Kiwamu Okabe - Research and Development Engineer

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Interests

I launched my career on developing embedded devices at Ricoh Company, Ltd, and also learned application design using functional language such like Haskell. I found Metasepi project[1] what is trying to apply strong type to embedded programming. Until now, I developed an embedded Haskell compiler named Ajhc[2], and also traslate documents about ATS language[3] into Japanese[4]. And I published some research papers[5].
Today, I choose VeriFast[6] to verify C language running on embedded platform, and translate the tutorial into Japanese[7]. And I'm trying to apply the verifier to RTOS[8].
Metasepi is very experimental and ambitious project, however I believe that it also introduces an by-product "the technology to design real software with predictable manpower and safety" regardless of embedded domain.

Work Experience

November 2016 - Present: Expert Engineer (permanent employee) at SELTECH CORPORATION

- Maintain a Hypervisor for embedded market
- Design and develop own secure OS for ARM platform

August 2014 - Present: Part-time Researcher at RIKEN Advanced Institute for Computational Science

- Research embedded functional programming running on ARM Cortex-M and AVR
- Verification for RTOS application such like ChibiOS/RT[9] running on ARM Cortex-M

July 2013 - Present: Self-employed Software Engineer at METASEPI DESIGN

- Research and develop Ajhc Haskell Compiler
- Host meetups[10] for hands-on to verify embedded application on ARM Cortex-M using STM32[11] board and ST-LINK[12] debugger

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[1] http://www.metasepi.org/
[2] http://ajhc.metasepi.org/
[3] http://www.ats-lang.org/
[4] http://jats-ug.metasepi.org/
[5] http://www.metasepi.org/papers.html
[6] https://github.com/verifast/verifast
[7] https://github.com/jverifast-ug/translate/blob/master/Manual/Tutorial/Tutorial.md
[8] https://github.com/fpiot/chibios-verifast
[9] http://www.chibios.org/
[10] https://metasepi.connpass.com/
[11] http://www.st.com/en/microcontrollers/stm32-32-bit-arm-cortex-mcus.html
[12] http://www.st.com/en/development-tools/st-link.html

- ATS language evangelist
- Verification evangelist using VeriFast[13], which is a verifier C language programs annotated with pre-conditions and postconditions
- Translated VeriFast Tutorial into Japanese[14]
- Support to develop any embedded software
- Manage Metasepi Project and develop the core technology

February 2016 - November 2016: Software Enginner (contract employee) at Life Robotics Inc.

- Design GUI application running on Linux OS, using C++ and Qt[15]
- Design network protocol for Robotics application
- Reason for Quitting: to challenge verification of secure application using C language and VeriFast

March 2015 - February 2016: System Enginner (contract employee) at Centillion Japan Co., Ltd.

- Technical support for stock chart application using JavaScript
- Maintain MySQL database servers
- Launch new IoT business for farming
- Design a platform[16] to accelerate R programs
- Reason for Quitting: to change my job into embedded one, again

September 2014 - December 2014: Software engineer (trustee agreement) at Axsh co., LTD.

- Develop an OpenFlow application named "OpenVNet"[17]
- Design automation scripts for AWS using Ruby and GNU make
- Reason for Quitting: to have better salary

March 2012 - July 2013: Software Engineer (permanent employee) at MIRACLE LINUX CORPORATION

- Maintain own Digital Signage platform running on Intel architecture using Linux OS, C++, OpenGL, GTK+[18] and GStreamer[19]
- Verify and tune up performance of Digital Signage on new Intel platform and Intel video driver
- Verify PowerPC Linux kernel and debug/fix a race condition in the SMP kernel

[13] `https://github.com/verifast/verifast`
[14] `https://github.com/jverifast-ug/translate/blob/master/Manual/Tutorial/Tutorial.md`
[15] `https://www.qt.io/`
[16] `https://github.com/centillion-tech/kick-r`
[17] `https://github.com/axsh/openvnet`
[18] `https://www.gtk.org/`
[19] `https://gstreamer.freedesktop.org/`

- Debug and fix bug of crash[20] command's PowerPC virtual memory paging
- Design new Windows installer using NSIS[21]
- Introduce and maintain new Git server for internal use
- Reason for Quitting: to focus researching and developing Ajhc Haskell compiler on full-time work

April 2001 - February 2012: Software Development Engineer (permanent employee) at Ricoh Company, Ltd.

