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Objective & Research Interest

I am looking for a full-time position in coded-communication and/or video research-and-development. I am drawn towards problems which aid in advancing the science and at the same time have a practical payoff. My research is broadly categorized under: *Co-operative Coded Communication, Distributed Video Coding and Wireless Video.*

Education

Michigan State University (MSU) East Lansing, MI
Ph.D. (ABD), Electrical Engineering Expected: August 2008
(Dissertation topic: *Co-operative Coded Communication Under Network Constraints*)

Michigan State University (MSU) East Lansing, MI
M.S., Electrical Engineering GPA: 3.8 May 2002

Mumbai University D. J. Sanghvi College of Engineering
B.E., Electronics Engineering GPA: 3.9 (appx.) May 1998

Work Experience

Research Assistant & Mentor MSU 2004-present

Code Design under Network Constraints:

- Design Code-on-Graphs tailored to give higher performance on underlying wireless network graphs.
- Deduce inequalities to capture network restrictions and incorporate them in channel code design.
- Incorporate network characteristics in statistical models used to predict code behavior.

Wireless Video Communication:

- Investigated unique Distributed Video Coding architectures and complexity trade-offs involved in developing low-complexity video encoders.
- Developed schemes to improve wireless video (H.264) performance using partial channel state information and novel network-coding paradigms.

Mentoring:

- Define research problems and aid in the intellectual development/growth of junior lab members.
- Help junior members write research papers, guide theoretical deductions and aid in time management.

Teaching Assistant

Primary Instructor for a junior-level course on Introduction to Signal Processing MSU Summer 2006
Lab. assistant for a junior-level course on Microprocessors and Digital Systems Fall 2005, Spring 2006

System Integration Engineer

Designed and developed banking-database systems using C, Visual Basic and Oracle CMC Ltd., India Aug. 1998-Aug. 2000

Academic Awards

Academic Excellence Summer Research Fellowship Summer 2008.

Graduate School at Michigan State University

Research Enhancement Fellowship Spring 2008.

Graduate School at Michigan State University

Scholarship for excellence in academics 1995-96, 1996-97.

Sir Ratan Tata Trust, India

Second rank (out of 240 students) in semester-II of undergraduate program Spring 1995

Across all Engineering disciplines at D.J.Sanghvi College of Engineering

First rank (out of 240 students) in semester-I of undergraduate program Fall 1994

Across all Engineering disciplines at D.J.Sanghvi College of Engineering

Software Skills

Environments Linux, Unix, Windows 9x/NT/XP
Languages C/C++, Matlab, Visual Basic, Java, Intel 8086, 8051 assembly
Video Codecs H.264/AVC/SVC, MPEG-4 FGS

Publications (categorized + ordered by significance, C-Conference, J-Journal)

