffix array is a data structure for searching human DNA and its size is about 12GB, while a succinct data structure called compressed suffix array compresses the suffix array into 1GB.

301 Shoichiro ASANO Susumu YONEDA (SOFTBANK TELECOM Corp., former visiting professor (NII))

Innovations for Digital Inclusion

● Telecommunication's Innovation for Climate Change

The International Telecommunication Union (ITU), the international standard development organization for telecommunication technologies, has launched a series of forum called "Innovations for Digital Inclusion" aims at dialogue between ITU and academia. In 2008, the forum was specially focused on "Climate Change

and ICT", and innovative ideas presented were selected as the basis for initiation of technology developments. Our proposal on the "Architectural Framework for Sensor Network on Environment Data" is now discussing nationally as well as in ITU. The outline of the concept will be presented.

302 Michihiro KOIBUCHI Jose Miguel Montanana Aliaga

ULP-HPC: Ultra-Low-Power High-Performance Computing

● Interconnection Techniques for ULP-HPC

The power consumption of high-performance computing (HPC) becomes a limiting factor to develop HPC systems, as the performance is improved. We have proposed the ULP (Ultra Low Power)-HPC that will improve by 1000 times the power efficiency

by 10 years in collaboration with Tokyo Institute of Technology, U of Tokyo, U of Electro-Communications, and Tokai U. This study proposes and evaluates interconnection technique that is one of main components of the ULP-HPC.

303 Katsumi MARUYAMA Kazuya KODAMA (NII), Soichiro HIDAHA (NII)

LP49: Component-oriented software bus for federated embedded systems

● An approach to improve reliability and maintainability of federated embedded systems software

Dependability, enhanced features such as federated processing, and efficiency are required in embedded systems software. Ease of program development is also very important. LP49 is a component-oriented OS to answer these requests. It is a micro-kernel-based multi-server OS. We have adopted the L4 micro-

kernel for it's features, performance and flexibility. On distributed processing concept, Plan 9 had devised excellent results (e.g. 9P protocol, private name space, user-mode servers), and we have adopted its concepts and source code largely. LP49 will support easy development of federated embedded systems.

304 Ichiro SATOH

Computer Science for Environmental Issues

● Applications of computer Science to environmental issues

As a new application of computer science, we present an approach to making truck logistics more efficient and selecting trucks in cooperative logistics by using program analysis and code

optimization techniques, and also propose a novel CO2-emission trading and carbon-offset methodology with RFID tags.

305 Michael E. HOULE Shinichi HONIDEN (NII), Christian SOMMER, Martin WOLFF

Navigating through transportation networks

● Approximate Shortest Path Queries in Graphs Using Voronoi Duals

Travel agencies or producers of navigation systems may wish to provide advice to clients, who want to know the shortest, fastest, or cheapest way from one point to another. Instead of searching a large part of a transportation map using a traditional algorithm at every client query, they could instead precompute certain

information in order to better support subsequent queries. In our research, we design, analyze, and implement a method – based on random sampling and graph Voronoi duals – that precomputes this information so as to obtain fast, approximate answers for point-to-point shortest path queries in undirected graphs.

306 Michael E. HOULE Shinichi HONIDEN (NII), Christian SOMMER, Martin WOLFF

Effective analysis of very large data sets

● RSC: A Generic Query-based Model for Scalable Clustering

Traditional clustering-based data discovery tools often fail when the data sets are very large or have many attributes, or have performance parameters that are very difficult to tune in practice. We have developed a generic model for clustering, and implemented a clustering system based on the model that overcomes many of these difficulties. The model assesses the

quality of cluster candidates, the degree of association between pairs of cluster candidates, the degree of association between clusters and data items, and the relevance of data features to cluster candidates – all according to the statistical significance of a form of correlation among the neighborhoods of their constituent members.

307 Michael E. HOULE Hans-Peter KRIEGEL (LMU※), Peer KRÖGER (LMU), Erich SCHUBERT (LMU), Arthur ZIMEK (LMU) ※LMU=Ludwig-Maximilians-Universität Munich

Supporting effective data retrieval

● Can Shared-Neighbor Distances Defeat the Curse of Dimensionality?

Similarity measures based on distances are generally sensitive to variations within a data distribution, or the dimensionality of a data space. We study the effects of the notorious “curse of dimensionality” phenomenon on different similarity measures for data with many local distributions, as a setting relevant to data mining applications. In particular, we investigate shared-neighbor

similarity measures, which are secondary similarity measures based on the rankings of data objects induced by some primary distance measure. Our findings are that the use of rank-based similarity measures can result in more stable performance than their associated primary distance measures.

308 Michael E. HOULE Weihuan SHU

Effective analysis of database query results

● Query-Result Clustering Based on Relevant Set Correlation

Although today’s search engines are capable of returning query results containing many thousands of items, the size of the result prevents most users from viewing more than a very limited number of top-ranked items. For this reason, recent attention has been given to the problem of dynamically clustering the results of queries so as to allow users to better understand the distribution of items within the result. We have developed tools for query-result

clustering based on the RSC model, which assesses the quality of cluster candidates, the degree of association between pairs of cluster candidates, and the degree of association between clusters and data items, all according to the statistical significance of a form of correlation among the neighborhoods of their constituent members.

