Ravi Netravali

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Research Interests

Computer Systems, Computer Networks, Distributed Systems, Cloud Computing

Education

- **Massachusetts Institute of Technology**
  Ph.D. in Computer Science — 2014-2018 (expected)
  Advisors: Hari Balakrishnan and James Mickens
- **Massachusetts Institute of Technology**
  S.M. in Computer Science — 2012-2014
  Advisor: Hari Balakrishnan
- **Columbia University**
  B.S. in Electrical Engineering with honors — 2008-2012
  Advisor: Shih-Fu Chang

Awards

- **Qualcomm Innovation Fellowship** — 2017
- **Facebook PhD Fellowship Finalist** — 2017
- **NSF Graduate Research Fellowship** — 2013-2016
- **Irwin Jacobs Presidential Fellowship, MIT** — 2012-2013
- **William L. Everitt Award of Excellence, Columbia University** — 2012

Publications

In Submission

- **Cascade: Using Data Flow Analysis For Speculative "What If?" Debugging of Web Applications**
  Ravi Netravali, James Mickens
- **Lodestar: Fast, Secure Page Loads Using Remote Dependency Resolution**
  Ravi Netravali, Anirudh Sivaraman, James Mickens, Hari Balakrishnan
- **Remote-Control Caching: Proxy-based URL Rewriting to Decrease Mobile Browsing Bandwidth**
  Ravi Netravali, James Mickens

Conference and Workshop Papers

- **Vesper: Measuring Time-to-Interactivity for Modern Web Pages**
  Ravi Netravali, Vikram Nathan, James Mickens, Hari Balakrishnan
  USENIX NSDI 2018
- **Prophecy: Accelerating Mobile Page Loads Using Final-state Write Logs**
  Ravi Netravali, James Mickens
  USENIX NSDI 2018
- **Neural Adaptive Video Streaming with Pensieve**
  Hongzi Mao, Ravi Netravali, Mohammad Alizadeh
  ACM SIGCOMM 2017
- **Vroom: Accelerating the Mobile Web with Server-Aided Dependency Resolution**
  Vaspol Ruamviboonsuk, Ravi Netravali, Mohammad Uluyol, Harsha Madhyastha
  ACM SIGCOMM 2017
- **Polaris: Faster Page Loads Using Fine-grained Dependency Tracking**
  Ravi Netravali, Ameesh Goyal, James Mickens, Hari Balakrishnan
  USENIX NSDI 2016
- **Room-Area Networks**
  Peter Iannucci, Ravi Netravali, Ameesh Goyal, Hari Balakrishnan
  ACM HotNets 2015
- **Mahimahi: Accurate Record-and-Replay for HTTP**
  Ravi Netravali, Anirudh Sivaraman, Keith Winstein, Somak Das, Ameesh Goyal, James Mick-

ens, Hari Balakrishnan
USENIX Annual Technical Conference (ATC) 2015

- **WiFi, LTE, or Both? Measuring Multi-homed Wireless Internet Performance**
  Shuo Deng, Ravi Netravali, Anirudh Sivaraman, Hari Balakrishnan
  ACM IMC 2014
- **Authenticating a Mobile Devices Location Using Voice Signatures**
  Jack Brassil, Ravi Netravali, Stuart Haber, Pratyusa Manadhata, Prasad Rao
  IEEE WiMob 2012
- **Multi-Sensor Fusion of Electro-Optic & Infrared Signals for Visible Images**
  Xiaopeng Huang, Ravi Netravali, Hong Man, Victor Lawrence
  IEEE Oceans 2012
- **Femtocell-Assisted Location Authentication**
  Ravi Netravali, Jack Brassil
  IEEE LANMAN 2011

Journal Papers

- **Traffic Signature-Based Mobile Device Location Authentication**
  Jack Brassil, Pratyusa Manadhata, Ravi Netravali
  IEEE Transactions on Mobile Computing, Vol. 13, 2013
- **Multi-Sensor Fusion of Infrared & Electro-Optic Signals for Night Images**
  Xiaopeng Huang, Ravi Netravali, Hong Man, Victor Lawrence
  MDPI Sensors, Vol. 12, 2012
- **Improved Fusing of Infrared & Electro-Optic Signals for Night Images**
  Xiaopeng Huang, Ravi Netravali, Hong Man, Victor Lawrence
  SPIE, Defense, Security, and Sensing, Vol. 8355, 2012
- **Summary of Results for Optimal Camera Placement for Boundary Monitoring**
  Robert Holt, Hong Man, Rainer Martini, Iraban Mukherjee, Ravi Netravali, Jing Wang
  SPIE, Data Mining, Intrusion Detection, and Data Networks Security, Vol. 6570, 2007
- **A New Optic Flow Estimation Method in Joint EO/IR Video Surveillance**
  Hong Man, Robert Holt, Jing Wang, Rainer Martini, Ravi Netravali, Iraban Mukherjee
  SPIE, Infrared Imaging Systems: Design, Analysis, Modeling, and Testing, Vol. 6543, 2007