Co-operative Coded Communication	
C	“ Maximal Recovery Network Coding under Topology Constraint ”, K. Misra, S. Karande, H. Radha, in Proceedings of the 27th IEEE International Conference on Computer Communications (INFOCOM’08), April, 2008.
J	“Maximal Recovery Network Coding under Topology Constraint”, K. Misra, S. Karande, H. Radha submitted to IEEE Transactions on Information Theory, 2008.
C	“ INPoD: In-Network Processing based on Code Design ”, K. Misra, S. Karande and H. Radha, IEEE Communications Society Conference on Sensor, Mesh, Ad-hoc Communications and Networks (SECON’07), 2007.
J	“INPoD: In-Network Processing based on Code Design”, K. Misra, S. Karande, H. Radha, submitted to IEEE Transactions on Networking, 2008.
C	“ Design and Analysis of Generalized LT-codes using Colored Ripples ,” S. Karande, K. Misra, S. Soltani, H. Radha, to appear in Proceedings of IEEE Symposium on Information Theory (ISIT’08), 2008.
J	“Design of Distributed LT Codes using Multivariate Polynomial Approximations”, S. Karande, K. Misra, H. Radha, submitted to IEEE Transactions on Information Theory, 2008.
C	“Design of LT Codes for Nonuniform Demands”, S. Karande, K. Misra, S. Soltani, H. Radha, submitted to IEEE Transactions on Communications, 2007.
C	“Natural Growth Codes: Partial Recovery under Random Linear Coding”, S. Karande, K. Misra, H. Radha, in Proceedings of Conference on Information Sciences and Systems (CISS’08), Princeton, NJ, 2008.
C	“Adaptive Network Coding for Noisy Packets”, S. Karande, K. Misra and H. Radha, in Proceedings of Conference on Information Sciences and Systems (CISS’07), March 2007.
C	“Optimally Mapping an Iterative Channel Decoding Algorithm to a Wireless Sensor Network”, S. B. Qaisar, S. Karande, K. Misra, H. Radha, IEEE International Conference on Communications (ICC’07), June 2007.
Wireless Video & Networking	
C	“ Multi-Hypothesis Based Distributed Video Coding using LDPC Codes ”, K. M. Misra, S. Karande, and H. Radha, Allerton Conference on Communication, Control and Computing (Allerton’05), September 2005.
C	“ On Link-Layer Reliability and Stability for Wireless Communication ”, S. Soltani, K. M. Misra, H. Radha, to appear in the Proceedings of 14th Annual International Conference on Mobile Computing and Networking (MOBICOM’08), San Francisco, USA, 2008.
C	“Complexity Reduction Using Power-Law Based Scheduling For Exploiting Spatial Correlation In Distributed Video Coding”, K. Misra, S. Karande, K. Desai, H. Radha, to appear in the Proceedings of IEEE Conference on Image Processing (ICIP’08), San Diego, USA, 2008.
C	“Utilizing Signal to Silence Ratio indications for improved Video Communication in presence of 802.11b Residue Errors”, S. Karande, U. Parrikar, K. Misra, H. Radha, IEEE International Conference on Multimedia and Expo (ICME’06), July 2006.
C	“CLIX: Network Coding and Cross Layer Information Exchange of Wireless Video”, S. Karande, K. Misra and H. Radha, (invited) IEEE International Conference on Image Processing, (ICIP’06), 2006.
J	“On Channel Capacity Estimation and Prediction for Rate Adaptive Wireless Video”, Y. Cho, S. Karande, K. Misra, H. Radha, J. Yoo, J. Hong, accepted and to appear in IEEE Transactions on Multimedia.
J	“Survival Of The Fittest: An Active Queue Management Technique For Noisy Packet Flows”, S. Karande, K. Misra and H. Radha, (invited) Special issue on “Multimedia Networking” in Journal of Advances in Multimedia, Hindawi Publication, 2007.
C	“On Channel State Inference and Prediction Using Observable Variables in 802.11b Networks”, S. Karande, S. Khayam, Y. Cho, K. Misra, H. Radha, J. Kim, J. Hong, IEEE International Conference on Communications (ICC’07), June 2007.

Invention Disclosures (Patents Pending)

Framework for Network Coding	MSU# 6550-000133
A Method to Utilize Physical Layer Channel State Information to Improve the Video Quality	MSU# 6550-000134
Modeling of Residue Errors Using Models that Adapt on the Basis of Link Quality Indicators	MSU# 6550-000135
Method for estimating channel capacity and tuning coding rate for adaptive video transmission, and video transmission/receiving apparatus using them	ETRI# DP20070367
A Method for channel state inference and prediction using side-information in 802.11b	ETRI# DP20061538

Significant contributions to the following funded research grants

NOSS: Sensor Data Ghosting: A Framework for the Survival of Critical Data under Sensor Failures	PI: Hayder Radha	NSF CCF-0721550
Investigation into Non-conventional Analog Decoders for Low-density Parity Check Codes	PI: Shantanu Chakrabartty, Co-PI: Hayder Radha	NSF CCF-0728996

References

Prof. Hayder Radha (radha@msu.edu, +1 517 432 9958)
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Dr. Shantanu Chakrabartty (shantanu@egr.msu.edu +1 517 432 5679)
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(More available on request)