309 Michael E. HOULE Vincent ORIA (NJIT), Umar QASIM (NJIT※) ※NJIT=New Jersey Institute of Technology

Efficient retrieval of similar data items

● Active Caching for Recommender Systems Based on Relevant Set Correlation

Online shopping and services are increasingly making use of recommender systems to inform customers of items that may be relevant to their interests. Generating ranked lists of items is typically an expensive operation that can lead to data access latency. Caching of frequently accessed data has been shown to be a useful technique for improving response time. However,

traditional caching techniques cannot be applied to “query-by-example” recommender systems. We propose a Cached Relevant Set Correlation (CRSC) model to estimate the top-k query result for a query with regards to a cache of ranked item lists. Our cache method not only answers queries that already exist in the cache, but also actively estimates results for queries not cached.

310 Shin NAKAJIMA

Systematic Approaches to Finding Undesirable Behavior in Software Systems

● Model-Checking as a Tool for Achieving High Dependability

Formal methods are widely recognized of importance to achieve the desired levels of the system dependability. In particular, logic model-checking is expected in industry as an automatic and systematic approach to finding faulty behavior. This presentation discusses our

activities on logic model-checking; from a collaboration project with industry to some research topics including a new application of the state-of-the-art method and future directions.

311 Hiroshi HOSOBÉ

Developing programs by providing only objectives instead of computation methods

Constraint programming and its applications

Constraint programming is a useful technology for modeling and solving various problems. The traditional programming style requires programmers to describe computation methods for achieving their objectives, whereas constraint programming allows programmers to

describe only objectives that will then be automatically achieved by computers, which makes it easier to develop programs. We present technologies and applications of constraint programming, especially focused on recent results of our research.

312 Tomohiro YONEDA

Tolerating delay faults in advanced semiconductor process technologies

Achieving degradation tolerance in a hardware accelerator with parallel processing elements

Recent advances in semiconductor process technologies cause new types of faults, which should be handled in order to obtain large and dependable VLSI systems. This research project focuses on a type of faults that degrade performance of the circuit components. Conventional synchronous circuits need large margins to tolerate

them. Our approach is based on asynchronous circuit technology with detection and data flow control to send less data to degraded units. The proposed idea is implemented in a linear equation solver. The simulation results show that the proposed method effectively tolerate the degradation of several arithmetic units.

313 Shinichi HONIDEN

Fukazawa Laboratory (Waseda University), Honiden Laboratory, Levent GÜRGEN, Kenji TEI, Nobukazu YOSHIOKA (NII), Fuyuki ISHIKAWA (NII)

Toward a bridge between the real world and the virtual world

A middleware for open wireless sensor networks

Wireless Sensor Networks (WSNs) technologies are attracting more and more attentions, providing a foundation for context-aware user support in ubiquitous computing. Toward WSNs as open infrastructures, we are developing a middleware for WSNs,

providing run-time task management, adaptability to changes in user requirements and situations, security in response to possible attacks from malicious tasks or sensors, and tolerant of hardware or network failures

314 Levent GÜRGEN

Shinichi HONIDEN (NII)

Sensors at your service!

XSSStreamWare: management eXtension for SStreamWare

SStreamWare is a data management middleware that allows building declarative queries on heterogeneous sensor data. This work extends SStreamWare, in addition to its querying capabilities, with management capabilities. Supported management domains are configuration management, software management, performance monitoring and diagnostics. The objective is to increase the

efficiency of networked sensing systems and provide a better quality of service. The management solution is based on a hierarchical, service-oriented, manager-agent architecture. A simple and extensible data model is defined, representing a management information base (MIB). Generic management operations are performed on that base.

315 Shinichi HONIDEN

Yoshiyuki NAKAMURA, Susumu TORIUMI, Hikotoshi NAKAZATO, Daisuke FUKUCHI, Youichi KANEKI

Sensor Network support your life

The efficient information acquisition in Wireless Sensor Network and the management

It is necessary to acquire information on the real world to provide service that is appropriate for user's situation. Wireless Sensor Network(WSN) is paid attention as a basic technology for that. In WSN, every individual sensor need to consider the resource

saving because there is a limitation in the resource such as electric powers. Then we are researching about how to do the information acquisition like the tracking and the event detection and preserve it efficiently in WSN.

316 Shinichi HONIDEN Yojiro KAWAMATA, Ryuichi TAKAHASHI, Yusaku KIMURA, Kayoko YAMAMOTO, Satoshi KATAFUCHI

Service Development for Ubiquitous Environment

● To Realize Feasible and Reliable Service

In ubiquitous environment, functions of devices and software are provided as "service". Our research work relates to techniques required to utilize services, such as seamless service selection and service coordination. Also in such condition, software are

regarded as infrastructure and must be highly reliable. We focus on formal method as a solution to achieve high reliability and trying to solve a tradeoff it holds: usability and strictness of semantics and consistency checking.

317 Shinichi HONIDEN Hikari AIKAWA, Yukino BABA, Hirotaka MORIGUCHI

ITechnology Supporting Intelligent Computers

● Research for Algorithms based on Learning, Evolution and Collective Intelligence

To achieve intelligent computers, we are researching "Cost reduction of Real-time Garbage Collection Implementation on Ruby interpreter using runtime data", "Concept Extraction of Words

Using Co-occurrence of tags and location information on resources in Folksonomy services", and "Improvement of Neural Network using Genetic Algorithm".

