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Research Interest:

Recent Focus: Data Science in the domain of Digital Humanities.
Wider interest: Computer Vision, Data Science, Human-Centered Computing, and Machine Learning.

Education:

- Ph.D. Computer Science, May 2002, University of Maryland, College Park, MD
  Advisor: Prof. Larry S. Davis.
  Thesis: *"Efficient Nonparametric Kernel Density Estimation for Real-time Computer Vision"*
  Defense Committee: Larry S. Davis, Azriel Rosenfeld, Rama Chellapa, Amitabh Varshney

- M.Sc., Computer Science, June 2000. University of Maryland, College Park, MD.
- M.Sc., Computer Engineering and Automatic Control, June 1996. University of Alexandria, Alexandria, Egypt.
  Thesis: *"Bilingual Document Image Analysis"*
- B.Sc., Computer Science and Automatic Control, July 1993, with Degree of honor. University of Alexandria, Alexandria, Egypt.

Current Appointment:

- Professor, July 2016 – present
  (Associate Professor, July 2008 – June 2016, Assistant Professor, September 2002 – July 2008)
  Dept. of Computer Science, Rutgers, The state University of New Jersey.

  Academic Affiliations and roles:

  - Director of the Computer Science Master Program, 2014—2016
  - Executive Council Faculty member of Rutgers University Center Cognitive Science (RuCSS)
  - Director of the Art and Artificial Intelligence Laboratory – 2014-present
  - Member of the Center for Computational Biomedicine Imagining & Modeling (CBIM)
  - Director of the Human Motion Analysis Laboratory (HuMAn Lab)– 2002-present

Prior Appointments:

- Assistant Research Faculty, September 2001- August 2002. The Computer Vision Laboratory (CVL), Center For Automation Research (CFAR), Institute for Advanced Computer Studies (UMIACS), University of Maryland, College Park.

- Graduate Research Assistant, January 1998 - September 2001. The Computer Vision Laboratory (CVL), Institute for Advanced Computer Studies (UMIACS), University of Maryland, College Park, MD.
- Internship, summers of 1997, 1998, 1999, and 2001. Philips Research Laboratories, Briarcliff manor, NY.
- Graduate Teaching Assistant, August 1997 – January 1998. Dept. of Computer Science, University of Maryland, College Park.
- Graduate Teaching Assistant, August 1996 – May 1997. Dept. of Computer Science, Rutgers, The state University of New Jersey.
- Graduate Teaching Assistant/ Instructor, August 1993-August 1996. Dept. of Computer Science, University of Alexandria, Alexandria, Egypt.

Professional Services:

- Editorial Board: Image and Vision Computing Journal since June 2008.
- *Guest Editor*: Computer Vision and Image Understanding (CVIU) special issue on video analysis, 2009

- *Chair/Organizer:* ICCV Workshop on Closing the Loop Between Vision and Language 2015
- *Chair/Organizer*: ACCV Workshop on Detection and Tracking in Challenging Environments (DTCE) – Daejeon, Korea, November 2012.
- *Chair/Organizer:* The 3rd Workshop on Human Motion, Understanding, Capture, and Animation, with ECCV 2010.
- *Chair/Organizer:* The 2nd Workshop on Human Motion, Understanding, Capture, and Animation, with ICCV'07.

- *Area Chair*: IEEE International Conference on Computer Vision ICCV 2015.
- *Area Chair*: IEEE Computer Society Conference on Computer Vision CVPR 2014.
- *Area Chair*: 10th IEEE International Conference on Automatic Face and Gesture Recognition, Shanghai, China 2013.
- *Publication Chair*: 10th IEEE International Conference on Automatic Face and Gesture Recognition, Shanghai, China 2013.
- *Senior Program Committee*: AAAI'13
- *Area Chair:* International Conference on Computer Vision ICCV'07.

- *Session Chair:* 6th International Conference on Computational Creativity ICCC'15.
- *Session Chair:* Tracking Session - 21st International Conference on Pattern Recognition ICPR'12, Tsukuba Science City, Japan, November 2012.
- *Session Chair:* International Conference on Computer Vision ICCV'07.

