Huanbo Meng

Email: hmeng35@berkeley.edu | Web: https://huanbomeng.github.io

Education

University of California, Berkeley Aug 2023–Present
B.A. Applied Mathematics, Statistics GPA: 3.875/4.0 *Berkeley, USA*

University of Wisconsin-Madison Jan 2022–May 2023
B.S. Mathematics, Computer Science GPA: 4.0/4.0 *Madison, USA*

Research & Projects

Turbulence Analysis, Lattice Boltzmann and Chan–Vese Segmentation Jan 2024–May 2024
Instructor: Yury Kolomensky, Dr. Yue Wang *UC Berkeley*

- Simulated polygon-induced turbulence using the Lattice Boltzmann Method and Chan–Vese segmentation.
- Built D2Q9 lattice model and implemented a CUDA-accelerated solver on the Perlmutter supercomputer with computing access provided through Prof. Yury Kolomensky, achieving over 20,000 iterations on 1500×400 grids.
- Applied Ray Casting for boundary setup and level-set Chan-Vese segmentation to identify low-velocity turbulent regions, the analysis results have been updated on my personal website.

Voice-Controlled Navigation Vehicle Jan 2024–May 2024
Prof. Jean-Paul Tennant, Prof. Michael Lustig *UC Berkeley*

- Verified stability of motor-control using Bode plots, transfer functions, and pole-zero analysis.
- Applied Singular Value Decomposition (SVD) to denoise sensor measurements and analyze the structure of system matrices, improving state estimation and feedback stability, and Principal Component Analysis (PCA) to extract dominant features from voice-signal data, enhancing the accuracy and efficiency of command recognition.
- Completed full hardware integration, including DAC/ADC interfaces, CMOS analog front-end circuits, motor drivers, encoders, and microcontroller firmware.

Convex Programming: The Minimum Covering Circle Case May 2022–Aug 2022
Prof. Justin A Holmer *Brown University, UW-Madison*

- Investigated the minimum covering circle problem using convex programming and Wolfe duality theory
- Applied Karush-Kuhn-Tucker (KKT) conditions and Lagrange multiplier methods to simplify primal problems with complex nonlinear constraints, and analyzing the geometric characterization and uniqueness of optimal feasible solutions in Euclidean space
- Developed and implemented polynomial-time algorithms in MATLAB to solve minimum covering circle and sphere problems for 50 randomly generated points

Publication

Meng, H. (2023). Convex Programming: The Minimum Covering Circle Case. *Proceedings of SPIE*, Vol. 12597, 125970X. doi: 10.1117/12.2672704

Internship Experience

Siemens – Data Analysis & Software Testing Intern (Beijing, China) May 2023–Jul 2023

- Tested and validated a new vibration-analysis software by designing structured test cases, identifying anomalies in frequency-domain and time-domain outputs, and reporting reproducible issues to the engineering team.
- Processed and cleaned large-scale time-series sensor data, including outlier detection, resampling, and feature extraction for vibration diagnostics.
- Collaborated with mechanical engineers to interpret vibration patterns and ensure the software's analytical results matched real-world component behavior.
- Used Python (Pandas, NumPy) to automate part-ID matching and build data-cleaning pipelines that reduced manual verification.

Technical Skills & Additional Information

Computer Skills: Python, Julia, Matlab, R, AutoCAD, Fusion 360
Languages: English, Mandarin (Native)
Interests: Software Modeling, 3D Printing (Additive Manufacturing), Handicraft