IEICE Communications Society GLOBAL NEWSLETTER *Vol. 26*
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Special report: Panel discussions in 2008 IEICE Society Conference

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Foreword from GNL Editors

This is a special report of four panel discussions sponsored or cosponsored by Communications Society in 2008 IEICE Society Conference held at Meiji University in Kawasaki-shi, Japan in this September.

Hot topics related to advanced communication technologies were extensively discussed by the experts together with the participants to explore not only the future of communications technologies but also the deployment of new systems and services.

The editors hope the GNL readers to enjoy this special report and to learn what were discussed in the panels in 2008 IEICE Society Conference.

1. ABP-1: Practical Use of Biometric Authentication for Systems Design

1.1. Introduction

The panel discussion concerning with the safety system design of the biometric authentication was held in co-sponsoring of Circuits And Systems (CAS) and the Biometric system Security (BS) society in the IEICE08 society conference on September 16, 2008.

The biometric authentication is a personal authentication technique for attesting a person accurately by using human body information on everybody, i.e. the fingerprint, the face, the vein, the iris, and so on. Moreover, from the viewpoint that we need not to memorize and carry, it is one of the features that convenience is high because it uses the verifying data on human body information.

In recent years, the high accuracy of the authentication is made the best use of not only the system with high security of ATM and immigration control, but also the convenient system as the access control system, so it is paid to attention with the practical use of system and is going to advance.

We were collaborated with the five panelists of the vender and user on the matter that had to be considered from the viewpoint as safety, complacency and convenience in the development and operation for the system and the device used in the biometric authentication, and discussed under the chair of **Dr. Seto** and the project charge of **Mr. Hatano** and **Mr. Ishihara**. The participants were about forty members.

1.2. Panel discussion

(1) **Mr. Hisao Ogata** of Hitachi-Omron Terminal Solutions explained the background applied to the financial ATM, and had the proposal about the significance of the system development that is based on the necessity of an objective accuracy assessment for the finger vein pattern recognition technology and the user's operation. Moreover, it was pointed out that it could not be accepted to the bank that the securing was not guaranteed, and also it was important that the significance of implementation as devices.

(2) **Mr. Takashi Shinzaki** of Fujitsu Laboratories had the explanation the problem in the designing a biometric technology for the development to the mobile devices such as PC and portable terminals after the introduction of a general biometric technology. A technical performance and the User Interface (UI) performance were important, and the significance of showing a real performance by the product of both was pointed out.

(3) **Mr. Masahiko Hosoya** of Panasonic explained the especially use for the electric access control system after the introduction about the iris recognition technology. The iris recognition technology is noncontact, and it is suitable for the management system of the access control of building or room. Moreover, it was pointed out that the access control system needed to have the scalability on the system architecture.

(4) **Dr. Masashi Une** of Institute for Monetary and Economic Studies, BOJ introduced the ideal way of the biometrics system in financial applications. It was pointed out that the ensuring the safety and biometric security was necessary and the clarification of an objective safety measure scale was an important point because the security was deteriorated with time in general.

(5) **Mr. Shuichi Ikeno** of SECOM introduced the ideal way of the design and the operation of a safety biometric authentication system from the viewpoint of the privacy protection. It was pointed that the system design and operation should be existed on the consideration with the biometric vulnerability as the risk for the invasion of privacy changed by the system design or operation.

(6) **Mr. Hiroshi Kimizuka** of Immigration Bureau, MOJ introduced about the operation situation of a biometric system in the airport. In operation with a public service system, it was pointed out that the purpose of development should be shown by the accountability including the user of citizen and foreign countries.

1.3. General Overview

The Biometric market in Japan formed to bring a balance such as social ID, mobile terminals, and financial ATM. To ensure more growing the market, it is necessary to develop the evaluation axis that objectively measures the evaluation and security in not only a technical performance but also user's standpoint, because we cannot ensure the complacency with only technical performance evaluation.

2. ABP-2: Requirements and Technical Issues for IMT-Advanced

2.1. Introduction

The number of subscribers in cellular systems in Japan exceeded one hundred million in May this year. Moreover, the volume of data traffic in cellular networks including downloads from databases, e-mailing, Web browsing, and on-line services is dramatically increasing compared to that for voice traffic. Hence, packet based radio access systems were standardized and developed to correspond to the changes in user traffic demand and to address the increasing volume of traffic per user. In the 3rd Generation Partnership Project (3GPP), High Speed Packet Access (HSPA) was enhanced by introducing higher order modulation and multiple-input multiple-output (MIMO) channel transmissions from the Release 6 specifications. Moreover, the work item (WI) specification on the Universal Mobile Telecommunications System (UMTS) Long-Term Evolution (LTE) called Evolved UMTS Terrestrial Radio Access (UTRA) and UMTS Terrestrial Radio Access Network (UTRAN) is to be finalized as Release 8 (Rel. 8 LTE) [2-1]. Rel. 8 LTE supports efficient packet-based radio access and radio access networks that provide full IP-based functionalities with low latency and low cost. Furthermore, in the 3rd Generation Partnership Project 2 (3GPP2), CDMA2000 1xEV-DO (Evolution Data Only) was enhanced by introducing techniques such as higher order modulation, a multicarrier approach, and MIMO channel transmissions to achieve higher capacity and positioning/location based service. In addition, the Ultra Mobile Broadband (UMB) radio interface was established, which will achieve a higher peak data rate than that for EV-DO by introducing Orthogonal Frequency Division Multiplexing (OFDM) based radio access as well as Rel. 8 LTE in the 3GPP [2-2]. Following the completion of the specifications for commercial equipment in the 3GPP and 3GPP2, the development of commercial equipment for IP based broadband packet radio access is to be started.

