Zhenyu Ren

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Education

Southern University of Science and Technology (SUSTech) Shenzhen, China

B.Sc. in Communication Engineering; ***GPA: 3.69/4.00; Weighted Score: 88.07*** *Sep 2018 – Jun 2022*

M.Sc. in Electronic Science and Technology; ***GPA: 3.44/4.00; Weighted Score: 88.52*** *Sep 2022 – Jun 2025*

Supervised by Prof. Rui Wang (Editor of IEEE WCL, IEEE OJ-COMS), focusing on **sensing channel modeling and experimental millimeter-wave system for wireless simulation-to-reality gesture recognition.**

Experience

Huawei Technology, Wireless Technology (WT) Laboratory Shenzhen, China

Research Intern *June 2021 – June 2022*

- Supervised by Dr. Tony Han Xiao (Chair of IEEE 802.11bf WLAN Sensing TIG, Founding industry chair of ISAC-ETI), focusing on **the wireless communication and sensing technology.**
- Developed a Wi-Fi based indoor near filed imaging system base on AD9361 board and digital-controlled rail (all driven by MATLAB via my programming), which also served as my bachelor thesis: Slides and Report in Chinese.
- Contributed to the "Channel Models for WLAN Sensing Systems" for IEEE 802.11bf standard (doc.: IEEE 802.11-21/0782r5): Link.

Publications

Zhenyu Ren, Guoliang Li, Chenqing Ji, Chao Yu, Shuai Wang, and Rui Wang. "CASTER: A Computer-Vision-Assisted Wireless Channel Simulator for Gesture Recognition," in IEEE Open Journal of the Communications Society *(Current impact factor: 7.9, JCR Q1).*

Paper (Early access) | GitHub | Project Page ***(Includes 3 demo videos. It is highly recommended to watch these for a quick understanding of my paper. If the page loads slowly within China, you can try accessing http://lasso.eee.sustech.edu.cn/caster/ instead.)***

Zhenyu Ren, Chenqing Ji, Chao Yu, Wanli Chen, and Rui Wang. "Computer-Vision Assisted Wireless Channel Simulation for Human Motion Recognition: Methods and Applications," submitted to Journal of Radars *(Invited paper, Chinese top journal for radar system).*

Patents

Zhenyu Ren, Wanli Chen, Rui Wang, Chao Yu, "Wireless Channel Simulation Method, Device, Computer Equipment, and Storage Medium", Patent Application No.: 2023110356420, Southern University of Science and Technology, Application Date: 2023.08.16 (Chinese Invention Patent).

Awards & Achievements

Second Prize in the 17th "Challenge Cup" Guangdong University Student Extracurricular Academic Science and Technology Works Competition, 2023.

Leader for Guangdong University Students' Science and Technology Innovation Cultivation Special Fund ("Climbing Plan" Special Fund), 2022∼2023 *(Funding: 20,000 RMB).*

2022 Excellent Graduate of Undergraduate for exceptional performance in the SUSTech.

2022 Distinguished Undergraduate Thesis of the SUSTech.

Southern University of Science and Technology Outstanding Student Third-Class Scholarship (2018∼2019, 2020∼2021).

First Prize in the 2020 National College Student Mathematics Modeling Competition *(Top 0.5% among 45000++ teams in China).*

Skills

Programming Languages: C/C++, Python, MATLAB, Java

Technologies: PyTorch, Linux/Ubuntu, Git/GitHub, OpenCV, UHD/USRP, 60GHz Sivers, Linux 802.11n CSI Tool, Mediapipe/ZED-SDK (Human/Hand keypoint extractor)

Writing: LaTeX, Markdown, Website (HTML, CSS, JavaScript)

English: IELTS 6.5 with sub-score 6.0 (Test date: *Jan 2024*); GRE has not been tested.

Courses: Modern Signal Processing (Grade: A-, Rank: 1/90); C/C++ Programming (Grade: A, Top 2 with over 90 points in final exam); Effective Presentations in Electronic Engineering (Grade: A+, Rank: 2/20). Besides, I have taken courses related to wireless communication, digital signal processing, microwave technology, antenna design, as well as mathematical courses such as mathematical analysis, linear algebra, probability theory, and stochastic processes...

Projects

CASTER | Paper (Early access) | GitHub | Project Page

- An open-source platform for wireless channel simulation, human/hand pose extraction, gesture spectrogram generation, and real-time gesture recognition based on millimeter-wave passive sensing and communication systems.
  - Submodules mediapipe_spectrogram and testZED: Developed algorithms for keypoint extraction from video streams and used a primitive-based channel model to generate simulated data, addressing the data collection issue in wireless sensing.
  - Submodule CASTER_classification: Implemented a Simulation-to-Reality transfer learning strategy using ResNet18 and adversarial discriminative domain adaptation (ADDA) for wireless gesture recognition. This approach improved real-world dataset accuracy from 83.0% to 96.5%.
  - Submodule RxRealTime_GUI: Implemented real-time gesture recognition based on millimeter-wave passive sensing and communication systems, using USRP and 60GHz Sivers phased array.

Some other projects:

(1) rayTrace: MATLAB software for indoor radio ray-tracing with human blockage. ***A segment of GIF results was featured by Huawei's keynote speaker during the 1st workshop on wi-fi sensing (video recording at 15:52).***

(2) Personal Website: Math notes and technical blogs (example post: Notebook for Applied Stochastic Processes and Wireless Channel Trouble-Shooting).

Extracurricular Activities

Reviewer for IEEE ICMLCN 2024, IEEE ICC 2024. TPC reviewer for ICC 2024 Workshop - NGATFWN.

Teaching Assistant for EE313 Wireless Communication.

References

Prof. Rui Wang, Associate Professor, Department of Electronic and Electrical Engineering (EEE), Southern University of Science and Technology, Email: wang.r@sustech.edu.cn.

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