Demonstrations

- **Mahimahi: A Lightweight Toolkit for Reproducible Web Measurement**
  Ravi Netravali, Anirudh Sivaraman, Keith Winstein, Somak Das, Ameesh Goyal, Hari Balakrishnan
  ACM SIGCOMM 2014

Patents

- **Authenticating a User's Location in a Femtocell-Based Network**
  Jack Brassil, Stuart Haber, Pratyusa Manadhata, Ravi Netravali, Prasad Rao
  US Patent 9408025, 2016
- **Navigation System for Large Public Campuses**
  Rongrong Ji, Tongtao Zhang, Ravi Netravali, Shih-Fu Chang
  US Provisional Patent 61/344,650, 2010
- **Tracking of Objects with Infrared Cameras**
  Xiaopeng Huang, Ravi Netravali, Hong Man, Victor Lawrence
  US Provisional Patent 60/981618, 2007
- **Low Cost Network to Track Moving Objects**
  Robert Hold, Hong Man, Rainer Martini, Iraban Mukherjee, Ravi Netravali, Jing Wang
  US Provisional Patent 60/981608, 2007

Invited Talks

- **Understanding and Improving Web Performance**
  Guest Lecturer, MIT Graduate Networking Course (6.829) November 2016
- **Polaris: Faster Page Loads Using Fine-grained Dependency Tracking**

Invited Tech Talk, Google — April 2016
Guest Lecturer, MIT Advanced Topics in Computer Networks (6.888) — March 2016
USENIX NSDI — March 2016

- **Mahimahi: Accurate Record-and-Replay for HTTP**
  USENIX Annual Technical Conference (ATC) — July 2015
- **Femtocell-assisted Location Authentication**
  Columbia University, Joint CS/EE Networking Seminar Series — December 2011
- **Monitoring 3D Boundaries with Least Number of Cameras: A case study of the US-Mexican Border**
  Stevens Institute of Technology, iNets Seminar — July 2007

Research Experience

- **Research Intern, HP Research Labs** — 2011-2012
  Networking and Mobility Laboratory, Princeton, NJ
  Advisor: Jack Brassil
  Developed a system that robustly authenticates a mobile device's location by analyzing traffic signatures of ingress traffic at small cells (e.g., femtocells) in 802.11x networks.
- **Research Assistant, Columbia University** — 2010-2012
  Digital Video and Multimedia Lab
  Advisor: Shih-Fu Chang
  Developed an end-to-end image-based navigation system, in which users of our Android app upload GPS coordinates and an image of their surroundings. The backend uses an image processing pipeline to locate a similar image from its database, and then infers the user's position by comparing the two images. This information is used to improve the accuracy of the GPS coordinates, which are smoothed using an FIR filter (implemented on an FPGA).
- **Research Assistant, Stevens Institute of Technology** — 2005-2012
  Center for Intelligent Networked Systems
  Advisor: Victor Lawrence
  Developed algorithms and code to improve video-based boundary monitoring systems. We first generated a generic algorithm for optimal camera placement of a perimeter (which includes obstructions) such that each point is covered by at least one camera, while using the fewest possible cameras. We then generated a framework which improves the quality of monitoring data by fusing information from standard electro-optic cameras and infrared cameras.

Teaching Experience

- **Teaching Assistant, MIT** — 2014
  EECS 6.02: Digital Communication Systems
- **Teaching Assistant, Columbia University** — 2012
  CSEE 3827: Fundamentals of Computer Systems

Service

- **External Reviewer**: USENIX NSDI (2016, 2018), ACM SIGCOMM (2016)
- **Reviewer**: IEEE Transactions on Parallel and Distributed Systems, IEEE/ACM Transactions on Networking

References

Hari Balakrishnan
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Electrical Engineering and Computer Science
Massachusetts Institute of Technology
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Computer Science
Harvard University
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