The frequency spectrum for International Mobile Telecommunications (IMT) -Advanced was decided at the World Radiocommunication Conference 2007 (WRC-07) by the International Telecommunication Union Radiocommunication sector (ITU-R) last November [2-3]. Although the overall frequency spectrum for IMT-Advanced was decided, the actual available frequency bandwidth is different according to each region or country. According to the decision on the available frequency spectrum outline, however, standardization of a radio interface started in the 3GPP. The requirements for LTE-Advanced were agreed in [2-4] and the radio interface techniques are currently under discussion. Moreover, the IEEE Standards Association (IEEE-SA) approved the start of a project on IEEE802.16m (Mobile WiMAX) aiming at the proposal of standard specifications for IMT-Advanced [2-5].

Following the decision on a new frequency spectrum for IMT-Advanced and the start of standardization discussion in the 3GPP, 3GPP2, and IEEE, a panel session on requirements and technical issues for IMT-Advanced was organized in a timely fashion to address the latest standardization status and to indicate the technical trends for IMT-Advanced. In this panel session, six panelists who are involved in standardization and R&D for IMT-Advanced were invited. The six panelists were **Mr. Yasushi Sakanaka**, Director for Land Mobile Communications of Ministry of Internal Affairs and Communications (MIC), **Mr. Seizo Onoe**, Senior Vice President, Managing Director of R&D Strategy Department of NTT DOCOMO, INC., **Mr. Norikazu Yamazaki**, Director of the Industry Relations Department, Emerging Technologies and Spectrum Division, KDDI Inc., **Dr. Hirohisa Yamaguchi**, Director R&D Headquarters of the Intel Corporation, **Prof. Fumiyuki Adachi** of Tohoku University, and **Prof. Hiroyuki Morikawa** of the University of Tokyo. In this panel session more than 90 audience members participated representing universities and the wireless industry.

2.2. Presentation and Discussion

First, the six panelists presented the latest standardization activities for IMT-Advanced in the 3GPP, 3GPP2, IEEE, and ITU-R, and key techniques for IMT-Advanced.

The first speaker was Mr. Onoe, who addressed the current status and activities for IMT-Advanced in the 3GPP. In his talk [2-8], he first overviewed Rel. 8 LTE, which was originally initiated as “Super 3G.” In the E-UTRA, scalable multiple transmission bandwidths are

specified from 1.4 to 20.0 MHz, in order to achieve flexible system deployment using a given spectrum. The radio access schemes are Orthogonal Frequency Division Multiple Access (OFDMA) in the downlink and Single-Carrier Frequency Division Multiple Access (SC-FDMA) in the uplink. He also addressed NTT DOCOMO's migration scenario from Rel. 8 LTE to IMT-Advanced. In the 3GPP, the evolution of Rel. 8 LTE called LTE-Advanced is under discussion as a radio access candidate for IMT-Advanced. Then, he explained the current status and standardization plan for LTE-Advanced. In the 3GPP, multiple access schemes, key techniques to be applied, major radio parameters, etc. will be decided during the study item (SI) specification discussion which should be completed by next fall. Then, the work item (WI) specification for commercial equipment will be discussed aiming at completion at the beginning of 2011. He also presented the system requirements, which were approved for LTE-Advanced. In addition to capability-related and system performance requirements, backward compatibility with Rel. 8 LTE is desired in LTE-Advanced. Finally, he briefly explained key radio access techniques such as support for a wider transmission bandwidth employing carrier aggregation, multiple access scheme candidates, MIMO channel transmissions, coordinated multi-point, i.e., cell site, transmission/reception, and relay techniques.

The second speaker was Mr. Yamazaki, who is responsible for 3GPP2 standardization in KDDI, and is now serving as the chair for TSG-5 (Service and System Aspects) in 3GPP2. In his talk [2-9], he first addressed the major features of the EV-DO enhancement called EV-DO Rev.A and EV-DO Rev.B, and Broadcast/Multicast Services (BCMCS). In EV-DO Rev.A, the peak data rate is increased to 3.1 and 1.8 Mbps in the downlink and uplink, respectively. Moreover, the peak data rate is further increased to 4.9 x N Mbps in the downlink and 1.8 x N Mbps in the uplink by introducing 64QAM modulation and a multicarrier approach with N carriers. In addition, IP based real-time services such as VoIP capability is supported based on Quality of Service (QoS) control. He also introduced key standardization issues such as inter-working with LTE and WiMAX and the application of 1xED-DO to femto-cells. He then explained the features of UMB, which corresponds to 3.9 G systems in 3GPP2. In UMB, scalable transmission bandwidths are supported from 1.25 to 20 MHz similar to that in Rel. 8 LTE in the 3GPP. The adopted radio access schemes are OFDMA in the downlink and OFDMA/CDMA in the uplink. He presented technical and performance comparisons of UMB to Rel. 8 LTE, Mobile WiMAX, etc. and future standardization plans including the issues facing IMT-Advanced in 3GPP2. Finally in his talk, he presented field trials using the implemented testbed for IMT-Advanced in the KDDI Laboratories.

