Pran Mukherjee, Ph.D.

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Software Engineering & Architecture

Versatile senior engineer and programmer with significant technical expertise that brings additional dimensions of interpersonal skills, business savvy and leadership to drive collaboration and deliver on organizational goals. Uncovers root cause issues before they become costly problems and develops innovative solutions that are sustainable, scalable, and cost-effective. Keeps an eye toward enhancing organizational culture to improve team performance. Experience spans disciplines and industries due to rapid learning curve.

*Areas of expertise include:*

Software: Computer vision, Machine learning, Global distributed systems, System architecture

Hardware: Silicon process engineering, Plasma etch technology, Sensors

Professional Experience

**AKAMAI TECHNOLOGIES** | Cambridge, MA 2013 – Present

***Senior System Software Engineer: Internet Mapping, C++, Linux***

Lead full life cycle from design to maintenance of multiple infrastructure systems with global deployment, 24/7 readiness, and rapid response times to monitor, balance, and assign internet traffic. Support machines deployed on internal networks, including daily monitoring and maintenance as well as on-call incident assistance.

* Replaced obsolete component by designing a new system that is nearly infinitely scalable, more secure, significantly faster, and modernizes architecture to use newer tools.
  + With partial deployment, system is 3x faster while handling 5x more data while tests for remaining system components indicate 20-50x additional increase in capacity is possible with current design without additional machines needed. More machines can be added to increase capacity. Data accuracy has vastly increased and message sizes reduced by a factor of four.
* Designed a system for immediate check of network capacity to accommodate additional customer traffic.
  + Customer denies dropped by over 80%, saving money and reducing customer complaints.
  + Saved the performance teams significant by time eliminating manual processes.
* Enabled earlier detection of bugs by upgrading the reporting to SQL query tables, implementing graphs and alerts for most key functions which improved metrics and monitoring tools.
* Initiated an evaluation of a slow-running component to find bottlenecks and solved with code changes. Reduced component run time by 70% with no change in workload.
* Addressed scalability with increasing amount of data, including refactoring and parallelizing code, gzipping intermediate state files, simplification of data structures, and updating to modern language standards.
* Sped up downloads of hundreds of billions of encoded DNS requests by a factor of four by creating a parallel subsystem in Python.
* Initiated effort to improve documentation and tool standards throughout the division.
* Implemented IPv6 support for existing data streams.
* Uncovered and solved a client’s issue where servers were inundated by requests by a hardware vendor that was not standard compliant. Traffic was controlled the $1.5M client relationship was preserved.
* Improved culture of siloed, isolated associates by gaining senior leadership support to reinstate a monthly colloquium series which provided a forum for internal networking and spawned new project collaboration.
* Oversaw 20,000 lines of C++ code that measures the per-domain demand on 6.5 million domain name servers (DNS) around the world as well as over 4 million end-user CIDR blocks that use the EDNS client subnet protocol via open resolvers such as OpenDNS.

**CANARY** | New York, NY 2013

***Contract Programmer: Python, Computer Vision***

Wrote a Python-based motion detection, target tracking, and face recognition application for a new internet-of-things home security device that needed a way to detect individuals based on IR camera data.

**MASSACHUSETTS INSTITUTE OF TECHNOLOGY** | Cambridge, MA 2009 – 2012

***Research Scientist*** ***Space Nanotechnology Laboratory: Nanofabrication, optics, embedded systems (2010 -2012)***

***Postdoctoral Associate (2009 – 2010)***

Recruited to solve the need to create fine-grain nanogratings with high aspect ratio by creating a hybrid approach.

* Characterized revolutionary plasma etch process for silicon nanogratings with aspect ratio over 60:1 by using careful design-of-experiment, tool optimization, and creative solutions to tool limitations.
* Designed process for industrial study of quantum-dot enhanced solar cells on glass which included extensive FDTD simulations, dielectric index matching for laser exposure, and thin film processing.
* Led major refurbishment project which increased group productivity by a factor of four through coordination of goals and scheduled milestones across team levels.
* Spearheaded embedded Linux development for next generation interference lithography tool.
* Lab management tasks, including budgeting, capital equipment specification analysis, negotiations across the supply chain and with allied labs, tool maintenance, and minimization of overhead costs.
* Trained graduate students on lab safety, tools, and procedures, and managed lab contractor activities.

**UNIVERSITY OF MICHIGAN** | Dearborn and Ann Arbor, MI 2001 – 2008

***Graduate Student Research Assistantships – M.Eng., M.S., Ph.D.***

* Fabricated freestanding 240nm-pitch silicon nanogratings with 20:1 aspect ratio via double-sided membrane processing, nanoimprint lithography, and plasma etching.
* Programmed Coast Guard jet ski simulator in C++ for 3D CAVE environment
* Developed and trained neural-net based head tracking computer vision software in C++ for air bags.
* Designed neutral-atom instrument for Solar Probe Plus and simulated performance in Matlab.
* Awarded two prestigious NASA Graduate Student Research Program grants as primary funding for the work, as well as an ancillary grant for laboratory funding.

**CAMPFIRE INTERACTIVE, INC.** | Ann Arbor, MI 2000 – 2001, 2002, 2008

***Senior Software Engineer: Java***

* Managed software design and implementation of a make-your-own-cartoon applet in Java
* Built B2B visual document collaboration applet using J2EE in VisualAge, along with Swing/AWS GUI.
* Performed extensive development with Eclipse on an integrated supply chain and market management application using J2EE, Javascript, JSP, XML, SQL, Ajax, and CSS.

**ERIM INTERNATIONAL, INC.** | Ann Arbor, MI 1996 - 2000

***Research Engineer: Computer Vision***

Led development of two software modules of a military computer vision project based on C, C++, and Perl, including data structure organization, algorithm design and improvement. Managed team of six.

* Performed data fusion for template-based target matching in SAR, LIDAR, FLIR, and optical sensor data

Education

**UNIVERSITY OF MICHIGAN**

Doctor of Philosophy, Atmospheric and Space Sciences, 2008

Master of Science, Atmospheric and Space Sciences, 2005

Master of Engineering, Integrated Microsystems, 2004

Bachelor of Science in Engineering, Electrical Engineering, 1996