WEI ZHAO

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Education

- **Bachalar: Anhui Jianzhu University**
  - Computer Science and Technology, 2005.09-2009.07, Hefei, China
- **Master: University of Science and Technology of China**
  - Applied Computer Science and Technology, 2009.09-2012.07, Hefei, China
- **Ph.D: Tohoku University**
  - Applied Information Sciences, 2012.10-(2015.10), Sendai, Japan
  - Supervisor: Kato Nei (IEEE Fellow)

Research Interests

- **Wireless Network Recovery from Natural Disaster**
  - At the advent of the wireless network technology (for example 5G), it has been emerged as the most popular to provide communication service to areas. However, when natural disasters happen (like earthquake, typhoon, etc.), network infrastructure devices such as mesh routers (MRs) and base stations (BSs) can be easily destroyed. Therefore, it becomes of essential importance to efficiently build up the wireless network and rapidly provide services to people during or after disasters. In this study, we propose a movable and deployable resource unit (MDRU) based wireless network recovery architecture. In our proposal, a MDRU usually consists of processing servers, storage servers and Internet backhaul connectivity. It can be rapidly transported and configured in disaster areas so as to efficiently provide wireless Internet access, along with MRs deployed there. Specifically, we focus on planning and deploying dense WLAN networks such as determining the optimal density of APs.
- **RF-sensing in Pervasive Computing**
  - RF signals are defined by their amplitude, phase, and frequency. During signal propagation from the transmitter to the receiver, the radio waves are affected by physical phenomena through, for example, damping, reflection, and scattering. Experts in industry and academia have recognized the RF signal and its harmonics as a potential source of process information. It is applied to various technologies, such as Wi-Fi, FM radio, and etc. In the first place, we used FM radio based RF sensing to infer individual's attention by analysing signal fluctuations due to interruption by people in their walking speed and direction. In addition, we are accounting people indoors or outdoors from CSI fluctuation of beamforming by utilizing beamforming's feature of steerable antennas, which is best suited for detecting CSI fluctuation in the path of main beam by scanning in clock. This work can be extended to other applications such as activity detection, seeing through walls, etc. We are also working on releasing the CSI tool by hacking the 802.11ac wireless network adaptor for the wider spread of beamforming in pervasive computing.

Further Skills

- **Computer Languages:** C++, Java, LaTeX, Lingo, Python
- **Tools:** Matlab, Lyx, Texmaker, Eclipse, Inkscape, QualNet, Lingo
- **Languages:** English (fluent), Chinese (native), Japanese (basic)

Publications

- **Journals**
  1. **Zhao, W.**; Nishiyama, H.; Fadlullah, Z.; Kato, N.; Hamaguchi, K., "DAPA: Capacity Optimization in Wireless Networks through a Combined Design of Density of Access Points and Partially Overlapped Channel Allocation," Vehicular Technology, IEEE Transactions on, vol.PP, no.99, pp.1,1
  2. Shuyu Shi; Sigg, S.; **Wei Zhao**; Yusheng Ji, "Monitoring Attention Using Ambient FM Radio Signals," Pervasive Computing, IEEE , vol.13, no.1, pp.30,36, Jan.-Mar. 2014 doi: 10.1109/MPRV.2014.13

- **Conferences**
  1. **Wei Zhao**; Fadlullah, Z.; Nishiyama, H.; Kato, N.; Hamaguchi, K., "On joint optimal placement of access points and partially overlapping channel assignment for wireless networks," Global Communications Conference (GLOBECOM), 2014 IEEE, vol., no., pp.4922,4927, 8-12 Dec. 2014. **(Best paper award)**
  2. **Wei Zhao**; Fadlullah, Z.; Nishiyama, H.; Kato, N.; Hamaguchi, K., "Joint design of density of access points and partially overlapped channel assignment for capacity optimization in wireless networks," Wireless Communications and Signal Processing (WCSP), 2014 Sixth International Conference on, vol., no., pp.1,6, 23-25 Oct. 2014. **(Best paper award)**
  3. **Wei Zhao**; Fadlullah, Z. M.; Nishiyama, H.; Kato, N. (2013). "Characterizing the impact of non-uniform deployment of APs on network performance under partially overlapped channels," In Wireless Algorithms, Systems, and Applications (pp. 244-254). Springer Berlin Heidelberg.