Suchakrapani Datt Sharma

Personal Data

Location: Santa Clara, CA (USA)
email: suchakra@gmail.com
web: http://suchakra.wordpress.com

Education

Feb 2017 PhD in Computer Engineering, Polytechnique Montreal
Thesis: *Low-Impact System Performance Analysis Using Hardware Assisted Tracing Techniques*
Gpa: 3.25/4

July 2011 M.Tech. in Instrumentation & Control, College of Engineering, Pune
Major: Biomedical Instrumentation
Thesis: *Design and Development of ARM SBC Based Thin Web-Client*
Gpa: 9.61/10 (1st Rank)

July 2009 B.E. in Applied Electronics & Instrumentation, MDU, Rohtak
Thesis: *Low-Cost Video Surveillance System using AVR Microcontroller*
Percentage: 77.7% (First Division with Honours)

2005 AISSCE - Central Board of Secondary Education Exam (Grade XIIth)
Percentage: 79.2%

2003 AISSE - Central Board of Secondary Education Exam (Grade Xth)
Percentage: 80.6%

Work Experience

Jan 2017 - Now
Staff Scientist at ShiftLeft Inc. (Santa Clara)
Systems Engineering
Involved in product developemt, infrastructure and performance engineering, end-to-end test framework. Also involved in customer facing activities and architecting solutions

July 2015 - Now
Author at TheNewStack (http://thenewstack.io)
Contributing Author
Wrote numerous articles and invited editorials for the leading technology magazine on topics ranging from dynamic tracing tools to game engines

Sept 2014 - Dec 2014
Consultant at MELabs, India
Application Programming
Consulted remotely for development of an in-house CNC machine control and coding environment for this startup. Code editor, diff viewer and UI implemented using wxPython for multiplatform portability and compatability

Oct 2011 - July 2012
Assistant Systems Engineer at Tata Consultancy Services
Embedded Systems Development
Involved in development of an automotive infotainment device. Key responsibilities: Idea generation, proof-of-concept development, middleware development, maintainence & release management

Consultant at AGD Biomedicals

Sept 2011	Consulting work on an ARM based platform for an interactive HMI to be used in their upcoming electrolyte analyzer. Developed motor control device drivers, ported QWT toolkit and made a QT based GUI to create a demo of the HMI. Wrote documentation for their employees for further development on the framework.
May 2010- May 11	Embedded Systems Course Instructor at COEP *Embedded Linux Teaching Sessions* Took 30 hours bimonthly introductory sessions on GNU/Linux and advanced sessions on Embedded Linux for a batch of 25-30 students.
Summer 2008	Summer Intern at NTPC Ltd, New Delhi *Operations, Thermal Power Plant* Involved in study of thermal power plant operations and instrumentation systems. Remarked "Excellent" during assessment.
Summer 2006	Summer Intern at Indian Airlines Ltd, New Delhi *Avionics & Aircraft Instrumentation* Worked on primary and secondary Gyros in Avionics and Instrumentation division. Secured 92% during assessment.

Academic Projects

FlowJIT
Skills/Technologies - C, Linux kernel, hardware tracing

This is one of the primary project having a direct involvement with my PhD research. I have developed a way to recover control flow from dynamic traces when runtime compiled code is executed. The code is released as a Linux kernel patch

IOVisor/BPF Compiler Collection(BCC)
Skills/Technologies - C, Golang, Python, Linux kernel, dynamic tracing

This is a next generation systems performance analysis, security as well as networking technology. I have been involved in the BCC's project development and continue to do so.
`https://github.com/iovisor/bcc`

LTTng Project
Skills/Technologies - C, Linux kernel modules, tracing, profiling

This is one of the primary project having a direct involvement with my PhD research. My research revolves around exploring usage of interpreted and JITed bytecode filters for filtering out tracepoints before they are recorded for kernel and userspace along with dynamic instrumentation of binaries to add tracepoints using Dyninst

InfoCanvas
Masters Project, Sept 2010 - July 2011
Skills/Technologies - Embedded Linux, kernel modules, Qt Framework, C, UI design

A kiosk device which can serve multiple purposes such as an information desk, an interactive terminal used for e-learning activities, or even a device which displays remote sensor data from field sensors. InfoCanvas consists of a Qt based application which utilizes Qt libs compiled for an ARM based single board computer. The kernel has been customized with drivers for a 12.1 inch screen. The application is configured to be started at bootup. It renders a WebKit based Web wiew wich displays data and live sensor graphs fetched from another tiny ARM based server and displays them on screen. Project showcased by Nokia in the Qt Ambassador Program on their website.

MultiView
Academic Project, March 2010 - June 2010
Skills/Technologies - Embedded C, microcontrollers, PCB design, circuit simulation, analog electronics

A multi parameter display device for industrial applications. The device can take input from any field transmitter (4-20mA) and can display the corresponding readings on 7 segment display array for flow, temperature or pressure. Here is an option to calibrate the device with upper and lower set point according to the type of transmitter (flow, temp, pressure, level) The device is based on a PIC16F873 microcontroller which has an on-chip Analog-Digital Converter.

Hobby Projects

QRite
Skills/Technologies - Android, UI design

QR code app with smartwatch integration. Lean and simple UI with QR customization options. App released on Google Play. Source code on my Github profile.