The third speaker was Dr. Yamaguchi, who is responsible for standardization of Mobile WiMAX in the Intel Corporation. In his talk [2-10], he first presented the outlines for the IEEE802.16 specifications and mobile certification profiles. Then, he explained the mobile WiMAX roadmap. The specifications for 802.16m are currently under discussion with respect to complementing and modifying the 802.16-2004 specifications, in order to satisfy the requirements for IMT-Advanced. The 802.16m incorporates backward compatibility with the Rel. 1 specifications for the mobile system profile, which was specified by the WiMAX Forum. Moreover, the Rel. 2 specifications for the mobile system profile will be specified by the WiMAX Forum. The letter regarding voting on the 802.16m specifications will be completed in September 2009 and standardization on 802.16m will be finalized in March 2011. In the project on 802.16m, the System Requirement Document (SRD) and Evaluation Methodology Document (EMD) were specified in July this year. The System Description Document (SDD), which specifies the framework for the specifications, is under discussion in stage 2 of the investigation.

The fourth speaker was Mr. Sakanaka, who is responsible for standardization on IMT-Advanced in the ITU as a representative of Japan. In the famous van diagram in the ITU-R recommendation [2-6], the target peak data rate is specified as 100 Mbps in new mobile access with high mobility and 1 Gbps in new nomadic/local area wireless access with low mobility. At the Radiocommunication Assembly-2007 (RA-07) and WRC-07 held by the ITU-R in October and November last year, the future milestones and new frequency spectrum for IMT-Advanced were agreed. In his talk [2-7], he first addressed the decision issues at the meetings and future plans on standardization for IMT-Advanced in the ITU-R. To achieve high peak data rates, a wider frequency spectrum is necessary. In the WRC-07 meeting, the new frequency spectrum with the total of 428 MHz was approved: (1) 3400-3600 MHz (200-MHz bandwidth), (2) 2300-2400 MHz (100-MHz bandwidth), (3) 698-806 MHz (108-MHz bandwidth), and (4) 450-470 MHz (20-MHz bandwidth). He expressed that among the four frequency spectra, they are planning to promote the usage of the frequency spectrum of (1) and a part of (3) in Japan. He also explained the standardization plan for the IMT-Advanced radio interface aiming at completion in 2011. He then addressed the minimum system requirements for IMT-Advanced, which were approved at the 2nd Working Party 5D (WP5D) meeting held this past June. In regard to the strategies for IMT-Advanced in Japan, he introduced future plans on the frequency spectrum strategy in Japan, international cooperation with foreign standardization organizations, and collaboration research activities that the National Institute of Information and Communication Technology (NICT) is promoting. Finally, he explained the standardization activities for IMT-Advanced from

the viewpoints of technical investigations and radio interface standardization in the Association of Radio Industries and Businesses (ARIB).

From the view of academia, two distinguished professors gave informative talks regarding future technical directions and key techniques targeting radio access and networks [2-11], [2-12]. Prof. Adachi claimed that the most important technical issues facing IMT-Advanced are the further improvement of frequency efficiency (i.e., bits per second /Hz/base station) and the reduction in the required transmission power, to achieve the high peak data rates, which were specified in ITU-R recommendation in packet radio access. Then, Prof. Adachi explained the candidates for radio access schemes for IMT-Advanced. More specifically, he explained the principles and features of OFDMA, SC-FDMA using Discrete Fourier Transform (DFT)-Spread OFDM, and block spread Code Division Multiple Access (CDMA). Among these, the frequency domain equalizer is used for SC-FDMA and block spread CDMA. He also asserted that the MIMO channel transmission and distributed radio access networks are important techniques to solve the aforementioned two technical issues. Moreover, he showed that distributed antenna systems and multi-hop networks are promising for distributed radio access networks.

Finally, Prof. Morikawa addressed the future network structure for IMT-Advanced from the viewpoints of sensor networks, context, open NGN (Next Generation Network)/IMS (IP Multimedia Subsystem), and low-power radio communications. First, he defined Web2.0 as a system to achieve either a mechanism for collecting user content or for collecting action information. Then, he introduced service examples of the mechanism to collect user content, which constitutes overlay networks. To achieve the overlay network, authentication and flexible access control are necessary. He also introduced service examples of the mechanism to collect user action information and its requirements. He explained that the key functionalities offered in NGN/IMS are the authentication of access networks and the management of communication sessions. He introduced a testbed comprising open NGN/IMS, in which various services and applications are implemented including a sensing network, health monitoring, and a management system for power consumption. He also explained the necessity for low-power wireless communications, which is achieved through wireless communication technologies, computer architecture, device technologies, etc.

After the presentations by the six panelists, the panelists and participants discussed topics mainly focusing on the standardization status, future standardization plans in the 3GPP, 3GPP2, and IEEE, and key techniques applied to IMT-Advanced.

2.3. Conclusion

In this panel session, standardization activities for IMT-Advanced in the 3GPP, 3GPP2, and IEEE, and the corresponding requirements and technical issues were introduced and discussed. According to the future plans in the ITU-R, standardization activities will be accelerated in the respective organizations aiming at a proposal of a radio interface for IMT-Advanced submitted to the ITU-R. Simultaneously, key techniques in radio access and radio access networks will be developed for the purpose of IMT-Advanced.

