Tejaswi Nanjundaswamy

Email: tejaswi at ece dot ucsb dot edu

Education

Doctorate of Philosophy (PhD),
University of California Santa Barbara, March 2013
Thesis: Advances in audio coding and networking by effective exploitation of long term correlations
Advisor: Prof. Kenneth Rose

Master of Science (MS),
University of California Santa Barbara, Dec 2009
Major in Signal Processing; Minor in Communications
Cumulative GPA: 3.97/4.00

Bachelor of Engineering (BE),
National Institute of Technology Karnataka, June 2004
Major in Electronics and Communications Engineering
Aggregate: 85.2%

Research Interests

My interests include all aspects of multimedia compression and networking. Specific topics include: Improving prediction techniques in audio, video and image coders; Joint optimization of various modules (prediction, transform, quantization, entropy coding) of a compression system; Compression/processing of multimedia signals to account for transmission over unreliable heterogeneous networks via layered coding and packet loss concealment.

Professional Experience

Signal Compression Lab, UCSB, *Post-doctoral Researcher, April 2013–present*
Advances in multimedia signal compression and networking.

Ittiam Systems Pvt. Ltd., Bangalore, India, *Senior Engineer, Audio Group, Jul 2004–Aug 2008*
Design and development of audio compression and processing algorithms for embedded systems.

Texas Instruments, Bangalore, India, *Project Intern, Dec 2003*
Development of iLBC for embedded systems.

Funding Experience

Contributor to the NSF Award, PI: Kenneth Rose, CCF-1320599: The Common Information Framework and Optimal Coding for Layered Storage and Transmission of Audio Signals, 2013, Amount: $494,831

Contributor to awards from Google, LG and Mozilla, PI: Kenneth Rose, Advances in prediction, transforms and entropy coding for compression and networking of speech, audio and video signals, from 2013 to 2016, total amount of ~$550,000

Preprints

T. Nanjundaswamy and K. Rose, "Frame Loss Concealment for Polyphonic Audio by Cascaded Long Term Prediction," IEEE/ACM Trans. ASLP, in review

Journal Publications

T. Nanjundaswamy and K. Rose, "Cascaded Long Term Prediction for enhanced compression of Polyphonic Audio Signals," IEEE/ACM Trans. ASLP, March 2014

E. Ravelli, V. Melkote, T. Nanjundaswamy and K. Rose, "Joint Optimization of Base and Enhancement Layers in Scalable Audio Coding," IEEE Trans. ASLP, April 2013

Conference Proceedings

B. Vishwanath, T. Nanjundaswamy, and K. Rose, "Rotational Motion Model for Temporal Prediction in 360 Video Coding," to appear in Proc. MMSP 2017

S. Zamani, T. Nanjundaswamy, and K. Rose, "Frequency Domain Singular Value Decomposition for Efficient Spatial Audio Coding," to appear in WASPAA 2017

B. Li, T. Nanjundaswamy, and K. Rose, "An Error-Resilient Video Coding Framework with Soft Reset and End-to-end Distortion Optimization," to appear in Proc. ICIP 2017

W.-T. Lin, T. Nanjundaswamy, and K. Rose, "Adaptive Interpolated Motion Compensated Prediction," to appear in Proc. ICIP 2017

S. Li, T. Nanjundaswamy, B. Li, and K. Rose, "On Generalizing the Estimation-Theoretic Framework to Scalable Video Coding with Quadtree Structured Block Partitions," to appear in Proc. ICIP 2017

S. Li, T. Nanjundaswamy, and K. Rose, "Jointly Optimized Transform Domain Temporal Prediction and Sub-pixel Interpolation," Proc. ICASSP 2017

B. Vishwanath, T. Nanjundaswamy, S. Zamani, and K. Rose, "Deterministic Annealing Based Design of Error Resilient Predictive Compression Systems," Proc. ICASSP 2017

B. Li, T. Nanjundaswamy, and K. Rose, "Block-size Adaptive Transform Domain Estimation of End-to-end Distortion for Error-resilient Video Coding," ICIP 2016

S. Zamani, T. Nanjundaswamy, and K. Rose, "Recursive End-To-End Distortion Estimation for Error-Resilient Adaptive Predictive Compression Systems," SSP 2016

M. Salehifar, T. Nanjundaswamy, and K. Rose, "Joint Design of Layered Coding Quantizers to Extract and Exploit Common Information," DCC 2016

