david.bw.cheng@gmail.com

DAVID CHENG

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SKILLS

Programming	C++/C, Java, Python, Assembly (8051)
Software	Git, CMake, Linux, Qt Framework, MATLAB
Embedded	Arduino, ESP32, ESP8266, Raspberry Pi Pico

WORK EXPERIENCE

CNH Industrial Oak Brook, IL

Embedded Software Engineer II – *Guidance Team* July 2024 - Present

- Worked on the guidance backend component in C++, processing operator inputs and real-time data for UI visualization in a Qt application, running on an embedded Linux device using Yocto.
- Led the development of agricultural swath recording features in C++, improving swath creation, selection, and deletion efficiency by 30% through event-driven workflows using Qt signals and slots.
- Accomplished real-time guidance line tracking for the first time on the new proprietary OS by developing swath rendering code, interfacing the swath generation output API with the display API.
- Improved operator setup and load times by 20% by offloading persistence operations to a separate thread, ensuring critical events are handled and displayed to the UI without delay.

Embedded Software Engineer I – *Automatic End-of-Row Turn (AEORT) Project* July 2022 - July 2024

- Led the development of an automated field turn planner that generates the shortest, drivable turns between swaths, by implementing a Dubins-Clothoid-based turning algorithm.
- Designed and proposed a dynamic turn planning solution to address collision turns, dividing them into sub-turns for re-planning, resulting in a formal IP submission.
- Accelerated the transition from proof-of-concept to production by leveraging existing interfaces, which enabled rapid algorithm testing on the machine through sideloading.

PROJECTS

GitHub Portfolio Page: https://daviecheng.github.io/

Wearable Posture Corrector Device, *Self-Project*

- Prototyped and designed a wearable posture-correction device using the SEFR machine learning algorithm to detect and notify users of prolonged slouching.
- Interfaced an accelerometer with a microcontroller over I2C for real-time posture monitoring.
- Extended battery life to 4.5 days by decreasing the system clock frequency and removing unused internal LEDs on the microcontroller.
- **Utilized**: C/C++, Python, Arduino, ATmega328 MCU, Multimeter, Soldering, Fusion 360

Automatic Button Presser for Nintendo Switch, *Self-Project*

- Developed a circuit that simulates in-game actions by automating button presses on the Nintendo Switch Joycon.
- Implemented debounce logic within an interrupt service routine (ISR) to eliminate press fluctuations.
- **Utilized**: C Programming, Raspberry Pi Pico, Arm Cortex-M0+, GNU Arm Toolchain, CMake

EDUCATION

New York Institute of Technology Sept 2017 - May 2022

M.S. Electrical & Computer Engineering GPA: 3.96/4.00

B.S. Electrical & Computer Engineering GPA: 3.89/4.00

Degree Honors: *summa cum laude*, Presidential Honor List (2018-2021)