- Develop BIOS and bootloader for multifunction printer on Intel architecture
- Design secure boot for multifunction printer on Intel architecture
- Develop new BIOS for multifunction printer
- Tune multifunction printer boot time as 10 seconds
- Develop POSIX thread library
- Develop and technical support NetBSD OS
- Port OS to new Intel hardware
- Reason for Quitting: to join more small and quick team

Education

- March 2001: Master of Engineering from Department of Electrical and Electronic Engineering, Tokyo Metropolitan University.
  The thesis: "Multimode Quartz Crystal Microbalance"[22]

Publications and Reports

- Kiwamu Okabe and Hongwei Xi. "Arduino programing of ML-style in ATS"[23]. ML workshop, 2015.
- Kiwamu Okabe and Takayuki Muranushi. "Systems Demonstration: Writing NetBSD Sound Drivers in Haskell"[24]. Haskell Symposium, 2014.
- Kiwamu Okabe. "ATS 言語を使って不変条件を API に強制する".[25] 夏のプログラミング・シンポジウム 2014, 2014.
- Kiwamu Okabe, Hiroki MIZUNO and Hidekazu SEGAWA. "強い型による OS の開発手法の提案"[26]. 第 55 回プログラミング・シンポジウム, 2014.

[20] http://people.redhat.com/~anderson/
[21] http://nsis.sourceforge.net/
[22] http://ci.nii.ac.jp/naid/110004076869
[23] http://www.metasepi.org/doc/metasepi-icfp2015-arduino-ats.pdf
[24] http://metasepi.org/doc/metasepi-icfp2014-demo.pdf
[25] http://www.metasepi.org/doc/20141101_prosym_summer2014.pdf
[26] http://metasepi.org/doc/20140110_prosym55.pdf

Activities

Open-source projects

Metasepi Project[27]

- Challenge to create an open-source Unix-like operating system designed with strong type such as ML or Haskell.
- Rewriting NetBSD kernel using Ajhc Haskell compiler. `https://github.com/metasepi/netbsd-arafura-s1`

Ajhc Haskell compiler[28]

- Extend and add embedded features to Jhc Haskell Compiler `http://repetae.net/computer/jhc/`.
- Ajhc has thread-safe and reentrant runtime. Also has Erlang style GC. It means Ajhc's Haskell context has own GC heap. GC can run on tiny CPU such as Cortex-M3 with 32kB RAM.

Japan ATS User Group[29]

- An user group for ATS language promotion of utilization. Translating ATS documents into Japanese.

Debian Maintainer[30]

- Maintained uim package at Debian squeeze, and packages using Haskell at sid.

Carettah[31]

- A presentation tool written with Haskell. All of my slides[32] are created by the tool.

Computer Skills

- Languages: C, C++, Haskell, ATS, Intel/ARM assembler, Ruby, JavaScript, Python
- Platforms: Linux, NetBSD, FreeRTOS, ChibiOS/RT, Android NDK, Cygwin, MinGW, Bare metal

Reference available upon request

- Hiroyasu Fukuyama CTO - SELTECH CORPORATION
- Woo-Keun Yoon CEO - Life Robotics Inc.
- Kentaro Kuroiwa Research Chief - Centillion Japan Co., Ltd.
- Yasuhiro Yamazaki CEO - Axsh Co., Ltd.
- Takayuki Muranushi - RIKEN Advanced Institute for Computational Science
- Takashi KODAMA CEO - MIRACLE LINUX CORPORATION

[27] `http://metasepi.org/`
[28] `http://ajhc.metasepi.org/`
[29] `http://jats-ug.metasepi.org/`
[30] `http://qa.debian.org/developer.php?login=kiwamu@debian.or.jp`
[31] `https://github.com/master-q/carettah`
[32] `http://www.slideshare.net/master_q/`

- Shigeya SENDA - Ricoh Company, Ltd.
- Hitoshi Sekimoto Professor - Tokyo Metropolitan University, Department of Electrical and Electronic Engineering

Last updated: August 18, 2017