

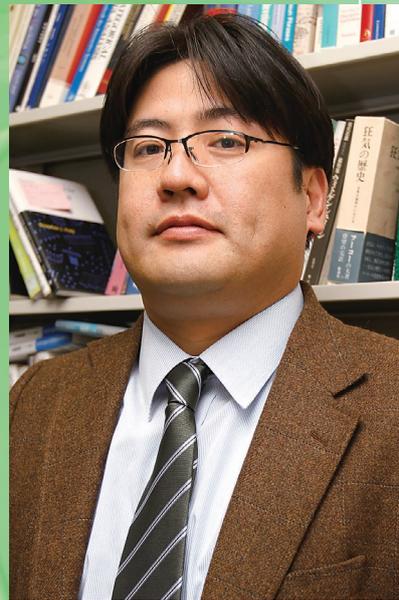
National Institute of Information and Communications Technology

Leadoff Interview

The World of an Auto-Evolutional Typed "Concept Dictionary" Covering 250 Million Words

Meanings of large numbers of words and their
 respective relations, which create a word
 spiral leading to new solutions and discoveries

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The World of an Auto-Evolutional Typed “Concept Dictionary” Covering 250 Million Words

Kentaro Torisawa

Group Leader, MASTAR Project, Language Infrastructure Group
Knowledge Creating Communication Research Center

He graduated from the University of Tokyo in 1992 (BSc in Computer Science). After receiving MSc in Computer Science from Graduate School of Science, the University of Tokyo, He became a research associate in the same school in 1995. In 2001, He was appointed Associate Professor in School

of Information Science, Japan Advanced Institute of Science and Technology. From 2008, he has engaged as Group Leader of Language Infrastructure Group in NICT's MASTAR project. He also holds an additional post as Professor at the Keihanna Joint Graduate School. Doctor of Science

Creating a dictionary — it's like dipping up an endless sea of words. The work is boundless, but new possibilities are coming to light through text processing by using powerful machines.

Gathering huge volumes of words and analyzing them as data are very important

What sort of research is being done currently in your projects?

Torisawa: Currently, we are working as a research group in the MASTAR Project, which is a five year project aiming at being a global hub for the speech and text processing research in the field of natural language processing, machine translation and speech processing. Within the project there are three groups. The first is the Spoken Language Communication Group, which conducts research on topics including speech recognition, spoken dialog systems and ubiquitous interfaces. The second is the Language Translation Group, which focuses on machine translation. The third is the Language Infrastructure Group, which is my group. We perform very basic research in the Natural language processing, with the goal of building "language resources."

With the MASTAR Project, we are striving to create a global center for research and development related to speech and language resources.

Could you describe further what you mean by "Language Resources"?

Torisawa: The term "Language Resource" refers to two main types of data. The first type of data is a collection of text written by actual people, called a "corpus" (pl. "corpora"). The second are so-called "dictionaries." In the language processing field, this refers to a great variety of dictionaries that you would not be able to find in a regular bookstore.

Use of corpora is relatively new in language processing. Language is an extremely complex topic, but until about the beginning of the 1990s, it was thought that language processing tasks could be accomplished

adequately by writing programs, and that much effort went into writing such programs, but, this effort did not lead to practical systems.

However, people began to notice an approach that was able to handle this complexity: that of using the statistical properties of large volumes of data. They showed that processing text data, or corpora, statistically, lead to various new and interesting possibilities.

So did that initiate the collection of large volumes of text and language?

Torisawa: Yes, but at the beginning of the 1990s, the large volumes of data, or corpora, required to get the statistical data were not available. People gradually began to create them, however, and it became clear that the statistical approach could rather improve the capabilities of language processing.

