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KEYNOTE SPEAKERS

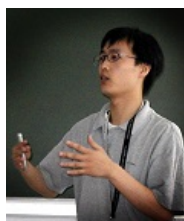


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Wireless Evolution and Challenges for 5G Wireless Networks

by **FumiYuki Adachi**, Dept. of Communications Engineering, Graduate School of Engineering, Tohoku University, 6-6-05 Aza-Aoba, Aramaki, Aoba-ku, Sendai, 980-8579 Japan

Abstract: Wireless networks have evolved from the 1st generation (1G) using analog technology to the 2nd generation (2G) using digital technology, the 3rd generation (3G) and then to the 4th generation (4G) called LTE-A via 3.9G LTE. Every 10 years, new generation networks appeared. LTE-A networks provide a very high speed transmission of several 100Mbps. The mobile data traffic has been increasing rapidly by about two times per year owing to increasing popularity of broadband data services such as high quality video. Because of limited available bandwidth, the spectrum-efficiency has been the most important concern for the last few decades. The available energy, in particular for battery operated user terminals, is also limited. Therefore, the energy-efficiency has become an important concern. To improve the spectrum-efficiency and energy-efficiency simultaneously, the wireless networks need to be significantly restructured. One promising solution is an introduction of small-cell structured network. However, a wide range of user mobility is problematic; frequent handover will be caused. Traffic density is not necessarily high everywhere. Therefore, it is wise to keep the cell size the same as macro-cell networks while exploiting more non-uniform spatial distribution of users. We are recently investigating a virtual macro-cell network, where a virtual macro-cell is consisted of a macro-cell and many small-cells. There are two approaches to implement the small-cell layer: distributed small base stations and distributed antennas. In this presentation, we will overview the wireless evolution over the last 30 years. Then, we will discuss the technical issues for the realization of 5G wireless networks. There is the spectrum-energy efficiency tradeoff when using the frequency reuse. The spectrum-efficiency and energy-efficiency can be improved by adopting the small-cell structure. We will introduce a virtual macro-cell network implemented by distributed antennas. Finally, we will present some simulation results of the communications quality achievable with the virtual macro-cell network.

Biography: FumiYuki Adachi received the B.S. and Dr. Eng. degrees in electrical engineering from Tohoku University, Sendai, Japan, in 1973 and 1984, respectively. In April 1973, he joined the Electrical Communications Laboratories of Nippon Telegraph & Telephone Corporation (now NTT) and conducted various researches on digital cellular communications. From July 1992 to December 1999, he was with NTT DoCoMo, where he led a research group on Wideband CDMA for 3G systems. Since January 2000, he has been with Tohoku University, Sendai, Japan, where he is a Professor at the Dept. of Communications Engineering, Graduate School of Engineering. His research interest is in the area of wireless signal processing (multi-access, equalization, antenna diversity, adaptive transmission, channel coding, etc.) and networking. He is an IEICE Fellow and an IEEE Fellow. He was a recipient of the IEEE Vehicular Technology Society Avant Garde Award 2000, IEICE Achievement Award 2002, Thomson Scientific Research Front Award 2004, Ericsson Telecommunications Award 2008, Telecom System Technology Award 2009, Prime Minister Invention Award 2010, British Royal Academy of Engineering Distinguished Visiting Fellowship 2011, KDDI Foundation Excellent Research Award 2012, VTS Conference Chair Award 2014, and C&C Prize 2014. He is listed in Highly Cited Researchers (<http://highlycited.com/isihighlycited.htm#table>).

Big Data Analytics for Appropriate Technology

by **Jason J. Jung**, Department of Computer Engineering, Chung-Ang University, 84 HeukSeok-Ro, Dongjak-Gu, Seoul, Korea 156-756

Abstract: Big data has been an important issue in many research domains. The amount of data generated is not only growing in the developed world, also the developing countries is experiencing rapid growth in data generation. However, a large part of the data generated in the developing countries has a different origin than in the rest of the world: the developing world is progressing rapidly to the mobile era and is largely skipping the desktop and wired era. This requires a completely new approach, but also offers a vast range of possibilities to beat poverty.