318 Shinichi HONIDEN Kenji TAGUCHI (NII), Nobukazu YOSHIOKA (NII), Fuyuki ISHIKAWA (NII)

Deliver Scientific Approaches to the Field of Manufacturing

● TopSE: Intellectual Manufacturing Education Program based on Science

The Top SE Project is a practical education program aiming to cultivate software engineers who have acquired highly advanced development techniques based on the concept, "intellectual manufacturing education based on science." The students

experience application of learnt techniques to practical problems through their graduation studies, in addition to lectures provided by professionals from universities and companies.

319 Zhenjiang HU Masato TAKEICHI (The University of Tokyo), Yingfei XIONG (The University of Tokyo), Hong MEI (Peking University), Haiyan ZHAO (Peking University), Keisuke NAKANO (The University of Electro-Communications), Soichiro HIDAKA, Hiroyuki KATO

Bidirectional Transformation Makes Software Evolvable

● Research on Software Development based on Bidirectional Model Transformation

Model transformations are a key element in the OMG's Model Driven Development agenda, providing a standard way to represent and transform software artifacts such as requirements, design models, program code, tests, configuration files, and documentation in software development. However, after a transformation is applied, the source and the target models usually co-exist and evolve

independently. How to propagate modifications correctly across models in different formats and guarantee system consistency remains an open problem. This work aims to solve this problem based on bidirectional model transformation. The success of the project would lead to a novel formal method for evolutionary software development, and a trusty tool for artifact synchronization.

320 Nobukazu YOSHIOKA

Development of Secure and Safe Systems

● SSE Project: Security and Safety on Software Engineering Project

The security has a great affect on modern society, as exemplified by personal information leakages and attacks on systems in recent years. Compared to other types of products and infrastructures, the technologies to enhance the security of information systems have

not yet reached the stage of being adequate. SSE project probes the theoretical foundation and systematic methodologies with the aim of establishing software engineering technologies to resolve these issues,

Propagating modification to transformed graphs backwards

• Bidirectionalization of Graph Transformation and its Application to Bidirectional Model Transformation

Model transformation in model-driven software development plays an important role in formal treatment of development process. It has been considered difficult to realize in a systematic manner in the development process to compose larger transformation from small transformations and propagating modification to the model in both direction (not only from source to destination but also backwards),

due to the complexity in the process. We cope with this problem by bidirectionalizing an existing graph transformation language that is already compositional and has clear formal semantics. We added several syntax that are useful to describe primitive operations on graphs like replacing subgraph.

Digital Content and Media Sciences

Understand services and compose your ones

• Quality-Change-Aware Service Composition and Delivery on the Web and around You

Technical foundations for Service-Oriented Computing have been investigated to allow software system to compose services by orchestrating various Web-based services and surrounding physical services. This work aims at facilitating development of software that ensures qualities in composed services, being aware of not only functional and non-functional properties of involved component

services but also their changes. Specifically, this work provides rigorous modeling of service qualities and their changes, as well as service contracts specifying them, in order to provide methods for design-time analysis and verification and runtime monitoring and adaptation.

From Regulations to Systems, From Systems to Regulations

• Identification and Refinement of Regulations Iteratively Combined with Formalization and Analysis of System Requirements

More and more regulations are being introduced for information systems. Higher-level organizations (e.g., governments) often determine abstract or partial regulations, which need to be refined into concrete and complete ones used for system development by each organization. They then need to be reflected in system requirements. This work aims at facilitating this process by

providing a methodology to identify and specify concrete (legal) regulations as well as to map them into (engineering) requirements to be formally analyzed. The proposed methodology explores iterative and circulative process for agile system adaptation to amendments and regulation refinements based on feedback from requirements analysis.

Using dataspace on the Web

• An XQuery Fusion based on Static Emulation of XML Store

Rewriting composite expressions based on eliminating unnecessary intermediate result is a traditional optimization technique known as fusion. In XQuery, composite expressions for node creation are typical in practice. We propose a fusion algorithm for this kind of composite XQuery. The XQuery fusion is more difficult than the existing fusion, because naive elimination of node creations

does not preserve document order. The document order plays an important role in XQuery. This presentation shows that XML fragments created dynamically as intermediate results in a store can be emulated statically in such a way that rewriting XQuery to avoid redundant expressions is enabled.

What technique should be used for coping with privacy and usability?

• Enforcement of Privacy-compliant Delegation of Personal Data

Privacy in business processes for personalized services is currently a matter of trust, since business processes require the delegation of personal data and users are not able to control their usage and so their delegation. Existing privacy-enhancing technologies like identity management systems consider access control but not the usage

of personal data. Current work on usage control mainly considers classification and formalization of usage rules, so called obligations, and the delegation of personal data with a trusted third party (TTP). We investigate on digital watermarking in order to observe the enforcement of obligations for a delegation of personal data without a TTP.

405 Jun ADACHI

Atsuhiko TAKASU (NII), Akiko AIZAWA (NII), Daiji FUKAGAWA, Hisashi KURASAWA

■ Cleaning large amount of information by similarity matching

● Integrating and indexing variety of data using approximate matching and metric index.

Amount of information we can access increases rapidly. However, it contains much of duplicated information. This study proposes a method to extract duplicated information and clean up it. We focus

on (i) fast and fine-grained approximate tree matching method, and (ii) multi-purpose index for similarity search in metric space.