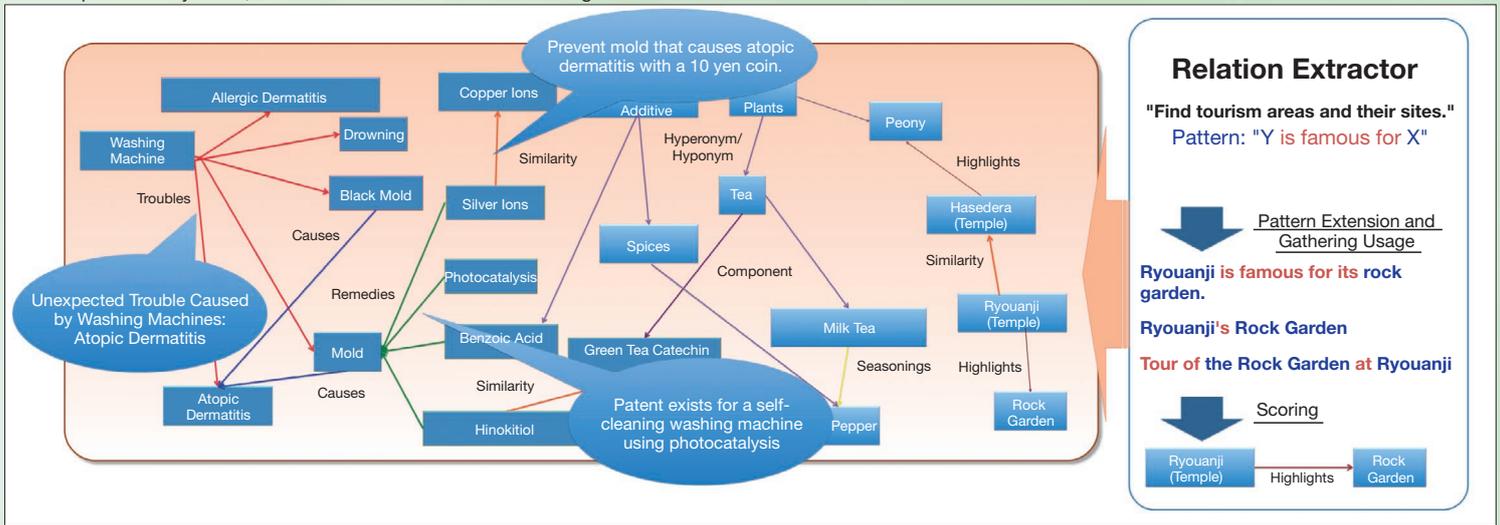
How were these large volumes of data gathered?

Torisawa: At the beginning, we received tens of years' worth of newspaper data from newspaper companies inexpensively and used them as our research corpora, but since around 2000, the Web has been available, making it easy to obtain incomparably more data. Corpora are processed statistically, so generally the bigger, the better and it became very important to make corpora from web content. These corpora have enabled us to do a variety of interesting things.

Can you tell us a bit what sort of language resources you have developed more specifically?

Torisawa: There are three main types of language resource. The first is the "Bilingual Corpus," which is used to improve machine translation. Using the technology being researched by our colleague group, Language Translation Group, as an example, it can use statistical analysis of corpora to automatically learn how to translate and be able to translate between multiple languages. Bilingual corpora are needed for this statistical processing. We are creating bilingual corpora together with Language Translation Group and providing them to the industry.

The second type of language resource which we are energetically pursuing at the moment is the "Concept Dictionary," which is a very promising and useful



resource for new language services and tools. These two, together with the "Speech/Language Corpus" as a combined corpus being developed by Spoken Language Communication Group, which incorporates both speech and text data, makes a total of three types of language resources. We are providing these to everyone in the shared area of ALAGIN (*), and our intention is that general industry will be able to start commercial services by using them.

A "Concept Dictionary" with two million entries, far surpassing the knowledge of any individual

Could you describe further what you mean by a "Concept Dictionary"?

Torisawa: Simply saying, the dictionary records the semantic relations among huge numbers of words. From one perspective, a dictionary like the one we are currently building can contain knowledge far surpassing that of any individual.

We are not writing this Concept Dictionary ourselves, but it is being created automatically by using super computers grinding away at text data found on the Website. The technology that accomplishes this is our offering strength. Koujien (a famous Japanese Dictionary) has around 250,000 entries, but our dictionary currently covers about two million—about eight times that of Koujien. We have set a goal of 2.5 million words and hope to complete the process in the next three years.

2.5 million words is a little beyond our imagination...

Torisawa: As an example, by entering the word "washing machine" in a Concept Dictionary browser, we can display troubles people have experienced related to washing machines. Problems like "water leak," "lint," and "soap scum" appear, quickly broadening to words like "atopic syndrome." Initially, I did not know how these were related, but the Concept Dictionary

is linked directly to a Website search engine, so by investigating each of them, we easily find that apparently mold in washing machines can be an allergen. Then, investigating words for causes of atopic syndrome in the concept dictionary leads to words such as "flat mite," "formaldehyde," "heavy metals," and "house dust." "Mold" also appears here.

Next, looking for remedies for mold in the concept dictionary, we find obvious items such as "cleaning" and "tidiness" as well as unexpected items like "silver ion" and "Hinokitiol." Surely only an extremely small number of people would have knowledge of all of these concepts related to the keyword "washing machine." This is the sense we mean in saying that the data in the concept dictionary far exceeds that of any individual.

The topics certainly continue to expand into unexpected areas!

Torisawa: If I was a developer at a washing machine manufacturer, I might be drawn to the connection between hinokitiol and disinfecting effect. Or I might follow up on the fact that "silver ion" came up. A similar key word, "copper ion," also appears. Then, when searching with the keywords "washing machine," "mold," "atopic syndrome" and "copper ion," we find a bit of homemaking wisdom on a chat site for housewives indicating that "placing a 10 yen copper coin in the lint net of a washing machine can prevent mold from forming." This sort of thing could be used in the development of new products.