- *Program Committee:* AAAI'15
- *Program Committee*: When Vision Meets Art Workshop, with ECCV 2014
- *Program Committee*: Vision Meets Cognition Workshop, with CVPR 2014

- *Program Committee*: IEEE Computer Society Conference on Computer Vision and Pattern Recognition: CVPR'15, CVPR'13, CVPR'12, CVPR'11, CVPR'10, CVPR'08, CVPR'07, CVPR'06.
- *Program Committee*: IEEE Conference on Biometrics: Theory, Applications and Systems, BTAS'07, BTAS'08.
- *Program Committee*: IEEE Workshop on CVPR for Human Communicative Behaviour Analysis, 2008, 2009, 2010.
- *Program Committee*: IEEE Online Learning for Computer Vision Workshop OLCV 2007, 2008, 2009, 2010.
- *Program Committee*: ACM Multimedia 2007, Interface track.
- *Program Committee*: Workshop on Dynamic Vision: WDV'09 with ICCV'09, WDV'7 with ICCV'07, WDV'06 with ECCV'06, WDV'05 with ICCV'05.
- *Program Committee*: International symposium on Visual Computing. ISVC'06 ISVC'07, ISVC'08, ISVC'09.
- *Program Committee*: The 7th International Conference on Face and Gesture Recognition FG'06.
- *Program Committee*: The European Conference on Computer Vision ECCV'10, ECCV'06.
- *Program Committee*: International Conference on Computer Vision ICCV'09, ICCV'05.
- *Program Committee*: IEEE Computer Society Workshop on Motion and Video Computing, 2007, 2005, 2002.
- *Program Committee*: IEEE Workshop on Applications of Computer Vision; (WACV'08).
- *Program Committee*: The 2nd International Workshop on Generative-Model based vision. GMBV 2004, Washington DC, USA, June 2004, with CVPR'04.

- Reviewer for most of the top journals in the computer vision field, including:
  - IEEE Transactions on Pattern analysis and Machine Intelligence (TPAMI)
  - International Journal of Computer Vision (IJCV)
  - IEEE Transaction on Image Processing. (TIP)
  - Computer Vision and Image Understanding (CVIU)
  - Pattern Recognition
  - Pattern Recognition Letters
  - Image and Video Computing (IVC)

Professional Memberships

- Senior Member of IEEE
- Member of the IEEE computer society and TC-PAMI.
- Member of the Renaissance Society of America
- Member of the British Machine Vision Association and Society for Pattern Recognition
- Member of the International Association of Pattern Recognition

Funded Research Grants:

- Adobe Gift: 19K – Fall 2015.
- Artsy Gift: 10K – Summer 2015.
- PI: NSF-IIS "Write-a-classifier: Joint learning from text and images for fine-grained recognition" – August 2014 - In collaboration with Smranda Muresan at Columbia University

  Award: $1M
- PI: NSF-IIS "Detecting Abnormality in Images" – June 2012 – In collaboration with Jacob Feldman (Rutgers Psychology) and Ali Farhadi (U. of Washington)

  Award: $460K

- PI: ONR “Towards Smooth Encoding of Local Features and Their Spatial Arrangement for Recognition” – June 2012

  Award: $125K

- PI: Rutgers Faculty Research Grant "Micro-UAV Swarm for Real-time 3D Monitoring and Surveillance" – January 2012

  Award $50K

- PI: Siemens Collaborative Agreement – December 2011 - $25K
- PI: Telcordia Research Gift – October 2011, $28K
- PI: Google Research Award – June 2011

  Award: $55K.

- PI: National Science Foundation – Office of International Science and Engineering (OISE)

  Project title: “Computer Aided Pronunciation Learning Application”,

  Award $75K, October 2009-September 2012.

- Co-PI: National Science Foundation - Industrial Innovation and Partnerships (IIP). Industry/University Cooperative Research Centers Program (I/UCRC) “Center for Dynamic Data Analytics”.

  Award: $817K, March 2011- February 2017.

