Wei-Han Chen

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Summary

Highly motivated Ph. D. student with research interests in 1) designing algorithms to optimize performance in various networked/wireless systems and 2) putting theory into practice by building efficient real-world systems. Strong mathematical background in modeling and algorithm design. Strong implementation skills with good system knowledge. Skilled in programming with C/C++, Python, and Matlab. Familiar with operating systems and data structure.

Education

The Ohio State University (OSU), Columbus, OH — Aug. 2017 -- May. 2022 (expected)
Ph. D. student in Computer Science and Engineering — GPA: 3.78/4

National Chiao Tung University (NCTU), Hsinchu, Taiwan — Sept. 2014 -- Jan.2016
Master of Science in Computer Science — GPA: 4.26/4.3

National Chiao Tung University (NCTU), Hsinchu, Taiwan — Sept. 2010 -- Jul.2014
Bachelor of Science in Electrical Engineering and Computer Science — GPA: 3.78/4.3

Qualification

- Programming Skills: Proficient in C/C++, Python, and Matlab, Experienced in Java and Linux System
- Extensive Knowledge: Data Structure and Algorithms, Computer Networks, Signal Processing, Operating System, IEEE 802.11 n/ac/ad
- Graduate Level Coursework: Algorithm and Data Structure, Operating System, Neural Network, Stochastic Signal Processing
- Software Radios: USRP, WARP, GNURadio

Research Experience

The Ohio State University

Research topic: Fast *mmWave Beam Alignment* — Aug. 2019 -- Present

Advisors: *Prof. Kannan Srinivasan*

- Proposed machine learning-based schemes for mmWave beam alignment without sector-level sweep probes.
- Developing prototypes on software radios and commodity AP with phased array antennas.

Research topic: *Parallel Interference Nulling* — Dec. 2017 – Dec. 2018

Advisors: *Prof. Prasun Sinha*

- Designed a parallel interference nulling algorithm that enables multiple full-duplex capable APs to decode multiple simultaneous uplink transmissions from single-antenna clients, and it does not require the APs to exchange packets over a dedicated backbone.
- Designed a greedy node selection algorithm for APs to cooperate in large scale enterprise WLAN and achieved reasonable interference cancellation performance.
- Developed a prototype built on USRP N210 software radios, and showed throughput gain up to 1.7x over TDMA.

National Chiao Tung University

Research topic: *WiFi/WiGig Seamless Handover* — Feb. 2017 – Jul. 2017

Advisor: *Prof. Chi-Yu Li*

- Designed an application-aware and seamless WiGig/WiFi handover solution above the network layer, which ensures timely handover trigger for the WiGig's abrupt link interruption, keeps service continuity during handovers, and adapts multimedia service qualities to different WiGig/WiFi links.
- Developed a prototype built on commodity WiFi device with a 60 GHz WiGig module, and showed a video streaming service at the client is not interrupted during WiGig/WiFi handovers, but smoothly switches between different resolutions according to different links. (DEMO at IEEE ICNP 2017, Toronto, Canada)

Research topic: *LTE Femtocell/Macrocell Networks* — May. 2015 – Jan. 2016

Advisor: *Prof. Jyh-Cheng Chen*

- Proposed a scheme to offload mobile data traffic from macrocells to femtocells considering various user mobility behavior and the trade-off between network signaling overhead and femtocell offloading capability.

- Developed an analytical model to quantify the trade-off and validate the results through extensive simulations in NS-2, reduced signaling overhead by 50% and compromised less than 10% femtocell offloading capability.

Engineering Experience

Concurrency: Multi-Thread Application (OSU) 2018

- Implemented a multi-thread dining restaurant application with pthread library, where multiple producers and multiple consumers modify shared variables through atomic operations.

Programming Language: LISP Interpreter (OSU) 2018

- Implemented a LISP frontend (tokenizer and expression parser) and interpreter (responsible for function definition/function application/special form inputs) in Python3.

Database: Facebook-like Web Application (NCTU) 2013

- Implemented a facebook-like web application using HTML/CSS/PHP (frontend), Apache (HTTP server), MariaDB (database).
- Functions implemented: article posts, likes/dislikes, direct messages, friend management.

Data Mining: Decision Tree and Random Forest (UIUC CS412) 2013

- Implemented two classifiers in C++, decision tree with C4.5 algorithm and random forest with Forest-RI.
- Evaluated the performance with different real-world datasets and showed its effectiveness.

Publication

- Ananya Mahanti, **Wei-Han Chen**, Prasun Sinha. "DuoRelay: Parallel Interference Nulling using Full-duplex Relaying." **(IEEE SECON 2019)**
- Yao-Yu Li, Chi-Yu Li, **Wei-Han Chen**, Chia-Jui Yeh, Kuochen Wang. "Enabling seamless WiGig/WiFi handovers in tri-band wireless systems." **(IEEE ICNP 2017)**
- **Wei-Han Chen**, Yi Ren, Jyh-Cheng Chen. "Design and Analysis of a Threshold Offloading Algorithm for LTE Femtocell/Macrocell Networks." **(IEEE ISCC 2016)**