JIN WOOK SHIN

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EDUCATION

University of Michigan - College of Engineering **Ann Arbor, MI**
B.S.E. Computer Engineering *Expected April 2027*

- GPA: **3.981**
- Awards: James B. Angell Scholar, University Honors, William J. Branstrom Freshman Prize

EXTRACURRICULAR ACTIVITIES

Strategy & Computer Vision Team, WolverBot Kickers *August 2023 – April 2024*

- Implemented real-time multi-agent A* pathfinding algorithm in C++ for soccer-playing robots competing in a dynamic environment, optimizing individual agent paths by actively processing opponents' positions and desired robot destinations, significantly enhancing route calculation speed, responsiveness, and overall team coordination
- Developed and trained YOLO-based computer vision model on 1,000+ labeled images for real-time soccer ball detection and player robot classification, achieving over 96% mean average precision (mAP) at 30+ FPS

Research Experience

Undergrad Researcher, ISC Lab *March 2025 – Present*

- Built a multi-label audio classification model to detect 24 human activities and 10 background noise types, achieving 85% precision; used Onset Detection to extract key STFT features from 10-second audio clips
- Characterized and tested ultrasonic transducers toward developing a novel on-body sensing device for seamless touch state detection without requiring on-skin sensors or computer vision
- Designed and developed an ultrasonic touch-sensing system using ESP32 microcontroller, custom analog circuit for square-to-sine wave conversion, voltage boosting, and integrated ultrasonic transducers with Voice Pickup Unit (VPU) for accurate signal transmission and reception
- Engineered a compact, wearable form factor by designing and prototyping a 3D-printed ring that embedded PCB boards for both the ultrasonic tweeter and VPU, enabling a seamless data collection process and user experience

PROJECTS

Any Surface Touchscreen *March 2025 – April 2025*

- Initiated and led development of "Any-Surface Touchscreen" system, designing and implementing a LiDAR-based finger-tracking solution via UART on STM32; built calibration tools for customizable surface sizes
- Collaborated on multi-board communication protocol and provided critical debugging support across subsystems, contributing to FPGA gesture state stability and DRAG functionality implementation

On Time Every Time *January 2025 – February 2025*

- Designed and deployed a real-time bus tracking web application using Flask, JavaScript, and the University of Michigan's MBus API, providing dynamic predictions of bus arrival times to improve commuter experience
- Built and integrated an ESP32-based standalone hardware device, enabling users to conveniently access live bus arrival data without relying on smartphones or external applications

LC2K CPU *June 2024*

- Programmed a fully functional LC2K CPU simulator and assembler in C with a multi-cycle pipeline architecture, accurately handling instruction decoding, assembly-to-machine code translation, and execution
- Implemented and synthesized a single-cycle LC2K ISA processor in Verilog using iVerilog and Gowin EDA, validated functionality through VCD waveform analysis, and successfully deployed onto a Tang Nano 20K FPGA

Bark Detector *June 2024 - July 2024*

- Developed and trained a TensorFlow model leveraging audio preprocessing techniques, including Fast Fourier Transform and Mel-Frequency Cepstral Coefficients, to accurately detect dog barks amidst household noises
- Deployed a lightweight TensorFlow Lite model onto Arduino 33 BLE Sense microcontroller, building an embedded device capable of autonomously identifying barking events and triggering real-time calming commands

ADDITIONAL ACTIVITIES

- **Korean International Student Association, President** *August 2023 – Present*
- **EECS 545 (Machine Learning) Grader** *January 2025 – May 2025*

SKILLS

Languages: C/C++, Python, Verilog, Assembly, Java
Skills/Framework: Machine Learning (TensorFlow, PyTorch, TinyML, CV), Debugging tools (oscilloscope, logic analyzer), Communication protocols (SPI, UART, I2C), Microcontroller programming (STM, ESP32, Arduino), 3D CAD (Onshape), PCB Design (KiCad)