Zhiyu Shen

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EDUCATION

Nanjing University (NJU) 09/2019-06/2023

Bachelor of Engineering in ***Microelectronic Science and Engineering****,* **GPA**: 4.37/5.00 (87.4/100)

Honors&Awards: (Twice) Third Prize of People's Scholarship, 11/2021 & 11/2020

PROJECT EXPERIENCE

A Differential Privacy Encrypted Communication Method based on Transmit Power Allocation 07/2022-present

Collaborative AIHW Lab of the University of Notre Dame

Individual Project, Mentor: Assistant Prof. Ningyuan Cao

- Modeled and simulated the AWGN channel, simulated the small-scale fading channel model (a Rayleigh fading channel model) and the large-scale fading model with MATLAB
- Derived a recursive expression for the PDF (probability density function) of data errors in a communication system with the BER as the independent variable
- Designed an exponentially distributed transmit power allocation scheme that allowed data errors to satisfy the Laplace distribution, significantly reducing power consumption while the communication data was encrypted

Codes and documentation: *https://github.com/Circuit-and-System-Intelligence/iSure-2022_Smart_Communication*

The Joint Estimation of Frequency, Phase, and Amplitude of Short-Time Sinusoid Signal 11/2021-11/2022

Institute of Biomedical Electronics of Nanjing University

Individual Project, Mentor: Prof. Hongxing Liu & Associate Prof. Junfeng Si

- Designed a joint estimation method on the frequency and phase of low-frequency short-time sinusoid
- Turned the estimation problem into a multi-dimension search optimization problem by introducing a method based on the maximum correlation coefficient
- Programmed for the hybrid optimization algorithm combining particle swarm optimization and conjugate gradient method with MATLAB in solving the search optimization problem
- Compared the joint estimation method with traditional methods to verify its advantage in efficiency and accuracy

Codes and documentation: *https://github.com/Addie-020/Joint-Estimator-of-Parameters-of-Short-Time-Sinusoid*

Terahertz High-Speed Wireless Communication System 11/2020-11/2021

Research Institution of Superconducting Electronics of Nanjing University

Project Leader, Mentor: Senior Engineer Xuecou Tu & Prof. Jian Chen

- Completed the basic experiment of the terahertz communication system using software-defined radio for baseband signal processing and Nb_5N_6 detector as well as GaAs subharmonic mixer for terahertz signal processing
- Designed a baseband signal processing circuit with Xilinx ZYNQ board and RF products from Analog Devices, Inc
- Designed a terahertz communication system architecture based on the self-designed baseband signal processing circuit and terahertz devices developed by the research group
- Characterized key indicators, including transmission rate, bandwidth utilization, and bit error rate, of both systems above

Codes and documentation: *https://github.com/Addie-020/Terahertz_Communication*

AIoT-based Intelligent Building Noise Control System 05/2021-10/2021

Institute of Acoustics of Nanjing University

Research Member, Mentor: Lec. Kai Chen & Senior Engineer, Zhijian Zhang

- Realized an ANC (Active Noise Cancelling) algorithm in MATLAB based on the FxLMS algorithm
- Applied CNN (Convolutional Neural Networks) technology to classify noise signals according to their spectrograms
- Ported the algorithm to the embedded system board with ARM CPU and NPU (Neural-Network Processing Unit)

EXTRACURRICULAR ACTIVITIES

Second Prize Winner (3.3%), **National College Students Internet of Things Design Contest** 08/2021

Research Member, **Investigation of the Impact of COVID-19 on Online Sales of Small Catering Industry (School-Level Key Social Practice Project)** 07/2020

- Carried out investigation and research on the sales of small catering businesses in some regions to explore the development of online sales and O2O business models in small catering businesses during the epidemic

Member, **Organization Department of Youth League Committee, School of Electronic Science and Engineering, Nanjing University** 09/2019-06/2020

- In charge of activity planning and venue layout

OTHERS

Programming Skills: MATLAB, C, Verilog HDL, Python

Research Interest: Wireless Communication, Signal Processing