406 Asanobu KITAMOTO

Yoko NISHIMURA, Mohammad DAOUD, Kinji ONO (NII)

■ Discovery from the digitization of cultural heritage

● Digital Silk Road Project : Digital Archives of Cultural Heritage

Digital Silk Road Project (<http://dsr.nii.ac.jp/>) aims at improving accessibility to the cultural heritage of Silk Road by the digitization of objects, and by the construction of a Web platform in which scholars and the general public can study, learn and enjoy. An

important question is - what did we discover from digitization? We will introduce the advantage of digitization and the acquisition of knowledge with a focus on Toyo Bunko Digital Archive of Rare Books and the analysis of historical maps along Silk Road.

407 Kazuya KODAMA

Ippeita IZAWA

■ Generating new “appearances”

● Light field processing based on decomposition of 3-D blurs

We introduce novel visual communication based on light field processing. Our method decomposes and transforms ray-sets acquired with a single system of lenses. Especially, by applying some 3-D filters to multiple differently focused images, free

viewpoint images and arbitrarily blurred or focused images can be reconstructed well. The technology is derived from simple image processing that is appropriate to hardware acceleration. It will open up new vistas on light field processing for 3-D TV.

408 Imari SATOH

Takahiro OKABE (The University of Tokyo), Yoichi SATO (The University of Tokyo)

■ Shape Reconstruction from Images

● Shape Reconstruction based on Similarity in Radiance Changes under Varying Illumination

This paper presents a technique for determining an object's shape based on the similarity of radiance changes observed at points on its surface under varying illumination. To examine the similarity, we use an observation vector that represents a sequence of pixel intensities of a point on the surface under different lighting conditions. Assuming convex objects under

distant illumination, we show that the similarity between two observation vectors is closely related to the similarity between the surface normals of the corresponding points. This enables us to estimate the object's surface normals solely from the similarity of radiance changes under unknown distant lighting by using dimensionality reduction.

409 Akihiro SUGIMOTO

■ Toward 3D Shape Modeling with Guaranteeing Optimality

● Graph-based Range Image Registration Combining Geometric and Photometric Features

We propose a coarse registration method of range images using both geometric and photometric features. The framework of existing methods using multiple features first defines a single similarity distance summing up each feature based evaluations, and then minimizes the distance between range images for registration. In contrast, we formulate registration as a graph-based optimization problem, where we independently evaluate geometric feature and

photometric feature and consider only the order of point-to-point matching quality. We then find as large consistent matching as possible in the sense of the matching-quality order. This is solved as one global combinatorial optimization problem. Our method thus does not require any good initial estimation and, at the same time, guarantees that the global solution is achieved.

410 Kenro AIHARA

Hitoshi KOSHIBA (Digital Content and Media Sciences Research Division),
Junichiro MORI (The University of Tokyo), Hideaki TAKEDA (NII)

Enhancing Your Life by Using Behavior Logging

● Integration of Real-world and On-line Behavior

This presentation gives our research into integration and utilization of real-world and on-line behavior logs. We focus on methodologies to estimate the user's implicit context at the time of user behavior

and produce "easily-accepted" information suitable for individual users.

411 Seiji YAMADA

Anja Austermann

Making a robot able to understand a human.

● Learning to Understand Multimodal Commands and Feedback for Human-Robot Interaction

We propose a method to enable a robot to learn how a user gives commands and feedback to it by speech, prosody and touch. We implemented a two-staged biologically inspired approach which is modeled after associative learning in humans and animals. In the first stage, we use unsupervised training of HMMs to model the

incoming stimuli. In the second stage, these models are associated with a meaning using an implementation of classical conditioning. Adaptation between the robot and a user is done using special training tasks, which allow the robot to explore and provoke situated feedback from the user.

412 Frederic ANDRES

Chbeir Richard, Kawtrakul Asanee, Sillaume Ghislain, Rajbhandari Sachit

Thematic Digital Library on European Integration Process

● The Semantic Digital Library Project

The Semantic Digital Library (SDL) project will demonstrate the SDL Concept Server Workbench and the European Navigator ENA. The SDL Concept Server Workbench helps build and structure the multilingual Europonomy on European Integration Process, the thematic Digital Library Referential Model and the Eurovoc

Classification as a distributed and collaborative environment. This project is a collaborative contribution based on the Web2.0/ Web 3.0, to create a system with rich semantics that will greatly enhance indexing, searching and information organization in a thematic digital library on European integration process.

Information and Society

501 Kouichirou UEKI

Next generation library information system

● Computerization of library and its Internet environment

Library has been contributing to improvement of intelligence of human society by helping spread and accumulation of knowledge in many places. Now, we can search through the resources of library by using a catalog database called OPAC from the Internet. Various

efforts have been made to enhance the searching ability of OPAC. From the viewpoint of informatics, the impact of computerization on libraries and the change in the Internet computing environment were investigated.

