

Hiroki Iwata

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Research Topic & Keyword

Wireless Communication & Networks, Cognitive Radio, Dynamic Spectrum Access, Spectrum Usage Measurement & Modeling, Machine Learning

Current Research

My current research is development of signal processing for spectrum measurement and spectrum use modeling in smart dynamic spectrum access.

Due to fixed spectrum assignment policy and increasing demand of wireless communications, there is little room to accommodate new wireless systems. However, actual utilization rate of spectrum is low and spectrum is not used effectively. New wireless system will be able to find unoccupied spectrum easily if they have statistical information of spectrum utilization and can predict the spectrum usage pattern. As a result, spectrum utilization rate can be improved.

Specifically, I am investigating signal detection method to obtain statistical information of spectrum utilization accurately and to model the spectrum usage pattern. In addition, I have implemented this algorithm by MATLAB for real observation using spectrum analyzer.

Education

April 2016 - March 2019 | Doctor of Philosophy in Engineering

Graduate School of Tokyo University of Agriculture and Technology,
Department of Electronic and Information Engineering

April 2014 – March 2016 | Master of Engineering

Tokyo University of Agriculture and Technology,
Department of Electrical and Electronic Engineering

April 2012 – March 2014 | Bachelor of Engineering

Tokyo University of Agriculture and Technology,
Department of Electrical and Electronic Engineering

Society

IEEE member, IEIEC member

Publications

- **H. Iwata**, K. Umabayashi, J. J. Lehtomäki, S. Narieda, "Welch FFT Segment Size Selection Method for FFT Based Wide Band Spectrum Measurement," IEICE Trans. Commun., vol. E101-B, no. 7, pp. 1733-1743, Jul. 2018.
- **H. Iwata**, K. Umabayashi, S. Tiirö, J. J. Lehtomäki, M. López-Benítez, Y. Suzuki, "Welch FFT Segment Size Selection Method for Spectrum Awareness System," IEICE Trans. Commun., vol. E99-B, no. 8, pp. 1813-1823, Aug. 2016.
- K. Umabayashi, K. Moriwaki, R. Mizuchi, **H. Iwata**, S. Tiirö, J. J. Lehtomäki, M. López-Benítez, Y. Suzuki, "Simple Primary User Signal Area Estimation for Spectrum Measurement," IEICE Trans. Commun., vol. E99-B, no. 2, Feb. 2016.

Conference papers and presentations

- **H. Iwata**, K. Umabayashi, M. López-Benítez and J. J. Lehtomäki, "Time and Frequency Varying Noise Floor Estimation for Spectrum Usage Measurement," in Proc. IEEE Wireless Communications and Networking Conference Workshops (WCNCW), IEEE, Marrakech, Morocco, Apr. 2019 (Refereed).
- **H. Iwata**, K. Umabayashi, A. Al-Tahmeesschi and M. López-Benítez, "[Poster Presentation] Neural Network-based Channel Occupancy Rate Prediction," in Proc. IEICE International Workshop on Smart Wireless Communications (SmartCom), Bangkok, Thailand, Oct. 2018 (Non-Refereed).
- **H. Iwata**, K. Umabayashi, J. J. Lehtomäki, M. López-Benítez and S. Narieda,

- "Development of A Smart Specrum Access Prototype," in Proc. European Conference on Networks and Communications (EuCNC), Oulu, Finland, June 2017 (Refereed).
- K. Umebayashi, H. Iwata, J. J. Lehtomäki and M. López-Benítez, "Study on Simple Signal Area Estimation for Efficient Spectrum Measurements," in Proc. European Conference on Networks and Communications (EuCNC), Oulu, Finland, June 2017 (Refereed).
 - H. Iwata, K. Umebayashi, S. Tiirro, J. J. Lehtomäki and Y. Suzuki, "A study on Welch FFT Segment Size Selection Method for Spectrum Awareness," in Proc. IEEE Wireless Communications and Networking Conference Workshops (WCNCW), IEEE, Doha, Qatar, Apr. 2016 (Refereed).
 - K. Umebayashi, R. Mizuchi, H. Iwata, K. Hayashi, M. Kobayashi, S. Tiirro, Y. Tamaki, T. Maruyama, J. J. Lehtomäki, M. López-Benítez and Y. Suzuki, "[Technology Exhibit] Spectrum Awareness System Prototype for Smart Spectrum Access", in Proc. IEICE International Workshop on Smart Wireless Communicarions (SmartCom), Tokyo, Japan, Oct. 2015 (Non-Refereed).
 - H. Iwata, K. Umebayashi, S. Tiirro, J. J. Lehtomäki and Y. Suzuki "Optimum Welch FFT Segment Size for Duty Cycle Estimation in Spectrum Awareness System", in Proc. IEEE Wireless Communications and Networking Conference Workshops (WCNCW), IEEE, pp.229-234, New Orleans, USA, Mar. 2015 (Refereed).
 - H. Iwata, K. Umebayashi, R. Mizuchi, T. Maruyama, K. Moriwaki, S. Tiirro, J. J. Lehtomäki and Y. Suzuki, "[Technology Exhibit] Development of A Measurement System for Spectrum Awareness ~DC Estimation based on Welch-FFT~", in Proc. IEICE International Workshop on Smart Wireless Communicarions (SmartCom), vol. 114, no. 284, SR2014-89, pp. 171-177, Singapore, Oct. 2014 (Non-Refereed).

Honors & Awards

- Best Paper Award for the 2nd international workshop on smart spectrum (IWSS) at IEEE wireless communications and networking conference (WCNC) (Apr. 2016)
- Excellent Paper Award for master thesis (Awarded by Department of Electrical and Electronic Engineering, Tokyo University of Agriculture and Technology, Mar. 2016)
- Excellent Paper Award for bachelor thesis (Awarded by Department of Electrical and Electronic Engineering, Tokyo University of Agriculture and Technology, Mar. 2014)

Technical skills

I have extensive skills of programming in MATLAB, especially for wireless communication and signal processing, basic programming skills of C., and database construction skills by MySQL and Microsoft Access. Throughout my studies, I have operation skills of measurement equipment, such as spectrum analyzer.