KYLE LOU

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SUMMARY

- Student researcher with expertise in statistical signal processing, control systems, and data analysis.
- Experienced in designing adaptive algorithms and processing high-dimensional datasets.
- Proficient in Python, MATLAB, and advanced DSP and control systems techniques.
- Developed scalable platforms and pipelines for research and industry applications.
- Passionate about solving complex problems in signal processing, optimization, and data-driven modeling.

EDUCATION

UNIVERSITY OF CALIFORNIA, SAN DIEGO — La Jolla, CA

B.S. Computer Engineering | GPA: 4.0/4.0 — Sep 2022 - Jun 2026

Relevant Coursework: Digital Signal Processing, Random Processes, Adaptive Filtering, Control Systems, Filter Design, Optimization, Design & Analysis of Algorithms, Deep Learning Algorithms

RESEARCH EXPERIENCE

RARE LABS AT UNIVERSITY OF CALIFORNIA, SAN DIEGO — La Jolla, CA

Data Processing Research Assistant — Sep 2023 – Present

- Designed and implemented adaptive filtering algorithms to isolate weak dark matter signals from multi-terabyte experimental datasets, utilizing advanced statistical signal processing techniques to enhance signal detection accuracy.
- Increased signal detection accuracy by integrating statistical signal processing methods tailored to noisy, high-dimensional data.
- Architected scalable data pipelines to optimize real-time analysis, accelerating experimental physics workflows.

WORK EXPERIENCE

UNIVERSITY OF CALIFORNIA, SAN DIEGO — La Jolla, CA

Calculus Instructional Assistant — Sep 2024 – Present

- Assisted in reinforcing student understanding of calculus concepts by providing constructive feedback on assignments and exams.
- Collaborated with instructors to address student challenges, ensuring a consistent and supportive learning environment.

DAIWA CAPITAL MARKETS — Hong Kong SAR

Data Science Intern — Jun 2023 – Sep 2023

- Spearheaded the development of a comprehensive data analysis platform focusing on the Hong Kong Stock Exchange, leveraging Python and Pandas.
- Utilized effective communication skills to collaborate with team members and stakeholders, ensuring project goals were met within specified timelines. Exhibited adaptability and a rapid learning curve in mastering new concepts and methodologies.

TECHNICAL PROJECTS

VEHICLE STEERING CONTROL [link] — Dec 2024

- Designed and implemented a PID control system with lead-lag compensation for a linearized vehicle model.
- Achieved precise reference tracking with a median percent error of under 1% for complex paths.
- Developed MATLAB simulations for time-domain and frequency-domain analysis, including root locus, step response, and Bode plots, to enhance system stability and performance.
- Applied algorithmic optimization for parameter tuning, minimizing oscillations, and ensuring robust system response across varied test scenarios.

SIMULATION OF OFDM IN LTE COMMUNICATION SYSTEMS [link] — Nov 2024

- Conducted in-depth modeling of an LTE system employing Orthogonal Frequency Division Multiplexing (OFDM) using MATLAB, with a focus on real-world wireless communication scenarios.
- Developed QPSK modulation schemes and implemented FFT-based signal processing for efficient frequency-domain multiplexing and transmission.

- Designed robust receiver algorithms to recover signals distorted by channel effects and noise, leveraging concepts like circular convolution and channel equalization.
- Performed a comprehensive analysis of signal-to-noise ratio (SNR) effects on system performance, using error probability metrics to evaluate system robustness.
- Compared frequency allocation strategies (dedicated vs. shared spectrum) to balance accuracy and data throughput, providing insights into design trade-offs for next-generation communication systems.

STOCK EXCHANGE DATA ANALYSIS PLATFORM Aug 2023

- Automated retrieval and cleaning of Hong Kong exchange data for accuracy and timeliness. Optimized performance for efficient handling of large datasets.
- Investigated stock price relationships using statistical techniques such as regression and correlation analysis.
- Developed a high-performance data analysis platform, automating large-scale stock data retrieval, cleaning, and visualization.
- Applied time series analysis to identify actionable market trends, improving forecasting accuracy.

TECHNICAL PROJECTS

Signal Processing: Adaptive filtering, digital filter design, time series analysis
Control Systems: PID design, lead-lag compensation, stability analysis, state-space modeling
Programming Languages: Python, MATLAB, C++, Java
Software & Tools: Pandas, NumPy, SciPy, MATLAB Toolkits

ADDITIONAL

Languages: Native proficiency in English, Cantonese, and Mandarin
Awards: UC San Diego Provost Honors