S. Li, T. Nanjundaswamy, and K. Rose, "Transform Domain Temporal Prediction with Extended Blocks," Proc. ICASSP 2016

M. Salehifar, T. Nanjundaswamy, and K. Rose, "Quantizer Design for Exploiting Common Information in Layered Coding," Proc. ICASSP 2016

M. Salehifar, T. Nanjundaswamy, and K. Rose, "On Scalable Coding of Hidden Markov Sources," Proc. ICASSP 2016

S. Zamani, T. Nanjundaswamy, and K. Rose, "Asymptotic Closed-Loop Design of Error Resilient Predictive Compression Systems," Proc. ICASSP 2016

S. Li, T. Nanjundaswamy, Y. Chen, and K. Rose, "Asymptotic Closed-loop Design for Transform Domain Temporal Prediction," Proc. ICIP 2015 *(Top 10% Paper Award)*

S. Li, Y. Chen, J. Han, T. Nanjundaswamy, and K. Rose, "Rate-Distortion Optimization and Adaptation of Intra Prediction Filter Parameters," Proc. ICIP 2014

T. Nanjundaswamy, K. Viswanatha, and K. Rose, "On Relaxing the Strict Hierarchical Constraints in Layered Coding of Audio Signals," Proc. ICASSP 2014

Y. Chen, J. Han, T. Nanjundaswamy, and K. Rose, "A Joint Spatio-Temporal Filtering Approach to Efficient Prediction in Video Compression," PCS, Dec 2013

T. Nanjundaswamy and K. Rose, "Cascaded Long Term Prediction of Polyphonic Signals for Low Power Decoders," 135th AES Conv., Oct 2013

T. Nanjundaswamy and K. Rose, "On accommodating pitch variation in long term prediction of speech and vocals in audio coding," 133rd AES Conv., Oct 2012

K. Viswanatha, E. Akyol, T. Nanjundaswamy, and K. Rose, "On Common-Information and the Encoding of Sources that are Not Successively Refinable," Proc. IEEE ITW, Sep 2012

T. Nanjundaswamy and K. Rose, "Bidirectional Cascaded Long Term Prediction for Frame Loss Concealment in Polyphonic Audio Signals," Proc. ICASSP 2012

T. Nanjundaswamy and K. Rose, "Perceptually Optimized Cascaded Long Term Prediction of Polyphonic Signals for Enhanced MPEG-AAC," 131st AES Conv., Oct 2011

T. Nanjundaswamy and K. Rose, "Cascaded Long Term Prediction for Coding Polyphonic Audio Signals," Proc. IEEE WASPAA, Oct 2011 *(Best Paper Award Finalist)*

T. Nanjundaswamy, V. Melkote, E. Ravelli and K. Rose, "Perceptual Distortion-Rate Optimization of Long Term Prediction in MPEG AAC," 129th AES Conv., Nov 2010 *(winner of Student Technical Paper Award)*

E. Ravelli, V. Melkote, T. Nanjundaswamy and K. Rose, "Cross-layer rate- distortion optimization for scalable advanced audio coding," 128th AES Conv., May 2010

E. Ravelli, V. Melkote, T. Nanjundaswamy and K. Rose, "Joint optimization of the perceptual core and lossless compression layers in scalable audio coding," Proc. ICASSP'10

Patents   K. Rose and T. Nanjundaswamy, "Method and Apparatus for Polyphonic Audio Signal Prediction

in Coding and Networking Systems," US Patent No. 9,406,307

K. Rose and T. Nanjundaswamy, "Method and Apparatus for Polyphonic Audio Signal Prediction in Coding and Networking Systems (Part 2)," US Patent Application No. 15/197,326 *(Approved)*

K. Rose, T. Nanjundaswamy, K. Viswanatha, and E. Akyol, "Method and Apparatus for Layered Compression of Multimedia Signals for Storage and Transmission over Heterogeneous Networks," US Patent Application No. 14/473,586 *(Approved)*

Distinctions and Activities

Winner of AES 129th Convention Student Technical Paper Award

Best Paper Award finalist at IEEE WASPAA 2011

Co-author of Top 10% Award winning paper at IEEE ICIP 2015

UCSB Doctoral Student Travel Grant 2012 (Amount: $1400)

Program committee member/reviewer for IEEE Trans. ASLP, IEEE MMSP, IEEE ICASSP, IEEE ICME, IEEE WASPAA, IEEE ICIP, PCS and PV Workshop

Secured 44th rank ($< 0.001\%$) in Engineering stream and 21st rank ($< 0.001\%$) in Medical stream in the Karnataka Common Entrance Test (in year 2000) amongst more than 200,000 students

References Available upon request.