502 Noriko KANDO

Yuka EGUSA (Cooperative Researcher, NII/National Institute for Educational Policy Research), Hitomi SAITO (Cooperative Researcher, NII/Aichi University of Education), Masao TAKAKU (Cooperative Researcher, NII/National Institute for Materials Science), Hitoshi TERAJ (Cooperative Researcher, NII/Tokyo Denki University), Makiko MIWA (Cooperative Researcher, NII/The Open University of Japan)

Mind and Behavior of the Web Search - Gaze tells a lot --

● Cognitive Research for Exploratory Search on the Web

How people search and explore on the WEB? We have investigated into users cognitive process of different types of exploratory searches on the WEB through detailed analysis of the integrated

data collected by eye trackers, search logs, think-aloud concurrent protocols, in depth interview and detailed. The derived models suggest better search functionality and interface of the Web search

503 Hironobu GOTOHDA**How to find objects like this?****● Similarity Search for 3D Models**

Similarity search for 3D models is a subject extensively studied in computer graphics research. While humans can recognize similar objects at a glance, computers will spend a lot of time in extracting features charactering the objects and comparing the features to find out whether these objects are similar to each other. In this

presentation, we will review the state of the art of 3D model search. More specifically, we will show various search algorithms, and demonstrate how well the algorithms work. Through a comparative study of these algorithms, pros and cons of each algorithm will also be shown.

504 Teruo KOYAMA**Reviewing the difference of contents in various documents****● An Evaluation of Document Similarity Based on Morpheme Occurrence Patterns**

We can assume that two different document sets may show similar morpheme occurrence patterns, if the sets both discuss about similar topics with similar discussion manners. In this paper, the authors show the occurrence patterns of morphemes really indicates the similarity of the sets. The authors also show the difference

of the patterns in both sets indicate the difference of topics or discussion manner between the sets. The authors also show how to find key morphemes that indicate the similarity or difference of the sets.

505 Nobuhiro FURUYMA Kazuki SEKINE**Does motion description change by listener location?****● A study on the impact of listener location on how motion event is expressed in gesture**

Native speakers of English tend to use different axes when they gesturally express one and the same motion event of a cartoon character, depending of where the listener is located relative to

themselves. To see if the same phenomenon can be observed, we collected narrative data for native speakers of Japanese, report on the results, and discuss the implications of the finding.

506 Akira MIYAZAWA**Exploring the gap between language and data representation.****● Is YOMI specific to Japanese?**

When designing metadata format or database tables, YOMI or Japanese "reading" is often regarded as specific issue for Japanese language. Many fields, such as NAME or TITLE, have to add

parallel fields for the reading. This issue is discussed from modeling of metadata representation and natural language writing system, and a guideline for design is given.

507 Yuan SUN

Sumio KAKINUMA (NII), Masaki NISHIZAWA (NII), Masamitsu NEGISHI (NII)

Using web data to mine university-industry collaboration**● An exploratory study on measuring university-industry relations using data on university web sites**

In recent years, collaboration with industry becomes one of the major missions for universities, and university-industry collaborations in research and development are encouraged in various areas and ways. So far, we have looked at the state of collaboration in scientific research between universities and industries mainly based

on coauthorship of academic publications between the sectors. In this study, we try to use relevant information on universities' web sites to analyze and take an overlook of university-industry relations, from a different point of view.

508 Morio SHIBAYAMA**Creation of World-standard Research Bases****● Research on 21st Century COE Program**

21st COE program was established in 2002 to cultivate a competitive academic environment among Japanese universities by giving targeted support to the creation of world-standard research and education bases (centers of excellence). By thus raising the standard of both education and research at them, the program

seeks to elevate Japanese universities to the world's highest echelons.

This research is aimed to clarify the process from individual research to large-scaled program through Grant-in-Aids database.

Business model for IPTV

● IPTV Diffusion and its Future

IPTV is sought to be one of attraction contents for broadband network or its diffusion drive while the situation of physical faculties network coverage, speed and competition situation are so different area by area. We analyse diffusion styles of the countries and found some critical factors for IPTV diffusion patterns.

The five major factors show that we must consider about not only communication market/regulation structures but also condition of media market structures in order to promote IPTV. At the same time we need to make a new design for competition framework in the context of national digital television transmission.

The effect of “similar others” in online shopping

● The effect of salient value similarity on purchase intention in e-commerce

Traditional social psychology which goes back to “Yale school” has shown that it depends on someone’s competence and integrity whether s/he is trusted or not. However, people cannot get enough information about the competence and integrity of the operators of EC sites because of information asymmetry. In such cases, people

tend to trust the judgments of those who are similar in their salient values. Experimentally manipulating the similarity of salient values among EC users, this study investigates their effects on purchase intention.

Speech Data and Speech Research

● Collecting and creating speech corpora with applications to speech research

A large amount of speech data of various kinds is required for speech research such as speech recognition and speech synthesis. Many speech databases or corpora have been developed by various projects in Japan, but it was difficult to maintain and control them after the project. We have initiated “Speech Resources Consortium

(SRC)” to collect such unused data in the universities and create new data in order to distribute them to potential users. The SRC aims to contribute to the development of information society through these activities.

Speech Data and Speech Research

● Visualization of multiple speech corpora by MDS

Speech corpora or databases have been demanded according to the development of speech research. NII-Speech Resources Consortium (SRC) and related organizations have created and distributed various speech corpora. It means that the user has obtained multiple choices of corpus selection, while on other hand, they have to select a good corpus for the intended purpose from

great variety of corpora. In order for users to utilize various corpora easily, we propose a new classification method based on corpus attributes which show corpus characteristics. It analyzes and visualizes the relationship and similarities mostly among Japanese speech corpora and tries to visualize speech corpora needed by the users.

