

# DA-HUI SONG

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## EDUCATION

### University of Illinois at Urbana-Champaign

M.S in Mechanical Engineering

Expected May 2025

GPA: 3.85/4.00

### Sookmyung Women's University

B.S in Mechanical Systems Engineering

Mar 2019 – Feb 2023

GPA: 3.64/4.00

B.S in Software Engineering

GPA: 3.92/4.00

## TECHNICAL SKILLS

**Lab/Research Processes:** Computer Vision, AI/ML, Real-Time System Development, Robotics, Automation, Sensor Fusion

**Programming Languages:** Python, C, C++, MATLAB, Java

**Applications:** Git, OpenCV, PyTorch, TensorFlow, AutoCAD, ROS, 3D Printing, LabVIEW, Simulink, Gazebo, CoppeliaSim

**Spoken Languages:** English and Korean

## PROFESSIONAL EXPERIENCE

### Intelligent Motion Laboratory, University of Illinois at Urbana-Champaign

Champaign, IL

Graduate Research Assistant

Feb 2024 – Sep 2024

- Participated in a robotic eye examination system using optical coherence tomography for enhanced diagnostic accuracy in ophthalmology with Duke University and National Institutes of Health
- Conducted qualitative and quantitative stress tests using Python, identifying system limitations and improving reliability under varied operational conditions
- Calibrated hardware components by comparing ZED camera calibration with a 3D camera calibration method, selecting the 3D camera calibration method for its superior depth estimation accuracy, achieving a 5% improvement using C++

### Autonomous Mechanical Systems Laboratory, Sookmyung Women's University

Seoul, S. Korea

Undergraduate Research Assistant

Apr 2020 – Mar 2022

- Preprocessed video data by extracting regions of interest, applying pyVHR to estimate heart rate, and contributing refined input data to the model development team for the First Vision for Vitals Challenge, achieving 4<sup>th</sup> place
- Streamlined and optimized 70,000-image dataset for the Driver Distraction Detection System by removing duplicates and irrelevant images, ensuring high-quality training data for a classification task provided by AI-Hub
- Trained and fine-tuned a deep neural network, adjusting hyperparameters to achieve a 15% improvement over the baseline model, enabling precise detection of inattentive driver behavior

## PROJECT HIGHLIGHTS

### Autonomous Land Yacht Carbot

Sep 2024 – Present

- Designed and assembled hardware components for an autonomous land yacht, optimizing structural integrity and functionality for stable navigation on diverse terrains at UIUC Center for Autonomy
- Developing software algorithms for navigation, path planning and obstacle avoidance, integrating GPU and wind sensor data for real-time decision-making

### SafeDrive: Enhancing Road Safety with Advanced Detection System

Mar 2024 – May 2024

- Integrated AI models using YOLOv8 for pedestrian and traffic sign detection and LSTR for lane detection
- Developed a real-time inference pipeline in Python, enabling robust detection in diverse environmental conditions
- Utilized the Traffic Signs Detection dataset to implement ensemble methods for enhanced pedestrian and traffic sign recognition

### Dog Bot

Aug 2023 – Dec 2023

- Designed and prototyped a robotic dog using SOLIDWORKS for CAD modeling, incorporating 3D printing and optimized motion studies to achieve smooth movements
- Developed software algorithms in C and LabVIEW to implement fetching functionality, enabling the robot to navigate from its current position to a designated target with 90% accuracy
- Programed interactive behaviors such as sitting, fetching, and spinning, enhancing engagement through expressive LED patterns

### Rescue Signal Detection and Reporting System

May 2022 – Aug 2022

- Developed a pose detection algorithm using 2D key point detection to calculate angles and accurately recognize specific rescue poses and implementing real-time visualization through a responsive HTML-based website, achieving over 70% accuracy.