Finally, I would like to express my appreciation to **Prof. M. Sawahashi** who has taken care of this panel session in all aspects.

2.4. References for section 2

[2-1] 3GPP, TS 36.201 (V8.1.0), “Evolved Universal Terrestrial Radio Access (E-UTRA); Long Term Evolution (LTE) physical layer; General description,” December 2007.

[2-2] 3GPP2, C.S0084-000-0 (V3.0), “Overview for Ultra Mobile Broadband (UMB) air interface specification,” August 2008.

[2-3] Final Acts WRC-07, Geneva, November 2007.

[2-4] 3GPP, TR36.913 (V8.0.0), “Requirements for further advancements for E-UTRA (LTE-Advanced),” June 2008.

[2-5] IEEE 802.16m-07/001, “Initial work plan for IEEE P802.16m draft & IMT-Advanced submission,” January 2007.

[2-6] S. Onoe, “Standardization activities for IMT-Advanced in 3GPP,” The 2008 IEICE Society Conference, ABP-2-2, Meiji University, March 19, 2008.

[2-7] N. Yamazaki, “Standardization activities for IMT-Advanced in 3GPP2,” The 2008 IEICE Society Conference, ABP-2-3, Meiji University, March 19, 2008.

[2-8] T. Shono, “IEEE’s standards development activities toward IMT-Advanced,” The 2008 IEICE Society Conference, ABP-2-4, Meiji University, March 19, 2008.

[2-9] ITU-R, M. 1645, “Framework and overall objectives of the future development of IMT-2000 and systems beyond IMT-2000,” June 2003.

[2-10] Y. Sakanaka, “Standardization activities on IMT-Advanced in ITU-R and Efforts of Japan,” The 2008 IEICE Society Conference, ABP-2-1, Meiji University, March 19, 2008.

[2-11] F. Adachi, “Technical issues of broadband wireless access for IMT-Advanced systems,” The 2008 IEICE Society Conference, ABP-2-5, Meiji University, March 19, 2008.

[2-12] H. Morikawa, “Research challenges in IMT-Advanced networks,” The 2008 IEICE Society Conference, ABP-2-6, Meiji University, March 19, 2008.

3. BP-1: SDR Front End and Evolvable Hardware for Cognitive Radio

This panel session was proposed by the technical committee on Software Radio and organized by **Prof.**

Yukitoshi Sanada of Keio University with helps from **Mr. T. Hamai** (KDDI R&D Labs.), **Mr. T. Kishi** (Toyota Info-Technology Center), and **Mr. T. Aoki** (Toshiba). It is focused on hardware technologies, especially on RF (radio frequency) frontend, implementing Cognitive Radio that is one of the most promising technologies for effective use of the radio spectrum resource. The aim is to discuss and make it clear what are required for the hardware implementation of Cognitive Radio (CR) or Software Defined Radio (SDR).

Six panellists including the moderator were invited and the session was held on the 18th September during the Society Conference. The research fields of the panellists are not limited in RF and evolvable circuits or devices, but include signal processing, MAC protocol and network technologies. This session consists of two parts. The first one is presentations by the panellists, and the second is the panel discussion.

3.1. Presentations by panellists

For the first, the moderator, **Dr. Makoto Taromaru** from ATR (Advanced Telecommunications Research Institute International) gave a presentation entitled "Overview of Cognitive Radio and Requirements to Wireless Terminals" as the introduction to this panel. He gave an overview of cognitive radio, that is classified into two categories: one is a network and its link/connection control system of aggregated or heterogeneous RANs (radio access networks), and the other is spectrum sharing techniques among two or more different radio systems. He showed that multiband and multimode transceivers are necessary for the former CR, and they are to be on SDR or reconfigurable radio techniques.

Fig. 1 Panellists of BP-1

Second presentation was "Development of Cognitive Radio Testbed for Dynamic Spectrum Access" by **Mr. Akira Yamaguchi** from KDDI R&D Labs. He introduced a CR test bed consisting of transportable base stations for a temporally radio access system in case of disaster. Each base station is connected to one another with multi-hop radio links using plural radio link standards, such as IEEE 802.16e, 802.11g, EV-DO cellular, and etc. The base stations monitor each frequency band for the radio link and recognise the radio resource environment, and determine the link standard and the direction of antenna beam with helps of Network Management Centre.

The third speaker was **Dr. Kentaro Nishimori** of NTT. He presented "Adaptive Array Technique for Reducing Co-channel Interference" where he presented adaptive array and MIMO techniques to cancel or reduce co-channel interferences that may be from the other systems sharing the same band. He introduced and compared various adaptive weight control criteria for combining signals from array elements, and pointed out that interferences from known systems can be processed with the criteria without using direction-of-arrival information.

Prof. Ken-ya Hashimoto from Chiba University made a presentation entitled "RF Front End for Wideband Software Defined Radio". He explained realistic architectures for wideband or multiband reconfigurable receivers and pointed out that it is difficult to realise a GHz-order sampling high-resolution A/D converter due to the jitter of sampling clock. Therefore, variable/tuneable RF filters are necessary but we haven't had good solutions yet. He showed some technologies for the solution, sampling mixer (RF direct sampling), recursive active filter (regenerative amplifier with resonator), and MEMS-switched piezoelectric resonators.

