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教育经历

浙江大学

中国 杭州

电气工程及其自动化

2022 年 9 月–2026 年 6 月 (预期)

- 主修课程GPA: 4.50/5.00 (10%) • 英语水平: CET-6 644/710
- 2022年“外研社·国才杯”全国英语写作大赛(浙江赛区)一等奖 2022.11
- 第十五届全国大学生数学竞赛非数学A类一等奖 2023.12
- 2023年浙江省大学生物理创新(理论)竞赛三等奖 2023.12
- 第四届高校电气电子工程创新大赛 能源数字化智能化转型赛道 省(区域)赛二等奖 2025.07
- 2025年CIMC中国智能制造挑战赛 离散行业自动化方向(工程实践) 省(区域)赛二等奖 2025.07

项目经历

直流电源检测仪开发

2024 年 3 月 – 2024 年 7 月

项目描述: 为弥补交流电源测试设备的局限, 设计了一种直流电源检测仪, 实现对直流电源输出的高速采集、实时处理与波形分析。

- 团队协作与项目管理: 主导方案设计、团队协作与项目跟进, 负责模块化分工、阶段性目标制定与定期汇报。
- 高速数据缓冲设计: 设计了跨时钟域FIFO缓冲系统, 解决了60MHz采样与115200波特率通信的速率失配问题。
- 实时通信接口开发: 设计并行转串行数据接口, 与队友共同负责FPGA与树莓派通信系统的联调工作。
- 系统容错优化: 重构数据缓冲策略, 引入“整段存储+连续读取”的模式, 以替代传统交流信号触发逻辑。
- 风险管控: 面对硬件故障果断决策, 4小时内完成代码重构与整合, 成功切换至单芯片方案, 确保项目如期完成。

基于边缘智能的电网需求响应空调控制系统

2025 年 2 月 – 2025 年 6 月

项目描述: 依据空调群降负荷策略, 基于环境数据实时感知, 设计了针对空调系统的云边协同智能控制方法, 实现了电网需求响应。

- 硬件系统架构设计: 负责项目分工, 将项目架构划分为决策层、执行层与监控层, 实现功能解耦与高效协同。
- Home Assistant平台搭建: 搭建本地Home Assistant服务器, 集成多类智能传感器与执行器, 构建完整的目标系统环境感知与控制闭环。
- 空调智能控制开发: 基于 Thonny 开发环境, 使用 Python 实现 WebSocket 协议与 Home Assistant 后端通信, 完成设备状态实时获取、控制指令下发及运行数据持久化导出, 提升系统响应性与可监控性。

科研经历

新能源场站频率支撑协同控制 (IEEE PES T&D 会议在投)

2024 年 7 月 – 2025 年 8 月

项目描述: 提出了一种风光储协同控制策略, 显著提升了新能源场站在频率扰动下的系统稳定性。

- 新能源场站基础建模: 完成风电、光伏及储能系统的动态建模与特性分析。
- 调频能力评估模型: 构建适用于多类型新能源设备的统一调频能力评估模型。在风电系统中创新性引入“能量-容量”协同评估机制, 根据频率事件的发展阶段动态调整响应权重, 兼顾快速性与可持续性。
- 风光储协同模糊控制策略: 设计并实现了一套风光储协调模糊控制器, 以其他两类资源的调频潜力作为输入, 动态生成第三类资源的功率调整增益, 实现调频责任的在线分配与差异化调控。

技术栈

- 编程语言: 熟悉: Python, C/C++, LAD, Verilog/VHDL; 有项目应用经验: 汇编语言
- 嵌入式系统与控制器平台:
 - 工业控制器: 西门子 S7 系列 PLC (基于 TIA Portal)
 - FPGA 平台: Intel MAX 10 系列 (基于 Quartus Prime)
 - 微控制器 (MCU): STM32 系列 (参与RoboMaster培训调试舵轮车), ESP32 系列, 8051 架构 (89C51)
- 其他开发工具: MATLAB/Simulink, Multisim, OrCAD Pspice, Home Assistant

个人能力

- 性格特点: 具备较强的检索能力、问题解决能力与调试韧性; 拥有一定的项目组织及团队协作经验; 学习能力强, 乐于学习新知识并积极应用于实践, 渴望在实践中持续成长与提升。
- 学生经历: 加入浙江大学机器人协会与浙江大学绿之源协会护水部, 并作为绿之源协会成员参与社会实践, 获得浙江大学2023年暑期大学生社会实践活动优秀团队与优秀论文荣誉; 在浙江大学大学生素质训练计划 (SQTP) 中组织《新型电池回收机制调研》项目, 并担任立项人。
- 职业兴趣: 拟保研进入新能源电力系统控制与保护相关实验室深造; 关注嵌入式系统与物联网方向; 对 Linux 系统有浓厚兴趣, 正在逐步学习探索; 计划搭建个人网站记录技术实践与生活思考; 认同开放协作、创新驱动的工程师文化。

Guyu Pan

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EDUCATION

Zhejiang University

Hangzhou, China

Electrical Engineering

Sep. 2022 - Jun. 2026 (Expected)