Speech Data and Speech Research

● Production / perception boundary of speech

Foreign language is hard to learn for adults because speech perception and production is language dependent. Research on speech perception and production to reveal differences between natives and non-natives would enable us to develop scientific

speech education methods and computer aided instruction systems. From this point of view, this research investigated phonetic boundary in speech perception and production in Japanese natives and non-natives.

Graduate University for Advanced Studies

601 Christian HOAREAU

Context-Aware Services**● Query Processing framework for Context-Aware Computing**

We present a query-processing framework for context-aware services.

To deliver contextual information ubiquitous computing platforms, current systems tend to query the underlying context models in an ad-hoc manner.

This makes it difficult to guarantee the quality of the results, and hence the reliability of context-aware services. Because such query

mechanisms have to be sound, our approach is build upon a logic-based query language.

We therefore ensure that the results of any query (i) do not miss any information that satisfy its necessary and sufficient conditions and (ii) do not contain any information that does not satisfy the conditions.

602 Molin DU

Face identification in video**● Improve face normalization for identification by using temporal information**

Face normalization is important to automatic face identification result. Normalization is subject to facial feature locating accuracy which is unstable in low quality video. We develop techniques to refine facial feature locating result by using feature trajectory

along the video sequences. Trajectory is acquired by applying KLT tracking and RANSAC. Experiment show our method could improve face normalization thus to improve face identification accuracy.

603 Takuma KUBO

Making staff schedules easily for users**● How to reduce the workload of modification effectively in small-scale staff scheduling from strategy of optimization?**

On staff scheduling in small offices, users usually have to modify the schedules obtained by optimization to match their criteria, and this task is usually the bottleneck. For such offices customization is always too expensive, thus we thought it is quite important to make optimization method and environment which lighten this task. We

had real-world experiments operated by human. In consideration for the result of our experiments, we also developed excel based scheduling system which can reduce the workload of users without much literacy

604 Ikki FUJIWARA Kento AIDA (NII)

Designing the Cloud Resource Exchange**● A research on the market-based allocation of distributed computational resources**

Cloud is a promising paradigm for distributed computing. Resources in the Cloud such as storages and virtual machines are becoming commodities. A number of suppliers and consumers may trade their resources in a market. We propose a concept of the Cloud Resource Exchange, which consists of the forward market and

the spot market. The participants make long-term reservation in the forward market and short-term adjustment in the spot market. We study the mechanism design of the Cloud Resource Exchange which will provide individual rationality as well as economic efficiency.

605 Hiroaki TOGASHI Shigeki YAMADA (NII)

IC tags make transportation environment be more comfortable and safer.**● RFID-based vehicular system for driving assistance and information providing.**

Conventional scheme in location-based transportation systems (e.g., car navigation systems) to obtain location information is GPS (Global Positioning system). The GPS system provides only values like the combination of "latitude" and "longitude", that are not convenient to transportation systems. We propose RFIDs (Radio

Frequency IDentifications) scheme to solve this issue. We consider that our RFIDs scheme can offer a driving assistance system that avoids clashes to roadsides, and also this scheme can make data retrieving from other databases easier, making the best use of the unique ID offered by RFID.

Delay- and Disruption-Tolerant Networks (DTNs)

● An Efficient Bundle Protocol to Deal with Mobility and Intermittent Connectivity (IC) in DTN.

Disconnections due to IC and Mobility lead to the Handover operations in the network which has been taken care of in Internet by developing different protocols. The aim of these mechanisms is to reduce the packet losses. In DTN, a specialized store-and-forward protocol, the BP, is used to provide guaranteed delivery of Bundles (packets) on hop-by-hop basis with the help of Custody

Transfer mechanism. It works in such a way that with some delay the bundles get eventually delivered to the destination almost without any losses. This implies that the BP can handle the Mobility and Handover more efficiently than the other prevailing technologies.

Delay- and Disruption-Tolerant Networks (DTNs)

● Location-based Routing in DTN

There has been progressive research in wireless IP-based and Ad hoc networks on a class of routing algorithms that rely on location information, possibly coupled with mobility and predictability features, with the focus of improving network scalability by reducing

the propagation of control messages. In this presentation, we briefly introduce our proposed location-aided PATH algorithm for a probabilistic DTN scenario.

Intelligent Interaction

● Management of Experience Data for Rapid Adaption to new preference based on Bayesian Significance Evaluation

In this poster I will present an interactive Bayesian behavior learning algorithm that is capable of adapting rapidly to new situation. Generally for Bayesian belief changes in query nodes, we are more interested in evidence that may lead to a change in decision. If an observation has very little effect on decisions, it

could be regarded as an insignificant observation for the learning process. The algorithm presented here uses Beta and Dirichlet distribution based evaluation of data for significance. The algorithm presented in this poster can learn interactive behavior rapidly with a very small number of data and can adapt rapidly to new situation.

Research on communication skill of Humanoid Robot for Human

● Inference of others' sensorimotor patterns based on symbol communication

There are lots of issues to be solved before the supporting robots, in the future, are accepted in the daily life. The robot, for instance, would be required to assist a user and career luggage, voluntarily, before asked. It, then, would be necessary for the robot to estimate the force applied to the muscles by only observable information. The objective of this study is to infer the unobservable sensorimotor information by applying "mimesis model".

A problem remained in the mimesis model is that it assumes the other to have identical body structure as the self. It, furthermore, is only capable of dealing with observable information. We solve these issues by proposing a method, adaptively acquiring inference model of others' sensorimotor patterns utilizing symbol communication.