The next speaker was **Dr. Tetsuya Higuchi** from AIST (National Institute of Advanced Industrial Science and Technology). His presentation was entitled "Applications of Evolvable Hardware to Communications" where he introduced applications of GA: genetic algorithm to communication hardware design, compensation, and calibration. Especially for analogue circuits, which we have to adjust sometimes to make and maintain its processing/operation error little, the evolvable H/W with GA or another adaptive optimisation algorithm is a promising technology for radio signal processing and RF circuits in the near future.

The final presentation was "Signaling Function for Software Defined Cognitive Radio Terminals" by **Mr. Homare Murakami** of NICT (National Institute of Information and Communications Technology). He showed overview of "Cognitive Wireless Crowd", the heterogeneous network architecture of several RANs, and he emphasised that how to implement the common signalling channel and its protocol must be still studied for user-centric cognitive wireless access systems. He gave some examples, using dedicated radio frequency and signalling system, two-way pager system, and control channels or control packets over existing RANs composing the heterogeneous network.

3.2. Panel Discussion

After the presentations, the panellists and participants discussed topics about the hardware implementation of SDR, spectrum management or regulation, and other extensive topics about cognitive radio. On the recursive/regenerative amplifier for tuneable filter presented by Prof. Hahsimoto, it was commented that super-regenerative amplifier can also be used. About

radio resource regulation issue, an opinion was given that “Frequency Division” is not an only way to avoid interference among radio channels any more so the resource management should not stick only in frequency domain. It was also noted by a participant that the cognitive radio is originally intended to overlay the “primary systems” that are used scarcely or sparsely. Most cellular bands would not fall into them.

3.3. Concluding remarks

About 50 participants and the six panellists discussed the issue actively and earnestly. Several key points to implement the hardware or system for SRD and CR become clear through this panel session. Finally, the moderator would thank to all panellists and participants for their interesting presentations and worthwhile discussions.

4. BP-2: Potentials and Future of Medical Informatics

The development of the ubiquitous medical informatics in situations where "Medical treatment collapse" appears imminent is eagerly awaited. As a familiar example that is applied ICT to the medical treatment, the telemedicine, the electrical patient record (EPR), and the hospital information system, etc. are the main one. They are the extensions or the substitutions of a past medical treatment, and seem to have a lot of tendencies to develop an existing as much as possible system by applying it.

However, in order to fully realize the true potential of ICT in medical treatment and to construct new highly advanced models of medical treatment, it is necessary to consider whether the proposed advancements can further enhance medical treatment and whether they can be developed using the existing technology. The panel session was executed by the specialist's from both the technology and the medicine fields gathering, and presenting their opinions concerning present ICT. In this session, various approaches were discussed for the practical use of the current technology at the medical field.

4.1. The lecturer from panelists

1) **Dr. Hideo Kusuoka** (National Hospital Organization, Osaka National Hospital)

BP-2-1 ; From the Viewpoint of Medical Service Providers

It was reported that the preservation of transparency is important in the medical field. It has been noted that the inability to accurately record the data obtained during medical practice is one of the reasons for the lack of transparency in the medical field. It had the problem in diagnosis and treatment, and had the problem in how to preserve the data generated from the inspection etc. An easy retrieval function of the record of automatic information according to medical practice and the used data is expected in medical treatment ICT development. Individual treatment information can be shared at the same time, and the construction of the data system with reliable access to a necessary record is expected. Further, the electrical patient record (EPR) system developed by medical professionals should allow the recording of handwritten and picture information in addition to digital and collected data is essential.

2) **Ms Noriko Kondo** (Routeku Research Project, Local welfare commissioner of Yokohama City)

BP-2-2 ; “The needs of Medical ICT for the elderly, and how to popularize the new technology among them”

A health report system that can reduce the burden to the elderly and their caretakers is expected. Ms. Kondo pointed out the necessity to educate the elderly persons regarding the use of instruments such as the use of cellular phones for automatic transmission of mails for health promoting. A technical supporter for instructing users on the technological know how, similar to welfare commissioners, who can provide free local consultation is indispensable; further, research for the support and training of elderly by technically well-versed staff is required.

3) **Dr. Eisuke Hanada** (Shimane University Hospital)

BP-2-3 ; “The Viewpoint of Medical Information System Management”

The hospital information system (HIS) was initially introduced for calculating the medical-treatment fee and evaluating the purpose of the claim. The function has advanced to the assistance of the diagnosis and treatment and the transmission of the instruction. In addition, it has evolved to sharing acquisition, transmission, and information of living body information. Henceforth, it is expected that systems be developed for community medicine cooperation where cooperating organizations can avail of patient information and the communication via such systems be secure.

The following issues were highlighted regarding the use of medical informatics.

- Barrier to the introduction of ICT to medical centers: The approval of the Ministry of Health, Labour and Welfare is necessary for the commercialization of the equipment personally related to the medical practice like the inspection and treatment, etc. Time and money hang though the approval is obtained. It is necessary to examine bringing the equipment that obtains approval in the foreign country to Japan in. The approval of the ICT technology from the Ministry of Health, Labour and Welfare is basically unnecessary. However, might it be considered that it remodels when the ICT technology is added to medical equipment, and be needed approving.
- The accuracy of the data on body functions obtained from equipment: In the case when the patient or a family member uses the device, the doctor is faced with the question of trusting the results and their accuracy, and it also gives rise to the problems associated with the remote management of patients.

