PAN Qingrui

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Summary

I am a final year PhD candidate in the Department of Computing at Hong Kong Polytechnic University, focusing on fingerprinting work related to RFID systems, specifically indoor localization and hardware fingerprint for security issues. My research interests also include AIoT, wireless sensing, and backscatter communication. With published papers in top-tier conferences and journals, I am passionate about advancing the field of wireless communication and AIoT.

Education

The Hong Kong Polytechnic University *Hong Kong*

Ph.D. in Computer Science *Sept 2019 - Current*

- Chief Supervisor: Dr. Lei Yang, Co-supervisor: Prof. Bin Xiao
- Cumulative Grade Point Average: 3.88/4.3
- Expected to graduate before Oct 2023.

City University of Hong Kong *Hong Kong*

B.E. in Information Engineering *Sept 2013 - May 2017*

- Bachelor of Engineering in Information Engineering with First Class Honours
- Cumulative Grade Point Average: 3.66/4.3

Publications

Conference Proceedings

1. **Qingrui Pan**, Zhenlin An, Xiaopeng Zhao, Lei Yang, "Revisiting Backscatter Frequency Drifts for Fingerprinting RFIDs: A Perspective of Frequency Resolution", In Proc. of IEEE SECON, 2023 (CCF B, accepted rate: 23.6%)
2. **Qingrui Pan**, Zhenlin An, Xueyuan Yang, Xiaopeng Zhao, Lei Yang, "RF-DNA: Large-Scale Physical-layer Identifications of RFIDs via Dual Natural Attributes", In Proc. of ACM MobiCom, 2022 (CCF A, accepted rate: 17.6%)
3. **Qingrui Pan**, Zhenlin An, Qiongzheng Lin, Lei Yang, "LSAB: Enhancing Spatio-Temporal Efficiency of AoA Tracking Systems", in Proc. of IEEE INFOCOM, 2022. (CCF A, accepted rate: 19.9%)
4. Xiaopeng Zhao, Zhenlin An, **Qingrui Pan**, Lei Yang, "NeRF2: Neural Radio-Frequency Radiance Fields", In Proc. of ACM MobiCom, 2023 (CCF A)
5. Donghui Dai, Zhenlin An, **Qingrui Pan**, Lei Yang, "MagCode: NFC-Enabled Barcodes for NFC-Disabled SmartPhones", In Proc. of ACM MobiCom, 2023 (CCF A)
6. Zhenlin An, Qiongzheng Lin, **Qingrui Pan**, Lei Yang, "Turbocharging Deep Backscatter Through Constructive Power Surges with a Single RF Source", In Proc. of IEEE INFOCOM, 2021 (CCF A, accepted rate: 19.9%)

Journal Articles

1. **Qingrui Pan**, Zhenlin An, Qiongzheng Lin, and Lei Yang, "LSAB: Enhancing Spatio-Temporal Efficiency of AoA Tracking Systems," ACM Transactions on Sensor Networks, 2022.
2. **Qingrui Pan**, Zhenlin An, Xueyuan Yang, Xiaopeng Zhao, Lei Yang, "Fingerprinting RFIDs with RF-DNA" (Submitted)

Research Projects

1. **Wireless Localization and Sensing**
   - RF Sparse Antenna Array for Angle of Arrival (AoA) Tracking (INFOCOM'22, TOSN'22)
   - Million-scale Dataset from Four Semi-indoor and Ten Full-indoor Environments
   - Neural Radio-Frequency Radiance Field (MobiCom'23)
2. **IoT Security and Privacy**
   - Physical-layer Identification of UHF RFID Tag Using Intrinsic Frequency Response Chain (MobiCom'22)
   - Physical-layer Identification of UHF RFID Tag Using Backscatter Link Frequency Shift (SECON'23)
3. **Backscatter Communication**
   - Long-range Backscatter Communication with Carrier Wave Optimization (INFOCOM'21)

4. **Cross-technology Communication System**
    - Cross-technology Communication between NFC and Camera via Magnetic Interference (MobiCom'23)

Work Experience

Huawei Technologies, Co. Ltd *Shenzhen, China*

Assistant Researcher *Oct - Dec 2020*

- Collaborated in a three-person team to develop a preliminary indoor RFID localization system. The system utilized a 4×4 antenna array to locate passive UHF RFID tags.
- Generated self-defined commands and transmitted them via USRP X310 to challenge the tags, extracting RSS and phase information from raw data.
- Created a Python interface to illustrate real-time localization results, achieving a localization error of less than 10cm.

Moxie Culture Communication, Co. *Shenzhen, China*

Content Creator *Nov 2016 - Mar 2019*

- Collaborated with a four-person team as the main writer, creating over 20 pieces of non-fiction science comics. The comics garnered a total of three hundred million views. Additionally, collaborated in the publishing of four books, with total sales exceeding 600,000 copies.

Technische Hocheschule Nürnberg *Nürnberg, Germany*

Student Research Assistant *May - July 2016*

- Recognized bird species by their songs and extracted features using Short-time Fourier transform (STFT).
- Created a graphical user interface using MATLAB, enabling manual key segment cutting.

Teaching Experience

COMP2021 Object-Oriented Programming *PolyU, HK*

Teaching Assistant (Lecturer: Dr. PEI Yu) *Fall 2019/2020*

- Designed six basic tutorials on Java programming for program beginners and created corresponding slides.
- Delivered four tutorial classes each week for six weeks, with a total of more than 100 students each semester.

COMP3421 Web Application Design and Development *PolyU, HK*

Teaching Assistant (Lecturer: Dr. YANG Lei) *Spring 2020/2021/2022*

- Designed and reviewed one homepage project, two assignments, and one quiz related to HTML and CSS for more than 120 students each semester.

ENG2003 Information Technology *PolyU, HK*

Teaching Assistant (Lecturer: Dr. YANG Lei) *Fall 2021, Spring 2023*

- Delivered two to four workshops related to Microsoft Access each semester, depending on the number of students in the course.
- Designed and reviewed assignments related to database concepts and SQL.

Professional Services

Reviewer

- IEEE Internet of Things Journal
- IEEE/ACM Transactions on Networking
- IEEE Transactions on Mobile Computing

Talk

- COMP Research Student Seminar

Awards and Scholarships

2022	**INFOCOM Student Conference Grant**, INFOCOM	*Virtual*
2022	**MobiCom'22 Travel Grant**, MobiCom	*Sydney, Australia*
2017	**Assistantship under the Teaching Postgraduate Studentship Scheme**, The Hong Kong Polytechnic University	*Hong Kong*
2016	**Overseas Internship Scheme**, City University of Hong Kong	*Hong Kong*
2013	**CityU Mainland Student Scholarship Scheme - Full Tuition Scholarship**, City University of Hong Kong	*Hong Kong*