

# YU-HSUAN WU

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## PROFESSIONAL SUMMARY

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Engineering graduate with a strong foundation in embedded systems, real-time optimization, and IoT development. Familiar with C++, Python, and Embedded C, as well as communication protocols such as TCP and UDP. Gained exposure to BLE through collaborative projects. Skilled in algorithm design and optimizing embedded applications to deliver efficient and innovative solutions.

## SKILLS

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|-------------------------------------------------|----------------------------------------|
| • Programming: Embedded C, C++, Python          | • Communication Protocols: SPI , I2C , |
| • Computer architecture                         | UART, Bluetooth                        |
| • RTOS (Raspberry Pi OS with PREEMPT_RT kernel) | • TCP/UDP socket programming           |
| • Embedded Linux                                | • Internet of Things                   |
| • Parallel Computing: CUDA(Jetson Nano)         | • Image Processing: OpenCV             |

## PROJECTS

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### MotraxVR: Bridging Real-World Kinematics with Virtual Reality

- Created a wearable system with 16 IMU sensors, enabling real-time motion tracking for VR avatars
- Designed algorithms to synchronize movements with a 5-degree tolerance and reduced latency for smooth responsiveness
- Collaborated on motion-based VR applications, enhancing workout experiences and interactive engagements
- Technologies: Embedded C, Python, Unity, Bluetooth

### Photo-Realistic Lighting System for AR Applications

- Developed a real-time, photo-realistic AR lighting system using YOLO-based neural networks for light source classification, effectively handling diverse indoor scenes despite limited training data
- Optimized mobile rendering performance using a Median-Cut algorithm for area light discretization, achieving up to 10x faster illumination and shadow calculations and smoother rendering on AR-capable mobile devices
- Integrated ARKit/ARCore into a unified pipeline, reducing cross-platform rendering overhead by an estimated 15-25%, leading to enhanced visual consistency and realism in complex AR scenes
- Technologies: Python, Pytorch, Unity, Flask

### CUDA-Accelerated Algorithms on Jetson Nano

- Developed prefix-sum algorithms for small and large arrays, achieving 10x GPU speedup over CPU
- Implemented tiled 1D and 2D convolution layers for DNNs, optimizing data processing
- Tuned GPU grid and thread block sizes on the Jetson Nano platform, accelerating kernel execution by an estimated 3- 5x
- Technologies: CUDA, C++, Jetson Nano, Makefile

### IoT Swarm System with Real-Time Data Logging

- Built a dynamic IoT network with ESP8266 and Raspberry Pi, enabling master node detection and sensor communication using UDP broadcasting

- Developed a real-time system for light intensity-based LED brightness control and data visualization on Raspberry Pi/Matplotlib, achieving 10-15 FPS.
- Technologies: Embedded C, Python, UDP Broadcasting, PWM Control, Matplotlib, GPIO

### Personal Portfolio Website

- Built a personal website to showcase embedded and software projects in a clean, responsive layout
- Presented technical skills and project summaries through structured sections and interactive design
- Used Vue 3 and Tailwind CSS for modular UI; deployed via GitHub Pages
- Technologies: Vue 3, Tailwind CSS, HTML, JavaScript

### EDUCATION

<b>University of California Irvine</b>	<b>USA</b>	<b>2024</b>
<i>M.S., Embedded and Cyber-Physical Systems – 3.8/4.0</i>		
<i>Coursework: Embedded System Software, Cyber-Physical Systems Design, Sensors, Actuators and Sensor Networks</i>		
<b>National Taipei University</b>	<b>Taiwan</b>	<b>2023</b>
<i>B.B.A., Business Administration – 3.9/4.0</i>		
<i>B.S., Computer Science and Information Engineering (Double Major) – 3.9/4.0</i>		
<i>Coursework: Algorithm, Data Structure, Operating Systems</i>		