Zheng Shi

https://zhengshi-wireless.github.io/
ZhengShi7@outlook.com — (+86)13972819442

EDUCATION

Shandong University - School of Information Science and Engineering, Qingdao, China 09/2021-06/2025
Bachelor in Communication Engineering (Innovation College)

- GPA: 4.185/5.0 | Cumulative Average Grade: 91.85/100
- Relevant Courses: Signal and System (99); Linear algebra (99); Principle of Communications(97); Probability and Statistics (95); Digital Signal Processing (95), et al.
- Note: Innovation College members are Top 5% Shandong University students selected after the first year.

RESEARCH INTERESTS

Wireless Sensing, AIoT, Mobile Computing, Ubiquitous Computing

PUBLICATIONS

- **MetaRFence: Protecting Human Motion Privacy Against RFID Sensing via Metasurface** [page]
  Zheng Shi,Zhikai Ding,Yanni Yang,Zhenlin An,Guoming Zhang,Pengfei Hu,Xiuzhen Cheng,Jiannong Cao
  IEEE Transactions on Mobile Computing (TMC)
- **RFnoID: Protecting RFID Motion Privacy via Metasurface** [paper]
  Yanni Yang,**Zheng Shi**,Zhenlin An,Runyu Pan,Yanling Bu,Guoming Zhang,Pengfei Hu,Jiannong Cao
  2025 IEEE International Conference on Computer Communications (INFOCOM)
- **Wireless Eavesdropping on Wired Audio with Radio-frequency Retroreflector Attack** [paper]
  Genglin Wang,**Zheng Shi**,Yanni Yang,Zhenlin An,Guoming Zhang,Pengfei Hu,Xiuzhen Cheng,Jiannong Cao
  IEEE Transactions on Mobile Computing (TMC)
- **A Sparse-Dense Based Forward-Looking Intelligent Vehicle Obstacle Avoidance Method** [page]
  Ming Fang,**Zheng Shi**,Wenchao Qiao,Yuxin Cui,Yuan Zhang,Liding Xu Patent No. CN118567361A
- **A Closed-Loop Road Based Limited Resource Intelligent Vehicle Navigation Method** [page]
  Ming Fang,Yuxin Cui,Wenchao Qiao,**Zheng Shi**,Yuan Zhang,Liding Xu Patent No. CN118482729A

RESEARCH EXPERIENCE

MetaRFence: Protecting Human Motion Privacy Against RFID Sensing via Metasurface 11/2024-06/2025
Main Contributor|Supervisor: Yanni Yang|Research Area:Wireless Sensing, RFID, Metasurface

- This work builds upon our previous work *RFnoID*, and has been accepted by *IEEE TMC*
- We detail our system design, improve our method and consider a wider variety of human motion eavesdropping. We add new sections to describe the threat model and our compound strategy. In addition, more experiments and simulations are conducted.

RFnoID: Protecting RFID Motion Privacy via Metasurface 11/2023-08/2024
Main Contributor|Supervisor: Yanni Yang|Research Area:Wireless Sensing, Ubiquitous Computing

- As student first author, this work has been published in the *IEEE INFOCOM 2025*.
- Investigate the principle and application of metasurface, simulate and reproduce the reconfigurable element, design the metasurface in the UHF-RFID band. Implement sensing algorithms based on RFID, including through-wall human presence detection and through-wall respiration rate monitoring.
- Theoretically model and characterize the metasurface effect on the human-reflected RFID signal in temporal and spectral domains, and design a novel metasurface controlling strategy to strike a balance between effective temporal and spectral domain obfuscation.

Wireless Eavesdropping on Wired Audio with Radio-frequency Retroreflector Attack 01/2024-06/2024
Co-author|Supervisor: Yanni Yang|Research Area:Wireless Sensing, Ubiquitous Computing

- As student second author, this work has been published in the *IEEE Transactions on Mobile Computing*.
- Utilize CST Studio to model and simulate the electromagnetic radiation pattern of the linear audio line to guide the placement of the eavesdropper TX and RX.
- Use USRP X310 to transmit wave signals of random magnitude and leverage dynamic multipath effects generated by human movement as countermeasures. Analyze the impact of these methods on eavesdropping.

PROJECTS

Design of Electronic Perpetual Calendar Based on ESP32 [page] 02/2023-06/2023
Team leader|Supervisor: Hua Li|Research Area: Embedded Development

- Designed hardware using AD to create schematics and PCB, integrating modules such as ESP32, capacitive touchscreen, music module, temperature and humidity sensor, DC/DC regulator, etc.
- Implemented embedded development using Arduino framework and LVGL library for software development. Developed a mobile application using App Inventor and MQTT protocol.
- Achieved all basic functionalities of a perpetual calendar, along with features like email smoke alarm, workstation status monitoring, and remote monitoring via mobile app.

High-Speed Mobile Unmanned Vehicles Based on ROS Architecture [page] 05/2023-12/2023
Team leader|Supervisor: Ming Fang|Research Area: Robotics, Autonomous Driving

- This project won the **national first prize** in the Undergraduate Intelligent Vehicle Competition
- Employed Karto for SLAM in high-speed motion, coupled with EKF for positioning and Teb for path planning. Utilized OpenCV for image processing tasks like edge detection, template matching
- Proposed a sparse-dense based forward-looking obstacle avoidance method for intelligent vehicles, employing filtering, clustering, and iterative classification of 2D LiDAR point clouds

Course Project : Labyrinth Smart Car [page] 09/2022-12/2022
Team leader|Supervisor: Ming Fang|Research Area: Robotics, Autonomous Driving

- Designed and implemented an intelligent vehicle system on Python 3.6 platform
- Conducted system simulation using models and algorithms, incorporating signals and systems for stable driving and collision avoidance
- Utilized amplifiers and photosensitive resistors to steer the intelligent vehicle toward light sources

AWARDS

National Awards

- First Prize of Undergraduate Intelligent Vehicle Competition (Top 1%) 2023
- Second Prize of the "Shanshu Cup" Mathematical Modeling 2023

Provincial Awards

- First Prize of Undergraduate Mathematical Contest in Modeling (Top 5%) 2023
- Third Prize of Undergraduate Intelligent Vehicle Competition 2023
- First Prize of Shandong Robotics Competition 2023

School Awards

- First Prize of Shandong University Academic Award Scholarship (Top 5%) 2022
- First Prize of Shandong University Research and Innovation Scholarship 2024
- Third Prize of Shandong University Academic Award Scholarship 2023

SKILLS

- Programming Language: Python, MATLAB, C/C++
- Software: Latex, CST, HFSS, Altium Designer, EDA, Multisim, ADS, Keil, ROS, SDR
- Language: Mandarin, English (IELTS Overall: 7.0; GRE: 307+3.0)