Or, when developing a new product for instance, this could be an effective strategy for comprehensively avoiding all faults and troubles found in the existing products. Till now, however, the only way to enumerate the faults and troubles with the existing products was based on the past experience of someone with long experience in the field. But the concept dictionary contains a relatively comprehensive list of faults, including ways to resolve them, from product information on the Website. Used as a starting point, we believe that this should be able to accelerate the creative part of developing new products.

(*) ALAGIN - Advanced Language Information Forum. President: Junichi Tsujii, Professor, the University of Tokyo. A forum initiated in March, 2009 with starting the MASTAR project, to promote the spreading and deploying R&D and related results through collaboration among industry, academia and government. Its goal is to promote "Super Communication Technology" that will enable communication without the barriers of language. Currently the forum has participation from nearly 70 companies and 80 university-related members.

So, you think that various solutions and new ideas can be found by expanding from a single key word, don't you?

Torisawa: The Website is full of unexpected information that could possibly turn out to be useful. One of the problems with regular search engines is that they focus on measures of popularity and that users rarely look at more or less the first ten items. That is why it is difficult to make progress with a search like "washing machine for combating atopic syndrome." However, with the concept dictionary, a digest of the information on the Website is presented, making it relatively easy to find information, whether or not you knew that such information existed.

200 thousand items extracted from 200 million blog entries in recipe search

Is this Concept Dictionary already in use?

Torisawa: Yes. We have contracted some research from Nifty Corp. and one of the projects is the operation of a site called "@nifty Onsen," providing information on hot-spring resorts. Another project is called "@nifty

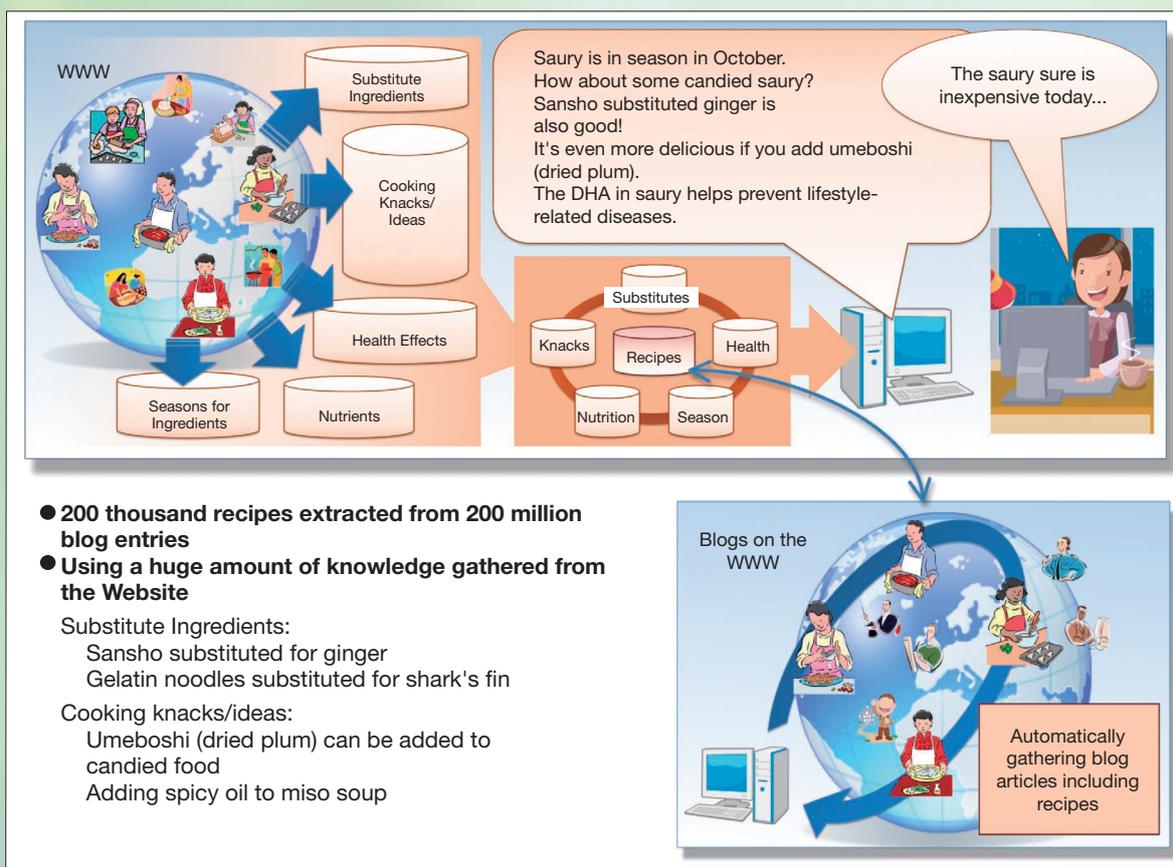
Recipe Search," which is still in beta version.