4) **Dr. Yoshio Nikawa** (Kokushikan University)

BP-2-4 ; From the Standpoint of Researcher in University

It was reported that a new education field that merges the medical practice and engineering appears. Medical students are interested in the association between medical informatics and engineering. Advancement in medical measurement technology indicated by the development of instruments for measuring the motion of the body and the effects of blood oxygen levels reflects the progress in medical informatics technology, and the close relation between these two areas of technology. The application of data communication systems employing ultra-wideband (UWB) facilitated data acquisition at the time of movement required for health. Moreover, high-speed transmission of images such as MRI images enables telediagnosis; thus, further education can be provided and advanced tests can be administered to students.

5) **Dr. Hidenori Shinoda** (Japan Association of Healthcare Information Systems Industry)

BP-2-5 ; "From Healthcare Information Industry's View Point"

The popularity of the EPR system which assists in medical examination remains stagnant at the stage. It was first introduced in large-scale hospitals, but there has been no further progress in its popularity.

The following are some of the reasons for this lack of widespread use.

-The device is expensive.

-Neither the items nor the place of the medical information displayed are standardized. It is necessary to develop the compatibility of the medical information system, and the user interface.

Recently, JAHIS began the business to verify the interoperability of the hospital information system and the business to promote the standardization of the medical information from the Ministry of Economy, Trade and Industry by the consignment aiming at solving the lack of doctor and the medical treatment at the patient center.

4.2. Panel discussion

1) About standardization of the EPR system

As for the world of the medical treatment in the region, the method is different according to the university. For instance, the writing of the prescription is different little by little, though it is not fundamentally different in each university that graduates. The pharmacist's understanding each recipe while noting it enough on the site of the medical treatment and judging it are the realities. The Ministry of Health, Labour and Welfare is examining the enactment of the writing of the recipe that exists in a global standard within 2-3 years in consideration of the medical safety.

There is a possibility of causing an accident when the method of handling the medical informatics system is different because the medical-internship system started, and the trainee doctor will be able to move to various hospitals freely. This problem has also been recognized at the level of hospitals. Efforts are also on to standardize the contents. Several only people understand the medical treatment of all types, and about the standardization of the medical jargon, how to work is different in each field of the medical treatment, and there is no uniformity at all. As for the standardization of name of a disease, the procedure that applies for medical insurance is made efficiency, too.

2) About the function of the EPR system

If it begins to use the EPR, it is not possible to part from the convenience of this system. There is a possibility of positively accepting EPR in the medical treatment site by the application of EPR being enhanced, being improved so that the input method may become easy, and being able continuously to use the application used by changing the system so far. Doctors feel inconvenience and stress for the ability of a picture not to be briefly entered in the present EPR system. The development of a technology which can simplify the input is necessary.

3) The contribution of ICT in aging society

A cellular phone is applicable to some extent. Information is shared between friends via a pedometer, thus increasing health awareness. Since the elderly comply with the instructions of doctors, the merits of using cellular phones should be explained to them by doctors. Moreover, the education of the elderly regarding the practical use of ICT and the development of systems that can be easily used by the elderly is essential.

4.3. Conclusions

Current problems of medical treatment ICT were able to be discussed.

The person who uses EPR is actually a medic. It differs in each medical treatment site that is flowing the method and the diagnosis and treatment of the medical treatment and is internal medicine department and surgical, etc. and there is no union by the hospital. It is necessary to examine standardization of the medical treatment term etc. and an application program, a filling in method of the electronic clinical record system, and an easy image input from such a current state further in the entire industry. The development of devices employing sensor technology with a security function using radio, such as automatic recording of biopsy data by the EPR system, is also expected. Such systems are also useful for the remote management of patients. Moreover, the system should enable the storage of a vast amount of medical data and the easy retrieval of required data.

The problem on the medical treatment site stood out in relief by this panel discussion. It is also true that there are a lot of problems in advancing standardization in the medical world of the current state. I think it is wonderful if IEICE promotes the standardization of technology and system.

Session Chairs/Organizers of the panels

ABP-1: Mr. Takahiro Hatano
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ABP-1: Prof. Yoichi Seto
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ABP-1: Mr. Takeshi Ishihara
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BP-2: Dr. Hachihei Kurematsu
National Institute of Information and Communications Technology

Report on Tutorial Lecture Session "New Communications Quality and Its Assessment Technology"



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1. Introduction

At the IEICE Society Conference held at Meiji University, a tutorial lecture session, BT-2 "New Communications Quality and Its Assessment Technology", was co-organized by the technical committee on Brain and Bio Communication (BBC) [1] and the technical committee on Communication Quality (CQ) [2] on September 17, 2008.

Recently user experience for info-communication service is considered as important to evaluate communication quality, which is related to human sense, brain activity, emotion, and so on. The aim of this session is to share the novel research results in these fields and to discuss new communication quality indexes and evaluation technologies from the viewpoint of comfortableness of communication.

This article reports an overview of the session.

2. Tutorial lectures

We invited five prominent lecturers for this tutorial lecture session. After Prof. Yutaka Ishibashi (Nagoya Institute of Technology) introduced circumstances surrounding new communication quality, the lecturers gave their talks. The lectures are summarized as follows.

