DONGHYEON (MAX) KIM

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EDUCATION

University of Maryland, GPA 3.77/4.0   College Park, MD
M.S. in Mechanical Engineering   Expected Dec 2024

- **Coursework:** Advanced Systems Control, Applied Machine Learning, Control of Smart Structures, Decision Making Under Uncertainty, Engineering Optimization, Industrial AI, Optimal Estimation.

B.S. in Mechanical Engineering, GPA 3.70/4.0   May 2023

- **Awards and Honors:** Clark Legacy Scholarship, Dean's List all semesters.

SKILLS

Engineering: Algorithms, computer vision, microcontrollers, systems modeling and analysis, soldering
Software: C/C++, Fusion 360, Julia, MATLAB, Python, Simulink, SolidWorks CAD, FEA.

EXPERIENCE

Research Assistant   College Park, MD
Laboratory for Control and Information Systems   Apr 2022 – Present

- Design and implement algorithms for signal preprocessing, system identification (including multi-blind system identification), optimization, optimal case-control matching, and data analysis on physiological signals with extensive parameter tuning in MATLAB and Python.
- Conduct signal processing such as pre-processing, filter design, time- and frequency-domain analysis, and feature extraction on 5 different physiological signals measured from 600+ subjects.
- Maintain detailed documentation of research activities, including data processing workflows, troubleshooting steps, and system modifications, ensuring transparency.
- Create and present weekly summaries of research progress and lead discussions on findings to drive productive, goal-oriented discussions and strategic planning

PUBLICATIONS AND PRESENTATIONS

- Kim, D., et al., "Transmission Line Model as a Digital Twin for Abdominal Aortic Aneurysm Patients." *npj Digital Medicine,* vol 7, Article 301, 2024.
- "Tube-Load Model as a Digital Twin for Abdominal Aortic Aneurysm Patients" (poster). IEEE International Engineering in Medicine and Biology Society Conference. Orlando, FL, July 2024.
- "Tube-Load Modeling of Aorta with Abdominal Aortic Aneurysm" (poster). IEEE International Conference on Biomedical and Health Informatics. Pittsburgh, PA, Oct 2023.

PROJECTS

Proximal Policy Optimization-Based Control for Autonomous Drone, Team Lead   May 2024

- Design and train a reinforcement learning navigation algorithm that could outperform a heuristic-based control algorithm in unseen environments by 27% in terms of time-steps taken.
- Built custom drone simulation environment in Julia featuring stochastic dynamics.

Robust PID Control of Automatic Blood Pressure Cuff   Dec 2023

- Performed system identification on known pressure cuff and PWM solenoid valve models to approximate a transfer function of the system.
- Designed a robust PID controller following ITAE and IMC principles to achieve 0 steady-state error.

Assistive Utensil for Essential Tremor Patients, Team Lead   May 2023

- Spearheaded the development of an assistive spoon for patients with essential tremors that could reduce tremors by up to 50%.
- Engineered an affordable solution priced at $40, ensuring accessibility for a wide range of patients.
- Created comprehensive test beds and protocols to facilitate weekly testing during prototyping.
- Served as technical expert, developing all mathematical models for the project, and acted as a key reference resource for team members by providing technical guidance and support.