

Raj Kumar

CONTACT INFORMATION	64 W 108 st., Apt 1B New York, NY 10025 <i>WWW</i> :www.ee.columbia.edu/~kumar	<i>Tel</i> : (212) 665-4602 <i>E-mail</i> : raj@cs.columbia.edu
SUMMARY	Computer and Data Scientist with strong analytical, systems, programming, big-data and web-development skills. Familiar with Machine Learning and Web Crawl tools. Worked in the Technical, Startup and Finance industries.	
CITIZENSHIP	USA	
RESEARCH INTERESTS	Distributed algorithms, network routing protocols, video and image semantics, video compression, machine learning, data mining, web-development.	
EDUCATION	Columbia University , New York, NY, USA Ph.D., Electrical Engineering, March 2008 <ul style="list-style-type: none">• Thesis Topic: <i>A Theory of Error Detection in Distributed Routing Algorithms</i>• Advisors: Professor Dan Rubenstein Professor Vishal Misra• Thesis studied the inherent security of network routing protocols and established theoretic bounds on when errors by participants <i>can and can not</i> be detected. Implemented practical anomaly-detection algorithms for well-known static and dynamic-mobile routing protocols. Additionally investigated image and video semantics and their use in improving video compression. M.S., Computer Science, 1999 The Indian Institute of Technology , Madras, India B.Tech., Engineering	
CONFERENCE PUBLICATIONS	Raj Kumar Rajendran, Vishal Misra, Dan Rubenstein. "Theoretical Bounds on Control Plane Self-Monitoring in Routing-Protocols" <i>ACM Sigmetrics 2007, San Diego, June 2007</i> Raj Kumar Rajendran, Vishal Misra, Dan Rubenstein. "Strong Detection of Misconfigurations" <i>Brief Announcement, Principles of Distributed Computing (PODC) 2005, Las Vegas, July 2005, Full Version, Allerton, Illinois, Sept. 2006</i> Raj Kumar Rajendran, Dan Rubenstein. "Optimizing the quality of scalable video streams on P2P Networks" <i>Extended Abstract in ACM Sigmetrics 2004, New York, June 2004</i> 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" <i>IEEE International Symposium on Circuits and Systems 2002, Phoenix, May 2002</i> Raj Kumar Rajendran, Shih-Fu Chang. "Image Retrieval with Sketches and Coherent Images" <i>International Conference on Multimedia Exposition 2000, New York, Aug 2000</i> L. Golubchik, and Raj Kumar Rajendran. "A Study on the use of Tertiary Storage in Multimedia Systems." <i>Proceedings of the 16th IEEE Symposium on Mass Storage Systems, Washington, DC, March, 1998.</i>	

JOURNAL PUBLICATIONS	Raj Kumar Rajendran, Dan Rubenstein. "Optimizing the quality of scalable video streams on P2P Networks" <i>Full Version in Journal of Computing Networks (JCN), June 2006</i>
REFEREE FOR JOURNALS AND CONFERENCES	<ul style="list-style-type: none"> • <i>IEEE Transactions on Networking</i> • <i>ACM Transactions on Information Systems</i> • <i>Journal of the ACM</i> • <i>IEEE Transactions on Multimedia</i>
HONORS AND AWARDS	<p>The Indian Institute of Technology, Madras</p> <ul style="list-style-type: none"> • Elected to Student Senate <p>The Sarnoff Symposium</p> <ul style="list-style-type: none"> • Second Place, IEEE 2002 Sarnoff Symposium Student Paper Contest, 2002
PROFESSIONAL EXPERIENCE	<p>Kikin, New York, NY</p> <p><i>Sr. Software Scientist</i> Fall 2012 to Present</p> <ul style="list-style-type: none"> • 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 <i>context</i> page. <p>SEMplest, New York, NY</p> <p><i>Team Lead, Machine Learning Group; Sr. Data and Computer Scientist</i> Fall 2011 to Fall 2012</p> <ul style="list-style-type: none"> • 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 <p>Adobe Systems, San Jose, CA</p> <p><i>Computer Scientist, EditAnywhere Platform</i> Fall 2011</p> <ul style="list-style-type: none"> • Helped design networking infrastructure for EditAnywhere, a platform that facilitates desktop products such as PremierePro to work in a distributed or cloud mode. <p>New York Area Startups, New York USA</p> <p><i>Consultant</i> Fall 2010 to 2011</p> <ul style="list-style-type: none"> • Worked with various small NYC startups. Developed prototype sites, and solution for video streaming, content-delivery and video-indexing. <p>Bellcore/Telcordia, New Jersey USA</p> <p><i>Sr. Research Scientist</i> 2008 to 2010</p> <ul style="list-style-type: none"> • Developed network-management algorithms for the next-generation all-optical core US Internet network. Designed optimal routing and wavelength-allocation algorithms. Built a simulation environment in NS2 and verified optimality of algorithms.

