

Yu-Lun (Larry) Tsai

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EDUCATION

Carnegie Mellon University, School of Computer Science, Pittsburgh, PA *Expected Dec 2017*
Master of Science in Embedded Software Engineering (QPA: 3.47/4.0)

- Relevant Coursework: Parallel Computer Architecture and Programming, Real-Time Embedded System

National Taiwan University, College of Electrical Engineering and Computer Science, Taipei, Taiwan *Jun 2015*
Bachelor of Science in Electrical Engineering (GPA: 3.9/4.0)

- Relevant Coursework: Algorithms, Data Structure and Programming, Operating System

EXPERIENCE

Software Engineering Practicum, Bezirk, Robert Bosch LLC & CMU, Pittsburgh PA (Android) *Jan 2017 - Aug 2017*

- Designed and implemented a data preparation framework used as an internal tool to facilitate experimentation
- Achieved framework extensibility by adopting message passing architecture, adapter and facade design pattern
- Participated in the entire software development lifecycle starting from requirement engineering, design to quality assurance
- Completed test automation including unit test, integration test, and static code analysis

Research Assistant, National Taiwan University, Taipei, Taiwan (C, Android) *Sep 2014 - Jun 2016*

- Developed a mobile alcohol and drug consumption self-monitoring system including hardware, firmware, and Android application, which helped 200+ patients with relapse prevention
- Implemented device driver on bare-metal micro-controllers through DMA, UART, I2C, and SPI interfaces
- Pipelined image upload from an external camera module to the web server using BLE protocol and HTTP request

Software Engineering Intern, Yotta Lab Technology Co., Ltd., Taipei, Taiwan (C++) *Jun 2014 - Sep 2014*

- Implemented a lane departure warning algorithm based on video data collected from driving recorders
- Built a MFC desktop visualization tool, helping diagnose and evaluate results on image processing algorithms

SELECTED PROJECTS

Linux Kernel Hacking and Development (C, Linux Kernel, Android NDK) *Aug 2016 - Dec 2016*

Course project for Real-Time Embedded System in CMU

- Developed a real-time task reservation and enforcement framework to guarantee each task gets sufficient CPU resource
- Implemented loadable kernel modules, system calls, and sysfs interfaces that allow developers to configure the framework, set and cancel real-time tasks reservation, and monitor current reservation status
- Generalized the framework to multiple-processor scenarios while minimizing CPU power consumption

Parallel Optimization Techniques (C++, OpenMP, MPI, CUDA) *Jan 2017 - May 2017*

Course projects for Parallel Computer Architecture and Programming in CMU

- Optimized the page rank algorithm, top-down and bottom-up BFS algorithms by reducing the amount of data false sharing
- Improved a sequential graphic renderer by parallelizing tasks in different rendering regions via CUDA
- Developed a multiple-node server to process requests in parallel, and reached 90% overall CPU utilization and throughput requirement by dynamically turning on/off worker nodes

Autonomous Driving Control (C++, Matlab, Simulink) *May 2017 - Aug 2017*

Independent study supervised by Prof. Raj Rajkumar

- Designed hierarchical finite state machine to capture behaviors of a human driver under multiple driving scenarios
- Solved the state explosion problem by separating perception, decision, and control logic and a fixed-priority message protocol
- Verified the architecture design using Simulink/Stateflow and implemented interface for generated C code

Dynamic Memory Allocator - Malloc (C) *May 2016 - Aug 2016*

Course project for Introduction to Computer System in CMU

- Implemented a dynamic memory allocator that supports malloc, free, calloc and realloc interfaces
- Compared three blocks organization strategies' performance: implicit free list, explicit free list, and segregated free list
- Optimized the memory utilization to 74% using segregated list as data structure and freed memory block coalescing

Mini-Kernel on Raspberry Pi 2 (C, ARM, Assembly) *Aug 2017 - Present*

Course project for Introduction to Embedded System in CMU

- Developed core real-time kernel functionalities on Raspberry Pi, including interrupts, timers, scheduling and profiling
- Implemented an ADC and servo control device drivers through MMIO, UART, I2C, SWI interfaces

SKILLS

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|------------------------------|---|
| Programming Languages | C, C++, Java, Android, Python, Objective C, Javascript, Matlab, Shell |
| System Engineering | Linux Kernel, ARM, Assembly, BluetoothLE, CUDA, OpenMP, MPI, Android NDK |
| Software Development | Object-Oriented Design, Git, Gradle, Test automation, Scrum, GDB, Microsoft TFS |