Jikai Wang

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EDUCATION

Cornell University Ithaca, US
M.Eng in Electrical and Computer engineering Expected Dec 2025
Relevant Coursework: Computer Architecture; Design with Embedded Operating Systems

The University of Manchester Manchester, UK
BSc (Hons) in Physics GPA 3.91/4.0 Sept 2020 - June 2023
Relevant Coursework: Quantum Computing; Condensed Matter Physics; Semiconductor Quantum Structures; Electrodynamics(M)

PROJECT EXPERIENCE

Raspberry Pi 4 Motion Detection and Surveillance System June 2024

- Implemented a motion detection system using a PIR sensor and indicator light on a Raspberry Pi 4.
- Developed a photo capture and upload feature using a V2 Pi Camera, with automatic email notifications containing photo timestamp and location.
- Designed a user-friendly webpage to view new photos, latest capture details, and to configure photo/video settings, including manual and scheduled captures.

FPGA Design and Implementation using Verilog and Xilinx Vivado Feb - Mar 2024

- Mastered Verilog for hardware description and Xilinx Vivado for FPGA design and synthesis.
- Gained expertise in various modeling styles and schematic design using IP integrator.
- Designed and implemented hardware components, including single-port and dual-port memory, finite state machines (FSMs), UART, Serial Peripheral Interface (SPI), PWM, LCD, and I2C.
- Developed comprehensive testbenches for verifying the functionality of each hardware module.

Advanced Embedded System Project using STM32 Microcontroller April 2024

- Developed an embedded application using STM32CubeIDE, creating and compiling projects on both Windows and STM32 Discovery Board.
- Implemented a comprehensive GPIO control program, leveraging bit manipulation and memory-mapped register access techniques.
- Designed and programmed a system for interfacing LEDs and keypads, using pointers, structures, and bit fields for efficient peripheral configuration.
- Conducted in-depth code analysis and debugging, utilizing memory browser, ELF file analysis with GNU tools, and hardware instruction-level debugging.

Embedded Linux Development on Beaglebone Black May 2024

- Developed an embedded Linux system on Beaglebone Black, mastering the ROM, U-Boot, and Kernel boot processes.
- Compiled and tested U-Boot and Linux Kernel, configuring platform devices and ARM-board configuration files.
- Implemented various boot modes (eMMC, UART, TFTP, NFS) and updated the Debian OS on the Beaglebone.
- Utilized Busybox and Buildroot, wrote and tested custom uEnv.txt, and used I2C tools for hardware interfacing.

RESEARCH EXPERIENCE

Investigation of the Electrical Properties of Graphene
Research Mentor: Prof. Alexander Grigorenko Feb 2023 - May 2023

- Prepared a CVD graphene sample and employed the van der Pauw method to measure its sheet resistance and hall resistance.
- Determined the density of charge carriers inside the graphene sample at different gate voltages by using the modified Hall coefficient equations and making reasonable assumptions.
- Investigated the electric properties of the graphene sample under various conditions, including undoped, doped with water vapor, and doped with ammonia.
- Discovered a zero hall resistance and a very low charge carrier concentration of graphene sample at the Dirac point, which is attributed to its distinctive electron band structure.

SKILL

Programming: C, python, Verilog, PyMTL3 pytest.

Embedded board: Raspberry pi, Beaglebone Black, STM32 discovery.

Tool: Xilinx Vivado, STM32CubeIDE, VSCode, Github.

OS: Ubuntu linux.