- GPA: 4.50/5.00 (top 10%) • CET-6 644/710
- First Prize in the Provincial Final of 2022 "FLTRP . ETIC Cup" English Writing Contest 2022.11
- First Prize in the 15th National Mathematics Competition for Non-Mathematics Majors 2023.12
- Third Prize in the Provincial Round of 2023 University Physics Innovation (Theoretical) Competition 2023.12
- Second Prize in Regional Round of the 4th University Electrical and Electronic Engineering Innovation Competition 2025.07
- Second Prize in Regional Round of the 19th CIMC China Intelligent Manufacturing Challenge 2025.07

RESEARCH EXPERIENCE

Design and Development of a DC Power Supply Analyzer

Mar. 2024 - Jul. 2024

To overcome the limitations of AC power supply testing equipment, a DC power supply analyzer was designed, capable of high-speed acquisition, real-time processing, and waveform analysis of DC power output.

- Team Leadership & Coordination: Spearheaded technical solution design, team collaboration, and project execution.
- High-Speed Data Buffering Design: Designed an asynchronous FIFO buffering system to resolve the data rate mismatch between sampling (60 MHz) and UART communication (115,200 baud rate).
- Real-Time Communication Interface: Developed a parallel-to-serial data interface and collaborated on end-to-end integration and debugging of the FPGA-Raspberry Pi communication system.
- System Reliability Enhancement: Redesigned the data buffering architecture using a "block storage & sequential readout" strategy, replacing conventional AC-coupled triggering logic for stability improvement.
- Crisis Response & Risk Mitigation: Responded swiftly to critical hardware failure by leading a full code refactoring and system consolidation within 4 hours, successfully migrating to a single-chip solution and ensuring project delivery.

Air Conditioning Control System for Grid Demand Response Based on Edge Intelligence

Feb. 2025 - Jun. 2025

Based on a load-reduction strategy for clustered air conditioning systems and real-time sensing of environmental data, an intelligent cloud-edge collaborative control method was designed for Air Conditioning systems, enabling effective power grid demand response.

- Hardware System Architecture Design: Led project task allocation by decomposing the system architecture into decision, execution, and monitoring layers, enabling functional decoupling and efficient inter-layer coordination.
- Home Assistant Platform Setup: Deployed a local Home Assistant server, integrated multiple types of smart sensors and actuators, and established a closed-loop system for comprehensive environmental awareness and automated control.
- Smart Air Conditioning Control Development: Using Python in the Thonny development environment, implemented WebSocket communication with the Home Assistant backend to enable real-time device status monitoring, remote control command execution, and persistent export of operational data, enhancing system responsiveness and monitorability.

RESEARCH EXPERIENCE

A Frequency Regulation Framework for Integrated Renewable Energy Systems

Jul. 2024 - Aug. 2025

(IEEE PES T&D Conference, under submission)

A coordinated control strategy for wind-solar-storage hybrid systems was proposed, improving stability of IRES under frequency disturbances.

- Fundamental Modeling: Conducted dynamic modeling and characteristic analysis of wind power, PV, and energy storage systems.
- Frequency Regulation Capability Assessment Model: Developed a unified evaluation framework for multi-type renewable energy. Innovatively introduced an "energy-capacity" coordinated assessment mechanism in wind power systems, which dynamically adjusts response weights according to the stages of frequency events, effectively balancing response speed and sustainability.
- Coordinated Fuzzy Control Strategy: Designed a coordinated fuzzy controller that utilizes the frequency regulation potential of two of the three resources as inputs to dynamically generate power adjustment gains for the third to enhance system coordination by optimizing individual contributions and enabling adaptive, differentiated control.

TECHNICAL STACK

- Programming Languages:** Proficient in Python, C/C++, LAD, Verilog/VHDL; Project experience with Assembly Language.
- Embedded Systems & Controller Platforms:**
 - Industrial Controllers: Siemens S7 PLCs (TIA Portal)
 - FPGA Platforms: Intel MAX 10 series (Quartus Prime)
 - MCU: STM32 series (Commissioning steering-wheel robot in RoboMaster training), ESP32 series, 8051 architecture (89C51)
- Development & Simulation Tools:** MATLAB/Simulink, Multisim, OrCAD Pspice, Home Assistant

PERSONAL PROFILE

- Key Strengths:** Strong information retrieval, problem-solving, and debugging resilience. Team player with experiences in project coordination and team collaboration. Quick learner with a passion for acquiring new knowledge and applying it in practice, committed to continuous growth through hands-on experience.
- Student Experience:** Joined Robotics Association and the Water Conservation Division of the Green Origin Association in Zhejiang University, and as a member of the latter, participated in social practice initiatives and contributed to a project that received the "Outstanding Team" and "Outstanding Paper" awards in Zhejiang University's 2023 Undergraduate Summer Social Practice Program. Initiated and led the SQTP research project "Investigation on a New Battery Recycling Mechanism" at Zhejiang University.
- Professional Interests:** Planning to pursue a master's degree in a laboratory focused on control and protection of renewable energy systems; interested in embedded systems and IoT; actively learning and exploring Linux; Planning to build a personal website to document technical practices and personal reflections; embracing the culture of open collaboration and innovation-driven development.