For the @nifty Onsen site, a dictionary analyzing and classifying a variety of word-of-mouth information posted on sites about the resorts is needed. For example, there is a lot of specialized terminology, such as sodium-hydrogen carbonate, neutral hot springs, and various words related to the cuisine served at each resort, and our dictionary is used to classify these words.

For the recipe-search site, the contribution base site is very popular for submissions, so our dictionary does not need to wait for new postings, and can gather recipes automatically from the existing blog entries. Currently we have about 200 thousand recipes gathered from about 200 million blog entries and we are building a system that can search these recipes.

We have also added additional suggestions from the concept dictionary that people would not normally be aware of to make cooking more interesting. Examples include substituting gelatin noodles for shark's fin, or adding hot spicy oil to miso soup to give it a miso-ramen flavor.

We also provide more than simple recipe searches, allowing for other factors like "food for sensitivity to chills," "soup good for the skin," or "Italian food



● Recipe Search Architecture



● Partial Screen Shot of @nifty Everyone's Recipe Search-Beta Version

good for the metabolism." As an example, if the words "sensitivity to chills" do not appear in any of the collected recipe data, a regular search would simply return "no hits." Our technology would find the relationship that "garlic is good for sensitivity to chills" and use it to recommend recipes containing garlic.

This type of data about relationships accumulates quickly, doesn't it?

Torisawa: One of the strengths of our technology is that it establishes relationships such as "A is effective against B" between words A and B. Once this type of relationship is established, the technology can find many other words with this type of relationship quickly and automatically from the large amount of text on the Website.

Through this process, the system is also able to automatically recognize that, for example, the pattern "A is effective against B" has the same meaning as "Using A to avoid B." We call these types of patterns that have the same meaning "paraphrases," and being able to recognize them automatically was only a dream as recently as the 1990s. But, to some extent, we are now able to do this. This is one of the exciting areas of our research.

So, by gathering huge volumes of material and analyzing it statistically to extract patterns, it becomes even easier to gather large volumes of material, doesn't it?

Torisawa: Yes, that's right. We are able to quickly create a positive spiral. We are currently operating with 50 million Web pages, but we plan on increasing this to 600 million pages within this fiscal year. Also, it currently takes about one hour to acquire one of these relationships, and we plan to reduce this to about 30 minutes. This can be used through ALAGIN, and we are conducting promotional activities every day.

Promising creation of high-level robots

Does this mean you are creating a program to recognize a type of pattern?

Torisawa: Our research enters the area of word semantics, which is one level higher than regular keyword search.

We have absolutely no intention that the dictionary is the final step, but in cooperation with other groups in MASTAR, we foresee an age, for example, when a robot could listen in on conversations in the home and possibly add helpful comments when appropriate.

A robot could recognize that the parents in a household were worrying about their child's atopic dermatitis. Then, if the parents began talking about replacing their washing machine, the robot could remind them that there is a relationship between mold and atopic dermatitis, and advise them to buy a product that

takes measures to prevent mold. The robot would possess common knowledge that the parents may not.

Does this mean that extracting the relationships within language resources is similar to thinking, and could lead to robots with high-level capabilities?

Torisawa: The Website is the largest repository of information in the world, but because it is not organized, we cannot really call it knowledge. However, our technology is organizing this information, turning it into something that could be called knowledge. I believe that we are approaching a time when we will be able to ask questions of such a Concept Dictionary and get many of the answers we need.

Is this Concept Dictionary only available in Japanese?

Torisawa: We also have a machine translation group, so we should be able to handle other languages by working with them as well. Doing so will allow us to quickly obtain all of the world's information. As an example, recently there was discussion on the Website about "fingers getting pinched in strollers" but there was a time lag before it reached Japan. It was not recognized as a problem in Japan even though it was in the U.S.A. It would be very beneficial for companies and others to be able to obtain this sort of information before it was general knowledge, so there is a need to create a foreign language version as well.

Your database will continue to grow, so it seems that in this way, we should be able to build a language-resource base of global scale in Japan.

Torisawa: Yes, that's right. We are now one and a half years into the MASTAR project's five year plan. I believe that we will have reached that state in another three years. As well, we look forward to seeing what sorts of services industry will come up with, using the results of this research and development. Probably, we are to see things that are unimaginable now.

Thank you very much for speaking with us today.