- Modeled Optical Networks (Sonet/Sdh, Dwdm) and implemented automated provisioning of services on these networks. Worked on a team that wrote detailed software requirements and implemented it on a Java environment.
- Designed and Implemented Routing and QoS in the IAMANET, an intrinsically-secure experimental Internet Architecture. Member of a large team that created a testbed, implemented, integrated, and tested the design.

Lucent Bell Labs, Murray Hill, New Jersey USA

Intern

Summer 2006

- 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 discard requests.

NEC Labs, America, Princeton, New Jersey USA

Intern

Summer 2005

- Designed an Overlay Network for routing VoIP calls and implemented it on PlanetLab. Used Error Correction Codes and multipath routing to improve quality.

Deutsche Bank, Proprietary Trading, New York, USA

Consultant

2001 to 2004 (Part-Time)

- Designed and built the system used by the prop-trading desk to gather real-time price information and compute valuations for equity pairs-trading and convertible bonds.
- Led effort that outsourced software development to India.
- Used machine-learning techniques to quantify news-stories that reported on stocks.

Philips Research, Scarborough, New York USA

Intern

Summer 2001

- Implemented the part of the MPEG-4 video-compression codec that provided fine-grained spatio-temporal scalability over a wide range of bitrates.

AT&T Research Labs, Red Bank, New Jersey USA

Intern

Summer 2001

- Implemented image-search features in a virtual shopping environment. Extracted image-features such as texture, color and edges to form a semantic index of image that could be used for comparison.

BoxHill Systems, New York USA

Engineer

1994 to 1998 (Part-Time)

- Implemented low-level system code that implemented the Redundant Array of Inexpensive Disk (RAID) technology to stripe data across multiple disk-drives.

TECHNICAL SKILLS Strong analytic, quantitative, system and programming skills. Wide experience in networking, information technology, databases and user-interface. Comfort in machine-learning and simulation tools and techniques. Strong web-development using the Ruby-on-Rails platform.

Programming: Scala/Java, C++/C, Perl, Ruby, PHP, Javascript, SQL, TCL

Operating Systems: Linux, Windows, MacOS, Solaris, some Android

Web Development: Scala-Lift, Ruby-On-Rails, JQuery, SQL, Apache, Perl, PHP, HTML5, CSS3 <http://liquido.heroku.com>

Video Streaming: AS3, Flowplayer

Information Technology: Networking (UDP, TCP, Dynamic routing, AODV, DSR), Service (Apache, SQL), Akka

Search: Lucene, Hadoop, Mahout

Computer Applications: (\LaTeX , \BIBTeX), most common productivity packages (for Windows and Linux platforms), Vim, Emacs

NS2 experience: TCL, OCL scripting, C++ code, TCL/C interface, Mobility

MATHEMATICAL EXPERTISE

Signal Processing: Machine Learning, Pattern Recognition, Linear Programming, Graphs, Image and Video Semantics, Video Compression techniques

Communications: Networking, Routing, Distributed Algorithms, Streaming

REFERENCES

- Prof. Dan Rubenstein <http://www.cs.columbia.edu/~danr>
- Prof. Vishal Misra <http://www.cs.columbia.edu/~misra>
- Mitch Berg <http://www.linkedin.com/in/rajkumar2011>