Yibo Wei

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Education

University of California, San Diego   Sept. 2023 – Present
Ph.D. in Computer Science and Engineering   La Jolla, CA

University of California, San Diego   Sept. 2019 – June 2023
B.S. in Computer Science and Engineering   La Jolla, CA

Skills

Languages: Python, C/C++, Kotlin, TypeScript/JavaScript, Rust, Shell

Tech Stack: FastAPI, Docker, Redis, PostgreSQL Database, CI/CD, SQLModel, Android Development, Linux

Systems & Security: Reverse Engineering, Vulnerability Assessment, BLE Security, Protocol Design, Network Engineering

Research Experience

I am a PhD student specializing in systems and security research. My work focuses on developing scalable infrastructures for security analysis. I have extensive experience in back-end service development, mobile development, and security vulnerability assessment. My technical expertise includes reverse engineering embedded systems, automated security testing, and full-stack research infrastructure development. I am particularly interested in the intersection of mobile sensing, distributed computing, and security analysis.

Security Research Infrastructure Engineer - BLE/Mobile Security   Feb. 2024 – Present
- Architected and implemented comprehensive BLE security scanning infrastructure managing 2,676,640 BLE advertisements globally, enabling vulnerability research that led to discovery of multiple vulnerabilities
- Developed resilient backend architecture leveraging **FastAPI**, **SQLModel**, and **PostgreSQL**, with **Redis Queue** for asynchronous processing, containerized with **Docker**, and **CI/CD pipeline** with GitHub Actions
- Built a high-availability system with 99.99% uptime since deployment
- Engineered real-time analytics dashboard visualizing critical security metrics, device relationships, and threat patterns
- Pioneered novel algorithms for mapping BLE device-to-application relationships
- Implemented application-level encryption between API server and client applications to ensure data security independent of cloud storage

Security Research & Vulnerability Assessment - Embedded Systems Security   Oct. 2024 – Jan. 2025
- Led security assessment of commercial embedded systems, discovering multiple high-severity vulnerabilities in BLE implementations
- Developed specialized security assessment framework combining static analysis tools and custom scripts for reverse engineering Android applications and C# software
- Engineered tools demonstrating authentication bypass vulnerabilities in wireless communication protocols
- Identified and documented critical security flaws affecting millions of deployed consumer devices

BLE Scanner Android App - React Native & Kotlin   Jan. 2024
- Engineered mobile app initially in **React Native**, then reimplemented in **Kotlin** with **Jetpack Compose**
- Implemented application-level encryption and secure upload to **Google Cloud Storage**
- Collected over 2.6M BLE advertisements supporting critical security research

Projects

Python API for Apple Geolocation Service   May 2024
github.com/Microwave-WYB/gsloc
- Reverse engineered Apple's internal geolocation API and developed an open source Python wrapper, enabling programmatic access to WiFi access point location data via BSSID queries
- Engineered robust protocol parsing using **ProtoBuf**, ensuring reliable data serialization and API compatibility
- Automated deployment pipeline using GitHub Actions for seamless **PyPI** distribution
- Maintained comprehensive documentation and example code, facilitating easy integration for third-party developers

Scalable Audio Processing Infrastructure - Bird Species Identification   Mar. 2024 – June 2024

github.com/Microwave-WYB/phone-sensors

- Architected and implemented a open source platform for collecting, processing and analyzing bird call audio data
- Designed highly reliable backend using **FastAPI**, **Redis**, and **PostgreSQL** with 99.9% uptime since deployment
- Implemented comprehensive monitoring ensuring stable 24/7 operation
- Developed efficient async processing pipeline for audio analysis with automated error recovery
- Orchestrated containerized deployment using **Docker**, maintaining consistent performance in production environment

Embedded System Design - STM32 Motion-Aware BLE Tracker   Dec. 2023

- Designed and implemented power-efficient **BLE** tag prototype inspired by Apple AirTag architecture
- Built hardware system integrating **STM32** microcontroller with gyroscope sensor through **I2C** interface and BLE module
- Engineered adaptive BLE broadcasting algorithm triggered by motion state, optimizing for both findability and power efficiency
- Achieved 74mA power consumption through careful power management and state transitions
- Awarded 1st place in class competition for exceptional power efficiency metrics

High-Performance IP Router Implementation   Sept. 2022 – Dec. 2022

- Architected and implemented a high-performance network router in **C**
- Engineered an optimized longest prefix matching algorithm
- Secured 1st place in competitive performance evaluation among 100+ implementations
- Received the George Varghese UCSD CSE Espresso Award