Building a well-coordinated interface connecting people and computers

Research Uniting Verbal Expression and Non-verbal Expression Such as Gestures and Body Language

● Profile ●



Hideki Kashioka

**Research Manager, Spoken Language Communication Group
MASTAR Project, Knowledge Creating Communication Research Center**

Completed a doctorate from the Osaka University Graduate School of Engineering Science in 1993 before joining the Advanced Telecommunications Research Institute International (ATR). Transferred to NICT in April 2006, left ATR in March 2009, and at current employer since April of that year. Associate Professor, Nara Institute of Science and Technology. Doctor of Engineering.



Future verbal interaction systems overcoming the boundaries of language

For a long time, science fiction has been depicting smooth conversation between humans and robots. MASTAR Project, at Knowledge Creating Communication Research Center in Keihanna Research Laboratories, has been making steady progress towards realizing it. Spoken Language Communication Group, which is one of groups composed for the project, is advancing research and development on natural language communication which will realize smooth communication between humans and computers.

There are four research teams in the group, including Speech Recognition, Speech Synthesis, Spoken Dialog System and System Integration. Hideki Kashioka is the Research Manager (hereafter, RM) of the Spoken Dialog System team. He is advancing work on future conversation systems that will enable verbal interaction, regardless of who, when, where, how is being expressed, or what language is being spoken.

"When two people converse, it is relatively easy to determine the meaning, even if it is not all put into words, if aspects such as intonation, body language, hand gestures, and timing of utterances are used, taken into account. Our goal is to achieve smooth communication between computers and humans by combining this non-verbal language with verbal language."

For well coordinated verbal interaction, it is vital to align the participants in various ways, such as

through the timing of nods and confirming words, with superficialities such as word choice or polite language, to control the pace of the conversation through order and confirmation of information provision, and to align shared beliefs through shared topics and knowledge. For learning these sorts of behaviors, it can provide a shortcut to copy human conversation.

Using tour guiding in Kyoto as a textbook

"We used tour guiding in Kyoto as a model, and collected data from the conversation between professional tour guides and users while making plans for half or full-day site-seeing tours in Kyoto. We recorded 100, 30-minute conversations during meetings as well as 60 conversations in cases other than meetings. Based on data obtained from it, we change state due to the characteristics of input and output for the system, and control the conversation."

In order to build a system capable of natural, well-coordinated verbal communications on a near-human level, additional statistically-based conversation control is needed. For this, we needed to create a large-scale tagged verbal interaction corpus. A corpus is a collection of language materials in electronic form, gathered for a purpose such as language research, with tags associated with each word.

"Two types of tag are allocated in the corpus. Speech act tags are used to describe the function of an utterance in a variety of ways. Semantic act tags are used

to describe utterances using differing expressions as uniformly as possible. Both perspectives are required in order to describe the flow of a natural conversation."

Artificially created conversation scenarios and those learned from the corpus complement each other, and enable conversation that is closer to a "human-to-human" conversation.

Experiments with two types of prototype

Dr. Kashioka as Research Manager and his colleagues are currently conducting experiments by using two verbal interaction systems of both a mobile and a large-screen. If a question like "Where is Kinkakuji?" (Golden Pavilion) is asked while facing the system, it responds immediately with information on the history of Rokuonji/Kinkakuji and a map with directions. The 50-inch large-screen verbal interaction system is particularly amazing, equipped with three tracking microohm-cameras and a directional microphone that follow the user's voice, line-of-site, and motions. It immediately evaluates what the user is interested in and displays related information.

"Various technologies are needed for conversation with a machine, such as multi-modal coordinated-verbal-interaction technology centered on voice, voice recognition and synthesis technology able to understand anyone regardless of the expressions used, user customization technology able to remember the language of individual users, and multi-language language processing technology. By using the two prototypes, we are currently conducting experiments to investigate how best to use these technologies."

Verbal interaction was Dr. Kashioka's research area when he graduated from university, and since then he has consistently pursued research in natural and verbal language processing, and in particular, statistical analysis and speech translation. He says this is founded on the hope that "if people and machines could converse well, it would enable an extremely wide range of new possibilities!" On the other hand, of himself he says "I've never been very good at conversation myself, and when I go to class reunions, classmates always tell me, 'All you ever do is listen, speak up more!'" (smiling).

A system to complement, rather than replace people

According to Dr. Kashioka's own reflections, "Many researchers select research topics from among things that they view negatively in themselves. Translation researchers might have a complex about their English, for example... Maybe that is why I chose conversation as my research area."

In that light, Dr. Kashioka says that one theme in his dream for the future is to have conversations between systems.

"Currently, on networks between computers, systems exchange information by using protocols that humans

cannot understand. Rather, let's have them speak to each other so that people listening in could understand to some extent. Then, they could contribute input in areas that computers are poor at, such as creative innovation. This would lead to interesting new ideas that would never occur just between computers."

