Yunpeng Xu

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EDUCATION

Carnegie Mellon University, School of Computer Science — Pittsburgh, PA
Master of Science in Embedded Software Engineering, QPA: 3.51/4.0 — *Sep. 2016 - Dec. 2017*

- Real-Time Embedded System, Parallel Computer Architecture and Programming, Introduction to Embedded System, Introduction to Computer Systems, Architectures for Software Systems, Mobile Application Development

University of Science and Technology of China — Hefei, China
Master of Biomedical Engineering, Medical Device, GPA: 86.03/100 — *Sep. 2011 - Jul. 2014*
Bachelor of Electronic Information Science and Technology, GPA: 86.42/100 — *Sep. 2007 - Jul. 2011*

EXPERIENCE

Research Assistant, CyLab, Carnegie Mellon University, Pittsburgh, PA — May. 2017 - Aug. 2017

- Built an OpenCV-based real-time moving object detection application with four fisheye cameras on NVIDIA TX1 and TI TDA2x ADAS platforms, successfully brought up the system and deployed it on a real vehicle.
- Evaluated application performance, decreased each frame's processing time by 23.5% after optimization using CUDA.

System Application Engineer, Ambarella Inc., Shanghai, China — Oct. 2015 - Jul. 2016

- Designed and implemented a smart rate control library for Ambarella's S2L and S3L SDK, supported AVC/HEVC.
- Efficiently improved video compression ratio while maintaining video quality, later ported to Apple's HomeKit service.
- Designed and implemented Netlink module to transfer messages between kernel and user-space process.

Embedded Software Engineer, Galaxycore Inc., Shanghai, China — Jul. 2014 - Sep. 2015

- Core Linux device driver developers for Galaxycore's video surveillance SOC.
- Implemented device driver for digital imaging sensors, and AVC and JPEG decoding modules using V4L2 framework.
- Optimized device driver for image signal processing (ISP) and AVC encoding modules based on V4L2 framework.

PROJECTS

Real-Time Task Scheduling Framework (C, Android), Pittsburgh, PA — Sep. 2016 - Nov. 2016

- Designed and developed a task scheduling and enforcement framework including kernel modules, system calls, sysfs interface and Android NDK for task admission control on Nexus 7 tablet.
- Implemented fixed-priority processor scheduling algorithms for multi-processors using task partitioning algorithms.
- Managed energy consumption of real-time tasks by implementing power management algorithms like Sysclock.

Parallel Optimization (C/C++, CUDA), Pittsburgh, PA — Apr. 2017 - May. 2017

- Designed an elastic web server on a pool of machines; exploited multi-thread execution and cache locality; optimized load balancing and scaling strategy for different requests, successfully meeting latency requirements for 98.8% requests.
- Designed and implemented a galaxy evolution simulator using both Barnes-Hut algorithm and Morton-Code algorithm, and achieved 10x speedup by using performance bottleneck analysis and CUDA acceleration.

Mini-Kernel on Raspberry Pi (C), Pittsburgh, PA — Sep. 2017 - Now

- Designed and built core embedded real-time functionalities from scratch for Raspberry Pi, including memory management , interrupts, timers, scheduling and ARM assembly profiling.
- Implemented driver for UART/I2C/ADC peripheral using MMIO, and applied them to implement a clap detector.

ROS Reconfiguration Framework (C++, ROS), Pittsburgh, PA — Jan. 2017 - Aug. 2017

- Led the team to design a reconfiguration framework that allows ROS application developers to swap navigation and control algorithms and parameters being used in the robot at runtime, and finally deployed and verified using Turtlebot 2.
- Implemented all core features (reconfigure framework, node dependency) individually and performed peer reviews.

Easy Order (Java/Python, Android/Django), Pittsburgh, PA — Jul. 2017 - Aug. 2017

- Led the team to design and develop a cross-platform meal delivery application for Chinese takeout.
- Built all user interfaces using Android layouts, implemented core features and interaction with RESTful APIs.

Dynamic Storage Allocator (C), Pittsburgh, PA — Jun. 2016 - Jul. 2016

- Implemented a Dynamic Storage Allocator including malloc, free, realloc and calloc interfaces.
- Compared three free blocks organization strategies' performance: implicit free list, explicit free list, segregated free list.
- Achieved 78% memory utilization over 29 cases using segregated list, first fit, splitting and coalescing after block freed.

SKILLS

Programming Languages: C/C++, Java > Python, ARM/X86 Assembly > Bash, Javascript, Matlab
Linux Development: Device driver, Kernel module, Task reservation & power-aware algorithms, Video Codec
Frameworks: ROS, CUDA, ARM, V4L2, Android, OpenCV, OpenMP, MPI, ISPC, Django, Bootstrap, React
Tools: Git, Makefile, GDB, Repo, Scrum, JIRA   **Interfaces:** UART, SPI, I2C