New solvers for least squares problems

● Inner iteration preconditioned Krylov subspace methods for least squares problems

Many problems arising in science and engineering can be reduced to least squares problems. Tomography, control, signal processing, statistics, image processing, and physical modeling are examples. We propose stable, fast, and efficient algorithms for large-scale and

ill-conditioned least squares problems. The method is based on Krylov subspace methods with inner iteration for preconditioning. The usefulness of the method is demonstrated by numerical experiments.

Others

701 Research Promotion Division

Introduction of the Graduate School (SOKENDAI: Chiyoda Campus)

● Outline of Department of Informatics and entrance exam guide for 2009 fiscal year

NII establishes Department of Informatics, School of Multidisciplinary Science at Graduate University for Advanced Studies (SOKENDAI), and offers both 5 year and 3 year doctoral programs.

These 2 courses make the best use of the specialty of NII that is pioneering and international research institutions of informatics, and aims at the promotion of the excellent talent who leads "Knowledge

society" of the 21st century.

It is located in the center of Tokyo, this good location enable busy students with job come to NII easier to learn and research. It has been registered more than 70 students, 30% of them are international students, and about half of them are working students. We guide the outline of Department of Informatics and entrance exam for October 2009 and April 2010.

702 The Scilab Consortium

Florian LANSON

The Open source Platform for Numerical Computation

● Scilab

Scilab is an open source platform for numerical computation and simulation. Established in 2003 at the initiative of INRIA (the French national institute for research in computer science and control), the Scilab software is, since July 2008, produced by a consortium, hosted by Digiteo*, which, to date, has 18 industrial companies, European research centers and prestigious higher education institutes as members. The Scilab Consortium keeps a privileged link with INRIA as the Institute remains one of its

members, continue to support actively its development and is also a founding member of Digiteo. More than 50,000 remote downloads of the Scilab software are carried out each month from the official site of the Consortium to the profit of companies, universities and research centers, from all over the world. * First world-class research park in the Île-de-France area dedicated to information science and technology

703 National Institute of Information and Communications Technology Knowledge Creating Communications Research Center

Naoto IWAHASHI Tsuneo NITTA, Hideki ASOH, Takayuki NAGAI, Tadahiro TANIGUCHI, Komei SUGIURA, Ken SATOH (NII)

Robots that learn language and action like infants

● Robots that learn language and action like infants

This presentation demonstrates a machine learning method that enables robots to learn the capability of linguistic communication from scratch through verbal and nonverbal interaction with users. The method focuses on two major problems that should be pursued to realize natural human-machine conversation: a scalable grounded symbol system and belief sharing. The learning is performed in the process of joint perception and joint action with a user. The method enables the robot to learn beliefs for communication by combining speech, visual, and behavioral reinforcement information in a probabilistic framework. The beliefs learned include speech units like phonemes or syllables, a lexicon, grammar, and pragmatic knowledge, and they are integrated in a system represented by a dynamical graphical model. The method also enables the user and the robot to infer the state of each other's beliefs related to

communication. To facilitate such inference, the belief system held by the robot possesses a structure that represents the assumption of shared beliefs and allows for fast and robust adaptation of it through communication with the user. This adaptive behavior of the belief systems is modeled by the structural coupling of the belief systems held by the robot and the user, and it is performed through incremental online optimization in the process of interaction. Experimental results reveal that through a practical, small number of learning episodes with a user, the robot was eventually able to understand even fragmental and ambiguous utterances, act upon them, and generate utterances appropriate for the given situation. This work discusses the importance of properly handling the risk of being misunderstood in order to facilitate mutual understanding and to keep the coupling effective.

704 "Yahoo! Chiebukuro Project", the Yahoo Japan Corporation /IDR Group National Institute of Informatics

Next Yahoo! Chiebukuro corpus

● Offering to the society for boosting the Web 2.0/CGM research

Yahoo!Chiebukuro corpus offers a posted data to National Institute of Informatics (NII) and to researchers through NII. It has been two years since starting to offer the 1st corpus. Meanwhile the posted data has been increased and various additional data for new functions has been added to Yahoo!Chiebukuro. So, we've planned

to offer the 2nd corpus. That contains five years of the posted data and the much richer additional data (evaluation number, access number, etc.). We hope the corpus is very useful for many researchers and their research results make Yahoo!Chiebukuro's customers happy.

705 Researchmap ID Center

Reserchmap

801 Cyber Science Infrastructure Development Department

Construction of the Cyber Science Infrastructure (CSI) for academic research and educational activities at universities.

●CSI : Cyber Science Infrastructure

NII is promoting the construction of the CSI : Cyber Science Infrastructure through cooperation with universities and other organizations.

CSI means an information environment that incorporates and utilizes various research activities and results from universities

and research institutions - such as supercomputers and other distinctive scientific utilities and resources, scientific software and databases, and human resources - over a super high-speed network, transcending the borders of organizations or scientific fields.

802 Cyber Science Infrastructure Development Department

SINET Promotion Office, Research and Development Center for Academic Networks

To provide a greater variety of network services and to respond more flexibly to changes in user requirements

●SINET3 : Science Information Network

Since June 2007, SINET3-- new ultrahigh-speed network-- has provided several new advanced network services for universities and research institutions throughout Japan. In this year, we will provide the bandwidth-on-demand service on layer-1, QoS service and multicast service in addition to the internet service and the

VPN service. The "SINET Promotion Office" promotes the use of service, by providing user consultation, user interviews/surveys and technical troubleshooting, as well as carrying out an educational campaign.

