

Abdolreza (Nima) Abdolhosseini Moghadam

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Summary of Qualifications

- Obtained industry experience through internship with Eastman Kodak, Technicolor and part-time jobs
- Patents, NSF grants and publications on modeling high dimensional, multi-channel data
- Established experience in algorithm design and development, data modeling and numerical methods
- Highly knowledgeable in certain branches of mathematics, statistics and machine learning such as linear algebra, probability theory, L-1 regularized linear regression and Support Vector Machine (SVM)
- Versed in complex coding projects involving Matlab, C/C++ and parallel processing

Education

Michigan State University

Ph.D. Candidate, Electrical and Computer Engineering
Thesis Title: "Combinatorial Algorithms for Compressed Sensing"

East Lansing, MI, USA
January 2014

Sharif University of Technology

M.Sc. Computer Engineering

Tehran, Iran
December 2006

Sharif University of Technology

B.Sc. Computer Engineering

Tehran, Iran
September 2003

Patents

- Video representations using a sparsity-based model (K000877US01/KES), Eastman Kodak.
- Scene boundary detection using a sparsity model (K000878US01/KES), Eastman Kodak.
- Motion Matrix for video compression (PU 100198/IU 100197), Technicolor.

Professional Experience

Eastman Kodak

Intern

Rochester, NY, USA
May 2011 - August 2011

- By effectively utilizing the spatio-temporal correlation, we proposed a modeling framework for video contents to optimize efficiency of a wide range of common video processing.
 - Two patents are filed and one journal paper is accepted in IEEE transactions on image processing.

Technicolor (Thomson)

Intern

Princeton, NJ, USA
May 2010 - August 2010

- Proposed a video compression method by utilizing the state of the art research on Affine Constraint Rank Minimization and theory of compressed sensing.
 - One patent is filed.

Research Experience

Michigan State University - Waves Lab

Research Assistant

East Lansing, MI, USA
May 2007-Present

- Studied properties (e.g. range of Eigen-values) of a class of sparse random matrices where the number of rows is less than the number of columns and non-zero entries are random variables with Normal distribution.
 - Designed a combinatorial algorithm for solving noisy under-determined systems of linear equations when the aforementioned matrices govern the system and the solution is known to be sparse (i.e. linear regression when parameters are sparse and the set of data points are sparse as well).

Skills

- Compressed sensing
- Machine learning
- Statistics and Probability theory
- Linear algebra
- Matlab
- Data modeling
- Signal processing
- Video processing
- Optimization
- C/C++
- Algorithms
- Image processing
- Numerical methods
- Embedded systems
- Distributed systems

Awards, Achievements and Grants

- Proposed a unifying model for video contents which led to comparable results from the state of the art algorithms in certain video processing problems.
- Achieved quantitative and qualitative records in image demosaicing by modeling the non-linear behavior of color correlation in the frequency domain and utilizing certain facts about human visual system.
- Served as journal reviewer for journals of IEEE transactions on Image Processing, Springer journal on Circuits, Systems and Signal Processing and Conference reviewer for IEEE ICASSP.
- Attained top 10% paper award in IEEE Multi-Media Signal Processing (MMSP) for the paper with the title "Compressive Demosaicing".
- Significantly contributed on NSF award No. 1117709 in 2011 (\$408,536 granted).

Selected Publications

- **Abdolreza Abdolhosseini Moghadam**, M. Kumar and H. Radha, "Common and Innovative Visuals (CIV): a sparsity modeling framework for video", accepted for publication in IEEE transactions on Image Processing, 2013.
- **Abdolreza Abdolhosseini Moghadam**, Mohamad Aghagolzadeh, Mrityunjay Kumar and Hayder Radha (2013). A compressive framework for demosaicing of natural images. IEEE Transactions on Image Processing, 2013, Vol. 22, Issue 6, pp 2356-2371.
- **Abdolreza Abdolhosseini Moghadam** and Hayder Radha (2013). Sparse Expander-like Real-valued Projection (SERP) matrices for compressed sensing. IEEE global conference on signal and information processing (GlobalSIP) 2013.
- M. Aghagolzadeh, **Abdolreza Abdolhosseini Moghadam**, M. Kumar and H. Radha, "Compressive demosaicing for periodic color filter arrays", IEEE International Conference on Image Processing (ICIP'11), September 2011.
- M. Aghagolzadeh, **Abdolreza Abdolhosseini Moghadam**, M. Kumar and H. Radha, "Bayer and panchromatic color filter array demosaicing by sparse recovery", SPIE, Digital Photography, 2011.
- **Abdolreza Abdolhosseini Moghadam**, M. Aghagolzadeh, M. Kumar and H. Radha, "Incoherent Color Frames for Compressive Demosaicing", IEEE ICASSP 2011.
- **Abdolreza Abdolhosseini Moghadam**, Mohamad Aghagolzadeh, Mrityunjay Kumar and Hayder Radha, "Compressive Demosaicing". IEEE MMSP 2010 (Top 10% paper).