Arul Selvan Sekar

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Work Experience

Current
Jan 2013

Senior Software Engineer, TEGRA
NVIDIA, Redmond WA

Core Program Architect, Automotive Foundation (Current)
- Responsible for architecture of SW Core program for Automotive Foundation (Flashing, Bootloader, TEE, Comms, Platform, etc.)
- Architect system level requirements and feature interdependencies, and decompose them to various components
- Coordinate Feature Architects to complete architecture of component level requirements

Software Architecture and Development, Automotive
- Design and implementation of system image generation and flashing components
- PSIRT PIC and Safety PIC for above components
- Architectural lead for next iteration of modular and scalable flashing framework
- Implement suspend framework for QNX OS running on hypervisor environment
- Requirement and design specifications for HDCP repeater use-cases

Tablet SW Architecture, Android Power and Perf
- Improve software architecture for memory management, performance and power governance
- Modifications to App Framework (Java), Native Libraries (C++), Kernel (C) and HAL
- Create metrics and viable solutions to quantify and track these improvements
- Define architectural changes, improvements and metrics for upcoming products

System Software Development, Android
- Kernel and user-space software stack that balance power and performance of SoC
- TEE, Secure OS on SoC for Security operations (such as RSA, AES, HMAC, CMAC)

System Software Development, Windows on ARM
- Power management for USB, XUSB software stack
- POR for XUSB changes on upcoming SoC
- Customer interaction for debugging on upcoming products

Dec 2012
Jun 2012

Embedded Software Engineer, OMAP Platform Business Unit
Texas Instruments, Redmond WA

- Responsible for developing OS and firmware drivers on Windows RT (WoA) tablets based on the OMAP processor
- Owner of Variable Services component of Security; point of contact in TI Redmond for security-related issues
- Ownership of functionality, robustness, and performance of UEFI and OS driver, and Trusted Application in ARM TrustZone
- Development of drivers from mid-development level to production level, including passing the Windows certification
- Active discussions and communications with numerous TI partners that provide implementation and specifications
- Working knowledge of security including ARM TrustZone, secure boot, measure boot, and trusted applications
- Fluent in UEFI DXI drivers and TianoCore EDKII; Familiarity of WHCK Security tests
- Participate in design and architecture reviews for Security
- Position requires usage of Lauterbach JTAG for HW debugging, WinDbg for debugging Windows device drivers
- Recent part of Power Management team, resolving related issues and bugs related to PMIC and PRCM

Jun 2012
Sep 2010

Teaching Assistant, Electrical Engineering Dept.
University of Washington, Seattle

- EE 478 (Embedded Capstone), EE 472 (Microcomputer Systems), and EE 271 (Digital Circuits and Systems)
- Supervise, guide, and evaluate students with labs and final projects; review sessions for additional materials
- Critique and award submitted functional and design specifications, proposals, and system designs

Sep 2008
Sep 2010

Engineering Intern, Premium Applications Engineering
ARRIS Group Inc./Digeo Inc., Kirkland WA

- Work as developer in Software Development Team for the Moxi HD DVR and Moxi Mate devices
- Fixed bugs related to the Moxi C++ Applications and XML/C++ Framework for UI and data layers
- Filter performance and warning bugs generated by Coverity and filed the appropriate bugs on Bugzilla

Education

June 2012 — Master of Science, Electrical Engineering, **University of Washington**, Seattle
Concentration: Robotics & Controls and Embedded Systems
Overall GPA: **3.75**

August 2009 — Bachelor of Science, Electrical Engineering, **University of Washington**, Seattle
Concentration: Embedded Systems
Graduated Cum Laude | Overall GPA: **3.76** | Major GPA: **3.94**

Academic Achievements

Jan 2019 – Jun 2019 | **Robotics Software Engineer Nanodegree**
Udacity
- Learn fundamentals of Perception, Control, Localization, Mapping, SLAM, Path Planning and essentials of ROS and Gazebo
- Create nodes in ROS to chase white colored balls for a custom robot built and simulated in a Gazebo environment
- Implement 1D Kalman Filters (KF) in C++ and extend learning to multidimensional KF
- Use Extended KF in ROS to perform sensor fusion and localize turtlebot's position in Gazebo environment
- Implement 2D Montel Carlo Localization (MCL) in C++ ane extend learning to Adaptive MCL
- Use Adaptive MCL in ROS to estimate a custom robot's position relative to a known map of Gazebo environment
- Implement 2D Occupancy Grid Mapping Algorithm and Sensor Fusion in C++ and extend learning to 3D Mapping
- Learn Particle Filter Approach to Online and Full SLAM vis Grid-based FastSLAM and GraphSLAM Algorithms
- Use Real-Time Appearance-Based Mapping (RTAB-Map) in ROS to localize and map a custom robot in a Gazebo environment
- Learn Discrete, Sample-based and Probabilistic Path Planning, and use ROS to build a home-service robot in Gazebo environment

Jun 2012 – Jan 2011 | **Dynamic Gravity Compensation for Raven II Surgical Robot**
BioRobotics Laboratory, University of Washington, Seattle
- Analyze the effects on dynamics due to change in orientation for Raven Surgical Robot
- Develop add-on hardware to calculate orientation of robot using sensor measurements
- Communicate orientation data to control system and modify the algorithm to compensate

Spring 2011 | **RSK Robotic Arm**
Capstone Project for EE 449 (Control System Design)
- 3-DOF arm that aids powered wheelchair users to automatically activate handicap door buttons upon request
- Implemented with cost-effective hardware, GUI for end-user and designer; using threads and wxWidgets on Linux
- Computer vision and Inverse Kinematics calculations for positional control; Safety using dynamic velocity control

Winter 2011 | **Lunar Rover Prototype**
Project Manager for EE 542, Rocket City Space Pioneers' Google Lunar X Prize
- Developed Functional, Requirement, Architecture, and Test Specifications, HW/SW Implementation documents
- For design of control system on lunar rover, covering locomotion, camera, communication with satellite, etc.
- Involved in project planning and timelines, and design discussion with team and customers

Fall 2008 | **Small Scale Positioning System**
Capstone Project for EE 478 (Design of Computer Subsystems)
- Portable device that enables the user to track the 3D location of any targeted object indoors with high accuracy
- Consists of six independent subsystems that coordinate, and use concepts of trilateration, to calculate location
- Wireless communication and high-level power management to preserve battery life on the subsystems

Highlighted Skills

Hardware | *Processors:* Tegra, OMAP, PIC, MSP | *Devices:* Android Tablet, Win RT Tablet, Automotive AI Platform
Languages | C, C++, Python, Verilog, MATLAB | *Dev Stack:* Android, Windows 8 RT, Linux, QNX, UEFI, ROS, Bare-metal