Ziliang Yin

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EDUCATION

Shenzhen University September 2022 - June 2025
Mphil, Integrated Circuit Engineering *Average Score: 81.7*
Core Courses: *Matrix Theory and Method, Random Process, Digital Signal Processing, Machine Learning, Digital Integrated Circuit Design, Integrated Circuit Back End Design, VLSI Design Introduction, Design of Analog IC*

South China University of Technology September 2017 - June 2021
BEng, Electrical Engineering and Automation *Average Score: 84.4*
Core Courses: *Circuit Principle, Analog and Digital Electronics, Automatic Control Theories, Power Electronics, Electromagnetic Fields, Signals and Systems, Electrical Machinery, Electric Power Systems*

RESEARCH INTERESTS

Biomedical signal processing;

Algorithm & hardware development;

Brain-computer interfaces;

Wearable devices

PUBLICATIONS

[J] **Z. Yin**, and W. Shi, "*WPCT: A Lightweight EEG Physiological Artifact Denoising Architecture for Single-Channel BCI Applications*", **IEEE Transactions on Circuits and Systems I: Regular Papers**, 2024, Under Review
[C] **Z. Yin**, W. Shi and K. Liu, "*An EEG Signal Processing System Design with Approximate Operations*", **2023 IEEE International Conference on Integrated Circuits, Technologies and Applications (IEEE ICTA)**, Hefei, China, 2023, Published

RESEARCH EXPERIENCE

Algorithm and Hardware Development for the Removal of Physiological Artifacts from Single-Channel EEG October 2023 - August 2024
Natural Science Foundation of Guangdong Province, China, (2023A1515010761)

- Developed a lightweight algorithm, WPCT, that removes *EOG and EMG artifacts*, and *corrects baseline drift* simultaneously from single-channel EEG, which is useful in *real-time single-channel BCI* signal preprocessing.
- Proposed an architecture that implements the WPCT algorithm in *digital circuits*. Significantly reduced the hardware scale with a new *area-efficient rotation ordering* for two-sided Jacobi SVD calculation of tall matrices.
- Configured the proposed architecture in four ways: Haar-16, Haar-32, Db2-16, and Db2-32. Their artifact removal performance and hardware performance were analyzed and compared, enabling the selection of *optimal configuration* for specific applications.

Digital System Development for Emotion Recognition Based on Long Short-Term Memory (LSTM) Network December 2022 - September 2023
National Natural Science Foundation of China, (61974095)

- Build three-dimensional *electromagnetic thermal coupling simulation model* of ground wire-suspension clamp system wound by aluminium armour tape.
- Calculated and analyzed the *current density distribution* and *temperature distribution* of the ground wire-suspension clamp system under the action of power frequency short-circuit current.
- Analyzed the effects of different *bolt torques* on the temperature of heating bottleneck point of the ground wire.

PROJECT EXPERIENCE

Research on Low-Power Target Recognition AI Edge Chip Design and Hardware Efficiency Optimization December 2022 - Now

Natural Science Foundation of Guangdong Province, China, (2023A1515010761)

· **Main Work:** Draft research proposal, feasibility report, technical guidelines; Algorithm & hardware co-design of a preprocessing module for single-channel EEG; UPF design for SVM & FFT modules.

Research on Core Technologies for High-Efficiency, Ultra-Low Power Brain-Computer Interface/Neural Signal Detection Chips November 2022 - December 2023

National Natural Science Foundation of China, (61974095)

· **Main Work:** Design replication; Design of an 1024-point radix-2 FFT; Draft research report; Development and hardware implementation of an LSTM network for emotional recognition using EEG.

TEACHING EXPERIENCE

· Teaching assistant for *Digital Integrated Circuits* undergraduate course (Spring 2023)

· Teaching assistant for *Introduction to Electronics and Information Engineering Discipline* undergraduate course (Fall 2022)

LEADERSHIP EXPERIENCE

Shenzhen University Student Union

Member, Practice Department October 2022 - September 2023

South China University of Technology Student Union

Secretary, Department of Manpower and Liaison May 2018 - July 2019

Student Innovation and Entrepreneurship Club of SCUT

Member, Outreach Practice Department March 2018 - August 2018

SKILLS

Programming: Matlab, Python, C++, Verilog

Language: English, Chinese

REFERENCE

Associate Prof. Weiwei Shi, IEEE Member

Shenzhen University

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