In this talk, appropriate technologies will be discussed to solve such problems in developing countries by using big data analytics. Big data can be as a catalyst for long lasting improvements, but we will have to look further ahead to see that. Mobile data alone is not sufficient to really create opportunities that could impact developing countries on the long term. Therefore, more data sources are required, ranging from data from NGO's, to public data and social data.

Biography: Dr. Jason J. Jung is an Associate Professor in Chung-Ang University, Korea, since September 2014. Before joining CAU, he was an Assistant Professor in Yeungnam University, Korea since 2007. Also, He was a postdoctoral researcher in INRIA Rhone-Alpes, France in 2006, and a visiting scientist in Fraunhofer Institute (FIRST) in Berlin, Germany in 2004. He received the B.Eng. in Computer Science and Mechanical Engineering from Inha University in 1999. He received M.S. and Ph.D. degrees in Computer and Information Engineering from Inha University in 2002 and 2005, respectively. Dr. Jung serves as Editorial board member of many international journals, e.g., Journal of Universal Computer Science, International Journal of Intelligent Information and Database Systems, International Journal of Social Network Mining and International Journal of Web Engineering and Technology. He has edited 10 special issues in international journals, 2 conference proceedings. He is the author of about 100 international publications. His research topics are knowledge engineering on social networks by using many types of AI methodologies, e.g., data mining, machine learning, and logical reasoning. Recently, he have been working on intelligent schemes to understand various social dynamics in large scale social media (e.g., Twitter and Flickr).

Recent Methods in Mining Patterns and Association Rules

by **Vo Dinh Bay**, Faculty of Information Technology, HUTECH University of Technology, Vietnam

Abstract: Mining patterns and rules is one of the most common topics in data mining. It has been applied to a vast variety of databases such as transactional databases, sequence databases, graph databases, and so on. Additionally, pattern and rule mining has been shown its practical applications in various areas like supermarket, finance, healthcare, education, bioinformatics, and so on. This talk begins with the applications of frequent (closed) itemset lattice to:

- mine traditional association rules: build and use a frequent itemset lattice to discover traditional association rules
- mine non-redundant association rules: build and use a modified frequent itemset lattice to generate non-redundant association rules
- mine most generation association rules: build and use a frequent closed itemset lattice to generate most generation association rules
- mine class association rules (CARs)

It then presents the dynamic bit vector structure and its applications in mining frequent patterns from transactional databases and frequent (inter)-sequences from sequence databases. Some methods in mining patterns from quantitative databases such as mining high utility itemsets, mining frequent weighted itemsets, etc are also mentioned. Finally, this talk introduces an application of association rule mining to classification such as mining all CARs, mining CARs with constraints, etc.

Biography: Bay Vo received his PhD degrees in Computer Science from the University of Science, Vietnam National University of Ho Chi Minh, Viet Nam in 2011. He is the dean of Faculty of Information Technology, Ho Chi Minh City University of Technology, Ho Chi Minh City, Viet Nam. His research interests include association rules, classification, incremental mining, distributed databases, and privacy preserving in data mining. Dr. Bay serves as associate editor of ICIC Express Letters, Part B: Applications (Indexed by Scopus and EI) and editor of International Journal of Engineering and Technology Innovation. He also served as co-chairs of several special sessions such as ICCCI 2012; ACIIDS 2013, 2014, 2015; KSE 2013, 2014, SMC 2015; reviewers of many international journals and conferences such as IEEE-TKDE, IEEE-SMC: Systems, Information Sciences, Knowledge-Based Systems, Soft Computing, PLOS ONE, etc. He has published around 70 journal/conference publications including 27 SCI(E) articles.