Android Smartwatch Watchfaces
Skills/Technologies - Java, Android, UI design

Designed few retro looking watchfaces for my Android smartwatch with a faux monochrome LCD look and a mini CRT look. Added functionality to display weather, battery status as well. Source code on my Github profile.

Dorsal Fun Bot
Skills/Technologies - Python, Raspberry Pi, electronics

An IRC bot that runs on a Raspberry Pi. Commands to the bot can trigger real actions such as switching lights on and off, blink lights on IRC mention etc. It also shows weather, translates text from French to English and shows menu for the day in cafeteria among other trivial tasks. Source code on my Github profile.

Academic Publications

1. Hardware Trace Reconstruction of Runtime Compiled Code, *Software: Practice and Experience*, Wiley, Jan 2018
2. Fine-grained Nested Virtual Machine Performance Analysis Through First Level Hypervisor Tracing, *Proc. International Symposium on Cluster, Cloud and Grid*, *IEEE*, May 2017
3. Low Overhead Hardware-Assisted Virtual Machine Analysis and Profiling, *Proc. Globecom Workshops*, *IEEE*, December 2016
4. Enhanced Userspace and In-Kernel Trace Filtering for Production Systems, *Journal of Computer Science and Technology*, Springer US, November 2016
5. Hardware-Assisted Instruction Profiling and Latency Detection, *Journal of Engineering*, IET, August 2016
6. GNU/Linux Shell Access through a Web-Browser for an Embedded Linux E-Learning System, *Proc. International Conference on Electronics Computer Technology*, IEEE Press, April 2011
7. Low Cost Subcutaneous Vein Detection System using ARM9 Single Board Computer, *Proc. International Conference on Electronics Computer Technology*, IEEE Press, April 2011

Posters

1. "Scalable user space dynamic tracing performance on multi-core systems", *ACM Symposium on Operating Systems Principles (SOSP)*, November 2013, PA

Talks

1. Now You See Me Too: Visual Tooling for Advanced System Analysis, *USENIX LISA 2017*, November 2017, San Francisco
2. The BSD Packet Filter A New Architecture for User-level Packet Capture, *Papers We Love Montreal*, June 2017, Montreal
3. Precursors of Security and Performance : Instrumentation and Tracing of Systems, *Security and DevOps*, August 2017, ShiftLeft HQ, Santa Clara
4. Low Level Tracing for Latency Analysis - From Baremetal to Hardware Tracing Blocks, at *Tracing Summit 2016 (Embedded LinuxCon)*, Berlin, Germany
5. LTTng's trace filtering and beyond - A unified approach and eBPF's role, *Tracing Summit 2015 (LinuxCon)*, Seattle, USA
6. Kernel and Userspace Tracing with LTTng and Friends, *Fedora Users and Developers Conference, 2015*, Pune, India
7. Qt on Android, *GNUnify 2012*, Pune, India
8. Qt Application Development on Embedded Devices, *Fedora Users and Developers Conference, 2011*, Pune, India
9. Tux Under the Hood! - Adventures with Embedded Linux, *GNUnify 2011*, Pune, India

Certifications

21W.789x, Building Mobile Experiences
edX (MITx)

Project based course for creating better mobile experiences. Focus on identifying problems, generative research, design and usability for building better mobile applications. Learnt how contextual enquiry, design decisions, wrireframing and mockups are done for apps and applied them for a NFC interaction app.

Computer Skills

Operating System:	Any GNU/Linux flavour
Languages:	*Intermediate* - c, Go, Python
	Basic - verilog, Javascript
Technologies:	Linux Kernel, Docker, eBPF/BCC, Android, RPM Packaging,
Graphic/UI Design:	gimp, Inkscape, html+css
3D Visualization:	Google SketchUp, Layout
Development Tools:	vi,PyCharm, Gogland
Mobile/Embedded Linux:	Kernel modules, porting libraries, middleware, UI/UX
Version Control:	git

Open Source Activities

IOVisor-BCC Wiki Education Dashboard
Skills/Technologies - Python, Linux kernel, Bash, Ruby

Fixed bugs, added documentation, performed reviews and added more features to the project

Fedora Project
Skills/Technologies - UI design, RPM packaging, event organization

I primarily package RPMs, maintain software packages and do design tasks such as UI elements/mockups and other print media for Fedora events. In 2015 I mentored an intern for Google Summer of Code for Fedora Project. In 2011, I helped organize Fedora Users and Developers Conference at Pune.

Google Code-In
Mentor (2017)

Mentored high school students from San Francisco as part of Wikimedia Foundation and introduced them to JS/HTML Mediawiki tools

Google Summer of Code
Mentor (2015)

Mentored an intern for Ask Fedora UX/UI Overhaul project under Fedora which helped improve the usability and user interface of the Q&A system

Articles

1. In-Depth System Analysis Using Hardware-Assisted Tracing, *ACM SIGARCH Blog*, May 2017
2. Turbocharged Tracing with LTTng, *Open Source For You*, March 2014
3. What's More in Tracing with LTTng, *Open Source For You*, April 2014
4. Invited editorials and articles for TheNewStack and Linux Foundation

Other Interests

Reading, composing music, poetry, computer art and graphics, bicycling, ice-skating.

Languages

English:	Native/Bilingual Proficiency (*IELTS Score - 8*)
Hindi:	Native/Bilingual Proficiency
Marathi:	Working Proficiency
Bengali:	Working Proficiency
French:	Elementary Proficiency