

RAJ KUMAR

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EDUCATION

Columbia University, New York, NY, Ph.D., Electrical Engineering, 2008

Thesis explored the inherent security of network routing protocols and established the theoretic bounds on when correctly functioning nodes *can and can not* detect malfunctioning nodes. Implemented practical algorithms for well-known static and dynamic-mobile routing protocols.

Additionally investigated image and video semantics and their use in improving video compression.

Columbia University, New York, NY, M.S., Computer Science, 1999

Studied use of tertiary-storage in multimedia servers. Extended the relational database model to improve expressability.

The Indian Institute of Technology, Madras, B.Tech. Engineering

EXPERIENCE

Kikin Inc. **Sr. Software Scientist** Fall 2012 - New York, NY

Senior member of engineering team that formulates and implements Kikin's core context-sensitive search algorithms for the Android and Chrome platforms.

Designed and implemented tunable-focus search, where results can be tailored to vary more or less from a reference *context* page.

SEMplest LLC **Team Lead, Machine Learning Group** Fall 2011 - Fall 2012 New York, NY

Led Machine Learning Team that formulated and implemented the core algorithms which sought to optimize the cost of advertizing on search engines.

Spearheaded effort that implemented a distributed system to collect, organize, analyse and classify ideal search terms.

Designed algorithms that optimized bidding strategies for the Google and MSN adwords platforms

Adobe Systems **Computer Scientist** Fall 2011 San Jose, CA

Helped design networking infrastructure for EditAnywhere, a platform that facilitates desktop products such as PremierePro to work in a distributed or cloud mode.

New York area startups **Consultant** 2010-2011 New York, NY

Worked with various small NYC startups. Developed prototype sites, and solution for video streaming, content-delivery and video-indexing.

BellCore/Telcordia **Sr. Research Scientist** 2008-2010 Piscataway, NJ

Developed optimal algorithms that allocated wavelengths for a future all-optical core US network made up of optical-switches with very limited memory.

Modeled Optical Networks (Sonet/Sdh, Dwdm) and implemented automated provisioning of services on these networks.

Designed and Implemented Routing and QoS in the IAMANET, a intrinsically-secure experimental Internet Architecture.

Lucent Bell Labs **Intern** Summer 2006 Murray Hill, NJ

Developed a library for use by applications to degrade gracefully under dynamic denial-of-service (DDOS) attacks and overload conditions. The library uses machine-learning techniques and feedback from application to selectively discarding requests.

NEC Labs, America	Intern	Summer 2005	Princeton, NJ
Designed an Overlay Network for routing VoIP calls and implemented it on PlanetLab.			
Deutsche Bank Proprietary Trading	Consultant	2001-2004(Part-Time)	New York, NY
Developed analytic, real-time software for equity pairs-trading and convertible bonds. Led effort that outsourced software development to India.			
Philips Research	Intern	Summer 2001	Scarborough, NY
Implemented temporal and spatial scalability in the MPEG-4 codec.			
AT&T Research Labs	Consultant	1998-99(Part-Time)	Red Bank, NJ
Implemented image-search features in a virtual shopping environment.			
BoxHill Systems	Engineer	1994-98(Part-Time)	New York, NJ
Implemented low-level Redundant Arrays of Inexpensive Disk system code.			

HONORS AND AWARDS

Elected to Student Senate, The Indian Institute of Technology, Madras
Second place, IEEE 2002 Sarnoff Symposium Student Paper Contest

COMPUTER SKILLS

Scala/Java, C/C++, Perl, Ruby, TCL, AS3, UNIX, Windows, MacOS, Android
NS2, Ruby-On-Rails, JQuery, HTML5, CSS3, Javascript, SQL (<http://liquido.heroku.com>)

SELECTED PUBLICATIONS:

Raj Kumar Rajendran, Vishal Misra, Dan Rubenstein. "Theoretical Bounds on Control Plane Self-Monitoring in Routing-Protocols" *ACM Sigmetrics 2007, San Diego, June 2007*

Raj Kumar Rajendran, Vishal Misra, Dan Rubenstein. "Strong Detection of Misconfigurations" *Brief Announcement, Principles of Distributed Computing (PODC) 2005, Las Vegas, July 2005, Full Version, Allerton, Illinois, Sept. 2006*

Raj Kumar Rajendran, Dan Rubenstein. "Optimizing the quality of scalable video streams on P2P Networks" *Extended Abstract in ACM Sigmetrics 2004, New York, June 2004, Full Version in Journal of Computing Networks (JCN), June 2006*

Raj Kumar Rajendran, Mihaela van der Scharr, Shih-Fu Chang. "FGS+: Optimizing the Joint SNR-Temporal Video Quality in MPEG-4 Fine Grained Scalable Coding" *IEEE International Symposium on Circuits and Systems 2002, Phoenix, May 2002*

Raj Kumar Rajendran, Shih-Fu Chang. "Image Retrieval with Sketches and Coherent Images" *International Conference on Multimedia Exposition 2000, New York, Aug 2000*

L. Golubchik, and Raj Kumar Rajendran. "A Study on the use of Tertiary Storage in Multimedia Systems." *Proceedings of the 16th IEEE Symposium on Mass Storage Systems, Washington, DC, March, 1998.*