BT-2-1: QoE from the Viewpoints of Perception and Behavior: Psychological Effects of Transmission Delay

Prof. Hitoshi Ohnishi (National Institute of Multimedia Education / the Graduate University of Advanced Studies)

Prof. Ohnishi introduced psychological effect of transmission delay on the performance of verbal conditioning. He explained that 300 milliseconds delay of reinforcement disturbed the conditioning and that meaningless words such like "Uh" decrease the effect on the conditioning. He also introduced psychological effect of transmission delay on haptic media. He showed that the delay of feed-back reduces the subjective impression of mass.

Fig. 1 Presentation by Prof. Ohnishi

BT-2-2: Measurement and Communication of Sensory-Motor Information: Request to QoS in Next Generation Network

Prof. Taro Maeda (Department of Bioinformatic Engineering, Graduate school of Information Science & Technology, Osaka University)

Prof. Maeda mentioned the importance of the last one meter of a communication channel toward a human, which transmits information between telecommunication devices and sense organs. Furthermore, delay-guaranteed type QoS can be considered as one of the major requirements for the next generation networks.

Fig. 2 Presentation by Prof. Maeda

BT-2-3: Activation of Autonomic Nervous System and its Application to Communications Science
Dr. Yasuto Tanaka (Miki Optical Institute, Paris Miki Inc. / NPO, Neurocreative Laboratory)

Dr. Tanaka presented that emotion was considered to be achieved by complex interactions between low-level physiological processes governed by an autonomic nervous system and high level cognitive processes governed by a central nervous system. He summarized the functional process to accomplish high-level emotion, namely subjective emotional feelings and their expression to other humans.

Fig. 3 Presentation by Dr. Tanaka

BT-2-4: Cognitive Neuroscience of Hearing and Emotion
Dr. Makio Kashino (NTT Communication Science Laboratories, NTT Corporation / ERATO SHIMOJO Implicit Brain Function Project, Japan Science and Technology Agency / Interdisciplinary Graduate School of Science and Engineering, Tokyo Institute of Technology)

Dr. Kashino introduced a scientific approach to tackle with issues on relationship between hearing and emotion. His presented approach consists of three major factors; 1) biological reaction to sound, 2) predicting coding of sound and 3) linkage between sense and motion. They are expected to contribute to evaluation of quality in media and communications.

Fig. 4 Presentation by Dr. Kashino

BT-2-5: Perception Mechanism of Surface Qualities
Dr. Isamu Motoyoshi (NTT Communication Science Laboratories, NTT Corporation)

Dr. Isamu Motoyoshi introduced that the perception of some surface qualities uses shallow and simple computations based on simple statistics or features in 2-dimensional images. He explained his recent analysis which demonstrates that the perceived lightness and glossiness of a natural surface strongly depend on skew in the luminance histogram of the image. Demonstrations are conducted, which showed a simple re-mapping of the image luminance can dramatically alter the perceived material.

Fig. 5 Presentation by Dr. Motoyoshi

3. Conclusion

After each talk, there were active and fruitful Q&A and short discussions between the lecturer and participants. At the end of this session, Dr. Hiroshige Takeichi (RIKEN) summarized the invited talks and the direction of communication quality assessment technology. It is expected to have further opportunities to share information of the state-of-the-art technologies in this area. Finally, co-organizers would like to express their appreciation to all lecturers and participants in this session.

4. Reference

http://www.ieice.org/cs/brain/
http://www.ieice.org/cs/cq/jpn/

Report on ICM English Sessions at 2008 IEICE Society Conference - Globalization of Tech Knowledge Share -

Yoshiyuki Takagi, Sun Microsystems
Hajime Nakamura, KDDI R&D Laboratories

1. Introduction – The Spirit of Globalization

The IEICE Communications Society held the Society Conference on September 16-18, 2008 at Ikuta Campus of Meiji University in Kanagawa. The technical committee on ICM (Information and Communication Management) planed and unfolded the following two English sessions at this conference.

- Symposium session: BS-12 "Network Planning, Control, and Management" by Organizer- Yoshiyuki Takagi
- Tutorial session: BT-3 "NGN Service in the era of IP Convergence" by Organizer- Hajime Nakamura

The former TM (Telecom Management) Committee has just changed its name to the ICM Committee in May 2008 to follow industry trends of convergence in networks and in IT/Communications. So, this is the first Society Conference after the change. TM had several experiences of English sessions in the past conferences, intending the knowledge share and active discussions for Japanese and foreign researchers, with a wish to contribute to the globalization of IEICE activity. The renamed new body, ICM , kept the spirit and organized the English Symposium and Tutorial sessions.

2. Symposium: Network Planning, Control, and Management

In this Symposium, we got thirty eight papers in total. And, we divided them into four-day, eleven sessions with very specialized chairperson to each session topic.

The topics are: Network Efficiency, Ad Hoc Network, Mobile Network Engineering, Overlay/P2P Network, Traffic Engineering, Network Planning, QoS, Video Quality Management, User Experience, etc.

We had session chairs, speakers and audiences both from academic and industry sides. One remarkable point was that lots of presentations and questions were from young university students, including those who are studying abroad. Very active Q&A and suggestive comments were observed. Also, they must have learned a lot from authorities of Tutorial speakers. Thus, I see our objective was achieved in more than the expected level.