Some people fear that if we enter an age when humans and robots (computers) can converse, soon conversation skills between people will decline. Of this Dr. Kashioka says:

"I believe people ultimately do not need spoken dialog systems that exceed human skill, but rather, systems that complement it. For example, people tend to avoid things that are not prepared for, and may choose not to meet the challenge. When this happens in the research world particularly, it can be a problem. If a computer could step in at those times and say "this needs to be taken care of—a system that could prop up communication between people—that would be ideal."

Here at Keihanna, we are making steady progress in research on systems to provide the ultimate in voice interaction between humans and machines—more human than between humans.



Dr. Kashioka with the mobile spoken dialog system. Behind him is the 50-inch large-screen voice interaction system.

“The 2nd Japan-EU Symposium on the New Generation Network”

— Strengthening Japan-EU Cooperation for Realizing the New Generation Network —

Tetsuo Aoki,

Strategic Promotion Office for New-Generation Network R&D,
Strategic Planning Department

2nd Japan-EU Symposium on the "New Generation Network" and the "Future Internet" was held by NICT in cooperation with the European Commission.

- Date: October 13 (Tue) and 14 (Wed), 2009
- Venue: Bellesalle Kudan, Tokyo
- Participants: 212 (Japan: 158, Europe: 54)
- Organized by: NICT and European Commission

"New Generation Network" refers to research and development being done in Japan and the EU towards a network more advanced than the so-called Next-Generation Network (NGN). In Europe, it is also called the "Future Internet."

This symposium was held again after last year in Belgium, and was attended by many participants working on the New-Generation Network. In the opening session, Hideo Miyahara, President of NICT gave a welcoming address, followed by a presentation of the ICT vision of Japan's Ministry of Internal Affairs and Communications (MIC) by Masataka Kawauchi, the Director General for International and Technology Policy Coordination of MIC, and then followed by a keynote address by Antti Peltomäki, the Deputy Director-General of the European Commission Information Society and Media Directorate-General, on the strategy for research and development on New-Generation Networks in Europe from 2010 onward. Later, sessions on 12 different themes were held over a two-day period, prompting lively discussion.

The Strategic Promotion Office for New-Generation Network R&D at NICT is creating strategies for technology and for promoting research, with the objective of strategic advancement of R&D for the New-Generation Network in an environment of international competition and cooperation. In particular, the progress made in joint programs with Europe is considered to be important in order to prevent the technology from becoming a technical "Galapagos Island." In the future, we will accelerate our joint research based on the discussion at this symposium, with the goals of promoting Japan's competitiveness and building NICT's presence within the world networking industries.



Closing Session

Keynote Address by Antti Peltomäki,
EU Commission Deputy-DG

Prize Winner ● **Hiroshi Harada** Group Leader, Ubiquitous Mobile Communication Group, New Generation Wireless Communications Research Center

Joint Prize Winners: Kazunori Takeuchi (KDDI Laboratories Ltd.)
Seishi Hanaoka (Hitachi Ltd.)
Toshiyuki Kuze (Mitsubishi Electric Corp.)
Sadao Obana (ATR)

◎DATE: 6.8.2009

◎NAME OF THE PRIZE: Meritorious Award on Radio Wave

◎DETAILS OF THE PRIZE: For a major contribution to the improvement of frequency utilization efficiency through conducting research and development on cognitive radio technology, and establishing a fundamental technology on it

◎NAME OF THE GROUP: Association of Radio Industries and Businesses

◎Comments by the Winner:

This was a national, basic research project conducted from 2005 to 2008, and the first in Japan on cognitive radio systems, and I am very happy to see the results being recognized in this way. In the future, I plan to continue research and development on this system, towards its standardization and putting it to practical use. I will continue these activities domestically and internationally as a leading laboratory for research and development in this field.



Prize Winner ● **Nobuyuki Kataoka** Researcher, Photonic Network Group, New Generation Network Research Center
● **Naoya Wada** Group Leader, Photonic Network Group, New Generation Network Research Center

Joint Prize Winners:
Kenichi Kitayama (Osaka University Graduate School)
Yoshihiro Terada, Akira Sakamoto (Fujikura Ltd.)
Akira Himeno, Takashi Saida, Shinichi Tsuda (NTT Electronics Corp.)

◎DATE: 7.23.2009

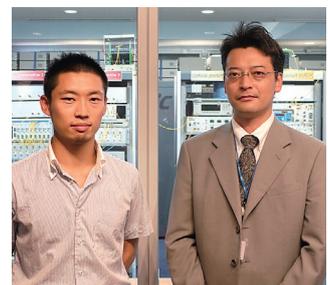
◎NAME OF THE PRIZE: Fuji Sankei Business Award

◎DETAILS OF THE PRIZE: Study on optical code division multiple access techniques

◎NAME OF THE GROUP: FujiSankei Business i

◎Comments by the Winner:

In this research, through collaboration between industry, academia and government, we completed everything from designing devices and systems to developing and prototyping them to realize optical code division multiple access technology to enable high-speed, high-capacity access systems. We are very much honored that the results of this research are being recognized in this way. We plan to strengthen ties between industry, academia and government, and continue this research towards realization.



