Curriculum Vitae

Changhun Park

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PROFESSIONAL SUMMARY

Mechanical Engineer with expertise in drivetrain systems, reliability engineering, and root cause analysis for complex mechanical assets. Hands-on experience in CAD modeling, FEA, vibration analysis, and mechanical testing under harsh environments (vibration, temperature variation, humidity). Skilled in integrating mechanical, electrical, and software components to enhance system performance and uptime. Strong background in wind turbine operations, robotics, and autonomous systems, with proven ability to lead cross-functional projects and drive continuous improvement in reliability and maintenance programs.

EDUCATION

Master of Computer Science-Data Science, *University of Illinois Urbana-Champaign*   Aug 2024
Bachelor of Mechanical Engineering, *University of Illinois Urbana-Champaign*   Dec 2022
        (Minor: Computer Science, Electrical and Computer Engineering)

PROFESSIONAL EXPERIENCE

Research Assistant

Smart Applied Technology Research Center, Dong-A University, Busan, South Korea   Feb – Present 2025

- Developed an autonomous container lashing robot system using Doosan Robotics M1509 to automate high-altitude lashing operations under strong wind conditions
  - Implemented Kalman Filter and Gaussian Blur for noise suppression in outdoor image processing
  - Fine-tuned YOLOv8 to accurately detect corner casting holes under variable lighting and background noises, achieving 95% recognition accuracy
  - Integrated IR sensors for distance measurement and gyro sensors for real-time robot posture correction
  - Designed a TCP/IP-based communication architecture ensuring stable and real-time data exchange among robot, camera, and sensors
  - Programmed robotic motion control using Doosan Robot Language (DRL) for autonomous lashing and unlashing processes
- Contributed in Planning and Feasibility Study on Robotic Power-Supply Technology for Refrigerated Containers Using NVIDIA Isaac Sim
- Proposed the development of an automated skipjack-tuna alignment system
- Initiated a proposal to develop a vision-guided automated species-sorting system for mixed non-mackerel bycatch on processing lines

Robotics Developer Assistant

Health Care Engineering Systems Center, UIUC, Champaign IL   June - July 2022

- Designed and prototyped soft robotic systems with drivetrain components optimized for torque transfer and reliability.
- Used SolidWorks and Fusion 360 to expand system DOF, applying tolerance analysis and manufacturability checks.
- Contributed to hardware validation for safety, compliance, and long-term usability.

Robotics Engineer Intern

Earthsense, Inc., Champaign IL   May - Dec 2021

- Improved drivetrain durability of autonomous agricultural robots by designing vibration-damping suspension and gear systems; validated with CNC prototypes and FEA.
- Conducted field testing and Root Cause Analyses (RCA) on mechanical failures, increasing reliability by 20%.
- Collaborated with vendors on tolerance stack-up analysis to enhance manufacturability and reduce component failure rates.
- Supported drivetrain performance monitoring and implemented design modifications that improved uptime.

PROJECT EXPERIENCE

Gateway-Inspired Data Pipeline Project-Predictive Model for Health Inspection Failures (2024):

Built a full-stack machine learning application (Python, Flask, SQL) simulating real-world data ingestion, cleaning, model deployment, and documentation practices.

Streaming Music Sentiment Dashboard-NLP Project (2023):

Designed interactive web interfaces (D3.js, JavaScript, SQL) with a focus on usability, dynamic feature expansion, and back-end support.

Academic Database Dashboard (2023):

Created real-time analytics dashboards integrating cleaned datasets and responsive web visualization.

Cooling System Design for Hair Clipper Blades (2022):

Applied CFD & FEA to reduce thermal build-up by 25%, extending component reliability under sustained operation.

Sequential Cam Transmission (2021):

Built prototype drivetrain to optimize torque transfer and mechanical efficiency.

Adjustable Selfie Stick Redesign (2020):

Improved ergonomics and reliability via CAD modeling and manufacturing-ready BOM for redeigning a selfie stick.

SKILLS

Language:

Python, C++, Java, DRL

CAD & Fabrication:

SolidWorks, Fusion 360, Autodesk Inventor, Creo 3.0, CNC machining, laser cutting, plasma cutting, sheet metal fabrication, aluminum extrusion, woodworking

3D Printing:

Ender3 maintenance & troubleshooting, functional prototyping, FDM optimization

Electronics & Programming:

PCB design, electrical soldering, Arduino (C/C++), Python, MATLAB, ROS

PUBLICATIONS

Changhun Park et. al, "Development of Autonomous Container Lashing System with Collaborative Robot and Sensors," *Journal of Marine Science and Engineering,* In progress.