Lastly, I do thank Dr. Yoshiaki Tanaka, the professor of Waseda University, who made a great contribution in call for papers, utilizing his nation-wide academic authority and human relations.

For more detail of each paper and is authors, refer to this URL; http://secure1.gakkai-web.net/gakkai/ieice/ ... … program2/html/program/bs_main.html#bs_12

3. Tutorial: NGN Service in the era of IP Convergence

The tutorial session was held between English Symposium sessions on September 18. There were three invited talks by distinguished experts in the areas related to NGN service technology. The lecturers made valuable and interesting presentations with fruitful Q&A and short discussions from global viewpoints.

The first talk is BT-3-1 "Missing Links among Technology, Service and Standardization in the Communication Industry" by Prof. Tohru Asami, Tokyo University, Japan. He presented inherent problems, which reside among technology, service and standardization in the current telecom industry. The second talk is BT-3-2 "Active Measurements in NGN Scenarios" by Dr. Marat Zhanikeev and Prof. Yoshiaki Tanaka, Waseda University, Japan. Dr. Zhanikeev lectured active measurement technology based on end-to-end performance metrics in the framework of heterogeneous services of NGN. The third talk is BT-3-3 "Technology and Standardization Trends for NGN QoS Control, Performance Monitoring, and Charging" by Dr. Taesang Choi, ETRI, Republic of Korea. He reviewed the capabilities for QoS control, performance monitoring and charging, which have been discussed by various industry or international SDOs (Standard Defining Organizations) such as 3GPP, TISPAN, ATIS, IEEE, and ITU-T.

Finally, as the organizer and chairperson of this session, I would like to express my appreciation to all lecturers and participants.

Fig.1 : Tutorial Session (BT-3)

Report on Internationalized Tutorial Session in the 2008 IEICE Society Conference

Yoshiaki Kakuda
Hiroshima City University

1. Introduction

The 2008 IEICE Society Conference was held in September 16 to 19 in Ikuta Campus, Meiji University. This conference was sponsored by the Institute of Electronics, Information and Communication Engineers (IEICE) [1].

The tutorial session titled "Latest trends of ubiquitous wireless communications technologies and their standardization" was organized by IEICE Communications Society Technical Committee on Ad Hoc Networks and held during 9:00-12:00 of September 18 in the Room 0410 of the Central School Building.

2. Purpose of Tutorial Session

To promote wireless ad hoc networks and related technology into the IT society, the tutorial session aims to overview and make vital communications on ubiquitous, broadband wireless access networks.

To make the IEICE society conference international, all speakers talked by English in the session.

3. Tutorial Session Program

The tutorial session was proposed by Prof. Hisaaki Tanaka, University of Electro-Communications and coordinated by Prof. Yoshiaki Kakuda, Hiroshima City University.

The tutorial session consisted of the following four speakers, titles and outlines.

(1) Dr. Gabriel Montenegro, Microsoft
"Wireless and IP: Who's driving?"
He addressed the standardization trend of mobile, PAN related protocols and technologies in the IETF.

(2) Dr. Emmanuel Baccelli, INRIA
"Internet Architecture Status and Trends"
He addressed the standardization trend of the MANET and its related issue in the IETF including the architecture and auto-configuration of MANET.

(3) Dr. Hideshi Murai, Ericsson Research Japan
"Mobile Broadband, from LTE towards LTE-Advanced"
He provided a high-level overview of some technology components for LTE Advanced.

(4) Dr. Takaharu Nakamura, Fujitsu
"LTE/LTE-Advanced: Its technologies and standardization activities in 3GPP (3rd Generation Patnership Project)"
He summarized radio transmission technologies in LTE and LTE-Advanced.

About thirty participants joined the tutorial session and enjoyed tutorial presentations and discussions.

4. Summary

This report has concisely explained the internationalized tutorial session in the 2008 IEICE Society Conference. We are grateful to the IEICE Communications Society President, Prof. Kenichi Mase, Niigata University for his constant advice and support to the session. I hope similar special sessions will be held in the future IEICE Society Conferences.

References

Proceedings of the 2008 IEICE Society Conference, ISSN 1349-144X, September 2008.

Fig. 1 Dr. Gabriel Montenegro

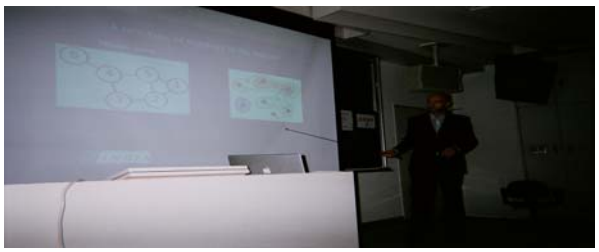

Fig. 2 Dr. Emmanuel Baccelli

Fig. 3 Dr. Hideshi Murai

Fig. 4 Dr. Takaharu Nakamura

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From Editor's Desk

● Welcome Party at IEICE Society Conference

As announced in the previous Global Newsletter, Communications Society had a welcome party on the evening of the first day of the IEICE Society Conference at Meiji University. Largely two hundred people, including students and young researchers, had gathered and enjoyed conversation and presentations given by active researchers from the industries related to our society, not to mention food and free drinks. Also, many of our technical committees presented appealing posters.

We hope many of you had dropped by and had a good time!

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