803 Center for Grid Research and Development

What can we do with the grid?

●Grid Middleware Development and Deployment

The grid is a technology enabling advanced services, e.g. computing, data sharing and collaborative experiments, by sharing/federating resources. The goal of the exhibition is to answer the questions: What can we do with the grid? Where is the grid infrastructure we can use?

We exhibit the grid middleware developed in the National Institute of Informatics and advanced computing services enabled by the middleware. We also introduce the status of the grid infrastructure being constructed in collaboration with Japanese universities.

804 Cyber Science Infrastructure Development Department

Research and Development Center for Academic Networks

Development of the Japanese inter-university Authentication and Authorization Infrastructure

●The leveraging of the Academic Authentication Federation UPKI-Fed

The National Institutes of Informatics is currently working with universities to promote the establishment of Academic Authentication Federation to leverage academic resources in safe and effective ways.

In our Pilot Federation, we realized the Single Sign-on environment

which enables us to use many Electronic Journal services or web sites seamlessly.

And we are also issuing the Server Certificates to confirm the actual

existence of web servers in universities.

805 Cyber Science Infrastructure Development Department

Research and Development Center for Scientific Information Resources

Promoting establishment of next-generation information infrastructure indispensable to the academic community

●Construction of the Next-Generation Academic Information Infrastructure

National Institute of Informatics (NII), in close collaboration with university is attempting to generate and secure content that are indispensable to the academic community, and to build an information infrastructure that will give added value to and broadly transmit these content. Specifically, NII provide comprehensive academic content services, including GeNii(NII Scholarly and

Academic Information Portal) and NACSIS-CAT/ILL(Catalog Information Service : Cataloging System / Interlibrary Loan System). NII also support for construction of institutional repositories collecting, preserving, and disseminating research produced in universities.

806 Shinichi HONIDEN

Promote world-leading research, education and practice for cutting-edge software engineering**● GRACE Center: Center for Global Research in Advanced Software Science and Engineering**

GRACE Center is a world-leading software research center in NII engaged in research, education and practical work in alliances with research organizations in Japan and overseas and as part of industry-academia collaboration. GRACE center seeks to put in

place the foundations of 21st century software, while developing world-class researchers and engineers who will go on to play central roles in the next generation.

Special Exhibition

901 Meiji University's library

Meiji University's library literacy education: active use of the library as an educational venue

Meiji University's library literacy education, which includes a university's credited course, Library Course, in which we teach library skills, joy of reading, etc., have been adopted as part of its 2007 Support Program for Distinctive University Education

(Characteristic Good Practice). In this presentation, we introduce an overview of our library literacy education, the digital content of Library Course, and "Program Evaluation" activities on Library Course.

902 National Archives of Japan

National Archives of Japan, Digital Archive: "Past is Prologue"

National Archives of Japan (NAJ) launched "Digital Archive" from 2005, providing catalogue database and some of its holdings in digital images. With the concept of "ubiquitous internet service," the system is based on the next generation of digital archival standards,

such as JPEG2000 and EAD/XML. NAJ holds demonstrations and displays of "Digital Archives," with its precursor, Japan Center for Asian Historical Records (JACAR).

903 Research and Development Center for Informatics of Association

IMAGINE - Federated Association among Museum, Bookstores and Libraries**● Creative Interaction with Cultural Information**

IMAGINE federates various cultural information sources such as art museums, bookstores and libraries, which have independently accumulated reliable information over many generations. It

combines the distributed associations for each corpus into one virtual association dynamically. Users can enjoy the unified association among the arbitral set of corpus to inspire themselves.

904 Tokyo Aquarian Booksellers Cooperative

"Nihon-No-Furuhon-Ya" (Old Japanese Book Shop System): search site for antique books

Tokyo Aquarian Booksellers Cooperative launched an antiquarian database in 1998, and this database has been appreciated ever since by researchers and book lovers nationwide. Now, the burning issue is how antiquarian bookshops with rich philological knowledge

can cooperate with the young generation, which can make full use of computers. "Nihon-No-Furuhon-Ya" is now in the process of development.

Hitotsubashi Memorial Hall/Conference Room

thu. June 11th Hitotsubashi Memorial Hall



Keynote Speech

Time 14 : 00 - 15 : 00
Lecture Hiroshi Ishii (Professor at MIT / Associate Director of Media Lab)
Theme "Unique, Collaborative, and Competitive Climate of Creation with Tangible Bits"



Keynote Speech

Time 16 : 00 - 17 : 00
Lecture Noriko Arai (Professor at NII)
Theme "If it would be useless, it wouldn't be Mathematics!!"



Public Lecture

Time 19 : 00 - 20 : 30
Lecture Nobukazu Yoshioka (Associate Professor at NII)
Theme "Security with Computers: How do We Develop Attack-Resilient Softwares?"

fri. June 12th Hitotsubashi Memorial Hall



Keynote Speech

Time 11 : 00 - 12 : 00
Lecture Yukihiro Matsumoto (Fellow at Network Applied Communication Laboratory and Rakuten Institute of Technology / Chairperson of Ruby Association)
Theme "Message from Ruby; as an open source language."