Prize Winner ● **Taiichiro Kurita** Group Leader, 3D Spatial Image and Sound Group, Universal Media Research Center

◎DATE: 9.24.2009

◎NAME OF THE PRIZE: Commendation for Contribution to Technology Development

◎DETAILS OF THE PRIZE: For Contribution to Technology Development and Specially Recognized Achievement

◎NAME OF THE GROUP: Governor of Tokyo (The Tokyo Metropolitan Area)

(This prize is in recognition of research results from the prize winner's previous working place, NHK Science & Technology Research Laboratories.)

◎Comments by the Winner:

I am very much honored that our research and development work on technology to improve the image quality of thin-screen televisions is being recognized and officially commended for it at this time. It was an excellent experience working on development of the first Hi-Vision plasma television receiver for the Winter Olympics in Nagano as well as the first 3D Hi-Vision plasma display. The research on deterioration of motion quality on LCD displays and ways to improve it, which is related to improving the image quality of current LCD televisions, has also received favorable recognition globally. My parents are very pleased with this recognition, and I am very happy to have been able to make them proud.



Prize Winner ● **Yasusada Ohta** Former Senior Researcher, Atomic Standards Laboratory, Standard Measurement Department, Communications Research Laboratory of Ministry of Posts and Telecommunications

◎DATE: 10.21.2009

◎NAME OF THE PRIZE: Radio Engineering & Electronics Association Award

◎DETAILS OF THE PRIZE: Contribution to the Improvement of the Accuracy of Japan Standard Time through Development of Hydrogen-Maser Atomic Clocks

◎NAME OF THE GROUP: Radio Engineering & Electronics Association

◎Comments by the Winner:

We originally began development of hydrogen-maser atomic clocks as a primary-frequency-standard device. We have been able to contribute to increasing the accuracy of Japan Standard Time (JST) by establishing the automatic resonator tuning method and operating the clocks continuously for several years as ultra-high-stability frequency-standard devices. This has also contributed to International Atomic Time (TAI) and Coordinated Universal Time (UTC), which are regulated by the Bureau International des Poids et Mesures (BIPM). We also conducted research and development on a self-tuning maser that was able to operate continuously and independently and an ultra-compact hydrogen maser for installation on satellites. These achievements were only possible through the guidance and cooperation of many people over many years, and I could not be more happy or thankful that they are being recognized at this time.



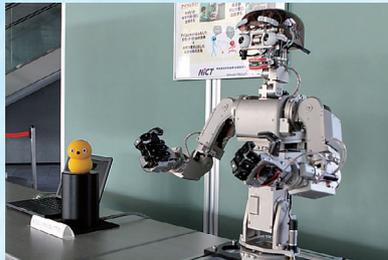
"Keihanna Information and Commu

— Research Aiming for the Future from Keihanna Scientific

Thirty minutes on the Kintetsu line from the Kyoto bullet train station and fifteen minutes on a bus from the Shinhosono station to Keihanna Scientific and Academic City, where we, information and communications research facilities gathered together and held the "Keihanna Information and Communications Research Fair 2009." A shuttle operated from the Shinhosono station during the event, and the facilities were open for tours, which are not usually possible to visit. Many families with small children could be seen there. At three NICT venues: NICT Keihanna, the Advanced Telecommunications Research Institute (ATR) and Keihanna Plaza, events for children were held, introducing the latest research in information and communications through presentations and exhibitions.

1st and 2nd Floors of NICT Building

At the first-floor entrance to NICT, we exhibited a 3D monitor and robots that follow and respond to a user's eyes: Keepon and a stuffed-toy, and Infanoid. In the children's workshop, on the second floor, children made simple speakers by using plastic and enamel string. They enjoyed talking and listening to the speakers, and asked questions with great curiosity, such as "If we use two speakers, will the sound become 3D?"



Keepon (left) and Infanoid (right)



External View of the NICT Keihanna Building



Making Speakers in the Children's Workshop

3rd Floor: Ubiquitous Home Of NICT Building

An "Ubiquitous Home" with retinal-scan access was exhibited. Various operations within the home, such as turning on the air conditioner or the television, could be done through interacting with an interface robot called "Phyno." Phyno was given a cute, childlike voice to help reduce user stress in cases, for example, when a request might not be carried out properly. The kitchen was also particularly popular with the female visitors.



