

# JIN WOOK SHIN

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## EDUCATION

### University of Michigan - College of Engineering

B.S.E. Computer Engineering

Ann Arbor, MI

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 – Present

- 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

### Strategy Division, UM Solar Car

August 2023 – March 2024

- Designed a race simulation program analyzing input data including aerodynamic drag, steady state speed, and road conditions with active differential system, optimizing energy consumption and speed efficiency by 5 percent
- Worked on Machine Learning Optimizer project by developing Ant Colony Optimization algorithm to simulate and produce the most efficient speed incorporated with environmental and kinematic factors for sectors of the race

## 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 representative 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

## 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

- **EECS 545 (Machine Learning) Grader**
- **Korean International Student Association, President**

January 2025 – Present

August 2023 – Present

## SKILLS

**Languages:** C/C++, Python, Verilog, Assembly, Java, HTML, CSS, JavaScript, NetLogo

**Skills/Framework:** Machine Learning (TensorFlow, PyTorch, Keras, TinyML, OpenCV, YOLO), Debugging tools (oscilloscope, logic analyzer), Communication protocols (SPI, UART, I2C), Microcontroller programming (STM, ESP32)