Being Met by Phyno at the Entrance



"I just turned on the TV!" Answers Phyno



The Next Panel Shown in Accordance with Recipe Proceeding

Communications Research Fair 2009"

and Academic City to Foster History and Culture —

November
5(Wed) to
7(Sat), 2009

ATR Building



Multi-Sensory Interaction System. A fragrance comes out when the user breaks the red balloon.

A system just announced on Wednesday, November 4, and capable of virtual interaction by using four senses (sight, hearing, smell and touch) was exhibited for the first time and attracted much attention from a group of reporters. Also in the "Grasping" hands-on corner, visitors could see and experience a compact kinesthetic device that allowed them to feel elements such as textures and force regulation with virtual objects.

In the 3D display able to see without glasses, visitors could view high-resolution 3D images. While previous showings of this technology were only possible in a darkened room, in this showing, viewing in a much brighter location was possible. Many visitors enjoyed the 3D images, changing with different viewpoints. The audio-acoustic research group also had a display allowing visitors to listen to audio adjusted for various ear shapes. As for listening to the customized acoustics, people gave comments such as, "Even though I'm listening with headphones, it feels like that someone is actually whispering just behind me..."



Visitors Lining Up for a Hands-on Exhibit



Experience of "Grasping" by Using the Compact Kinesthetic Device



"Jaws" of 3D Images Seen without Glasses

Keihanna Plaza Building

On the first floor, during the event, we showed exhibits including multi-lingual speech-to-speech translation from the Knowledge Creating Communication Research Center, as well as high-definition images of the total solar eclipse observed in July, 2009.

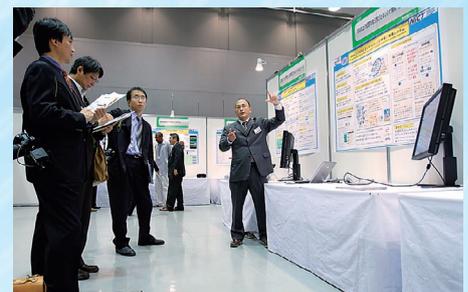
On the second day, November 6 (Fri), 13 research presentations (four from the Universal Media Research Center and nine from the Knowledge Creating Communication Research Center) were also given in two halls at the same time. There was much discussion among university students gathered in front of the program board, as they couldn't decide instantly which of the many interesting presentations to attend.



Sento-kun also attended and was popular for photos and hand-shakes (Mascot for the 1300-year anniversary of moving the Capital City to Nara).



Voice Interaction Technology for Lifestyle-Support Robots



Exhibits of Knowledge Creating Communication Research Center

◇ Nano ICT Symposium

Date: February 19 (Fri), 2010
10:00-16:30

Venue: Tokyo Big Sight
"Conference Room 102"
Conference Tower-1st Floor

Organized by: National Institute
of Information and
Communications Technology
(NICT)



International Nanotechnology
Exhibition & Conference

nano tech 2010

Date: February 17 (Wed) - 19 (Fri), 2010

Venue: East Halls 4, 5 and 6, Conference Tower,
Tokyo Big Sight

Organized by: nano tech Executive Committee

Concurrent: Nano-Bio Expo 2010

Exhibitions: nano & neo Functional Material 2010

Advanced Surface Technology
Exhibition & Conference (ASTECC) 2010

METEC '10, the 39th Surface Finishing
Exhibition

InterAqua 2010, International Water
Solution Exhibition

Preregistration for nano tech 2010 before entry is required for
admittance (free of charge).

<http://www.nanotechexpo.jp/>

Various details will be posted on the nano tech 2010 website as necessary.

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14th "Earthquake Recovery Technology Expo / Natural Disaster Recovery Technology Expo" in Yokohama

NICT will exhibit at the 14th "Earthquake Recovery Technology Expo / Natural Disaster Recovery Technology Expo" in Yokohama, which will be held on February 4th (Thu) and 5th (Fri) at Pacifico Yokohama. We will look forward to seeing all concerned.

◇ Organized by: 14th "Earthquake Recovery Technology Expo / Natural Disaster Recovery Technology Expo" in Yokohama Executive Committee

◇ Details: Exhibitions, Symposia, Seminars, Presentations on Disaster Recovery

※ Admittance is based on the same-day registration. Admission Fee: 1,000 yen (No charge with invitation)

<http://www.exhibitiontech.com/etec/yokohama.html>

Inquiries:

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Information for Readers

The next issue will feature interviews illustrating the close relationship between the fields of information and communications technology and biology, which appear utterly unrelated upon at first glance.

NICT NEWS No.387, December 2009

Published by
Public Relations Office, Strategic Planning Department,
National Institute of Information and Communications Technology
<NICT NEWS URL> <http://www.nict.go.jp/news/nict-news.html>

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