- Co-PI: National Science Foundation - Human Centered Computing Program - Medium Grant

  Project title: Multimodal Capture of Teamwork in Collocated Collaboration”

  Award: $500K, September 2008- August 2011.

- Co-PI: Rutgers University Seed Funding for Collaborative Computing Research 2008

  Project title: “Continuous Vital Monitoring for Trauma Triage using Wireless Sensor Networks”

  Award: $50K, Spring 2008.

- Co-PI: Rutgers University Academic Excellence Fund 2008

  Project title: “Real-Time Multimodal Monitoring of Collaborative Teamwork”

  Award: $20K, Spring 2008.

- Co-PI: National Science Foundation Small Grants for Exploratory Research

  Project title “Vision and RFID for Multimodal Tracking of Working Teams”

  Award: $84K, September 2007 – August 2008.

- PI: Mitsubishi Research Lab – "Novel methods for Face Tracking"

  Award $5,000 – Fall 2007.

- **PI: National Science Foundation CAREER Award** number 0546372.

  Project title “Generalized Separation of Style and Content on Nonlinear Manifolds with Application to Human Motion Analysis”

  Award: $512K, January 2006 – December 2010.

- Co-PI: Department of Homeland Security

Project title: "Deception Detection from Visual and Multimodal Input"

Award $3.5M, summer 2005- 2008.

- PI: National Science Foundation Award number 0328991.

  Project title: "Nonlinear Spatiotemporal Models for Decomposing Style Variations using Kernel Methods"

  Award: $250K, Date: September 2003- August 2006

- Co-PI: National Science Foundation Award number 0428231.

  Project title: "ITR –DDDAS - Advances in recognition and interpretation of human motion: An Integrated Approach to ASL Recognition"

  Award: $1.6M, Date: October 04 – October 07

- Co-PI: National Institute for Standards and Technology (NIST)

  "Gesture-based Control of Mobile Platforms"

  September 2002 – August 2004

Patents:

- United States Patent # 6,263,113 "Method for detecting a face in a digital image", 2001.
- United States Patent # 7,057,636 "Conferencing System and Method for Automatic Determination of Preset Position Corresponding to Participants in Video-Mediated Communications", 2006.
- European Patent #1,057,326 Automatic Determination of Preset Positions Corresponding to Participants in Video, 2008.

Honors, Awards, and Media

- *Recipient of the Outstanding Student Paper Award* – AAAI'16, B. Saleh, A. Elgammal, J. Feldman and A. Farhadi *"Toward a Taxonomy and Computational Models of Abnormalities in Images"*
- IEEE senior member since 2013.
- International Innovation North America Magazine has published a report about our NSF funded project on Generalized Separation of Style and Content for Human Motion Analysis, May 2013.
- *Editor Choice Paper*: Image and Vision Computing Journal – April 2013 "Homeomorphic Manifold Analysis (HMA): Generalized Separation of Style and Content on Manifolds".
- Google Research Award 2011
- Outstanding reviewer award, IEEE conference on Computer Vision and Pattern Recognition, June 2008.
- Rutgers Academic Excellence Award, Spring 2008.
- **National Science Foundation CAREER Award – January 2006**.
- *Recipient of Honorary Mention for Best Paper Award*. 4th Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP'04), December 16-18, 2004, pages 656-662.

Kolkata, India. With V. Shet, V. Shiv Naga Prasad, A. Elgammal, L. S. Davis, Y. Yacoob, paper title *"Multi-Cue Exemplar-Based Nonparametric Model for Gesture Recognition"*

Sample Media Coverage (for a more up to date and complete list check the Art and Artificial Intelligence lab web site)

The paper "*Quantifying Creativity in Art Networks*" has received worldwide media attention. Here are few prominent posts about it:

- Yang Wang "Why do we love Picasso? A 'creativity algorithm' explains" *The Washington Post*, July 31, 2015
- Stephen Heyman "How Computing Can Help Art Historians" *The New York Times*, July 15, 2015
- Dominic Basulto "Why it matters that computers are now able to judge human creativity" *The Washington Post*, June 18, 2015.
- Maddie Crum "Which Famous Paintings Are The Most 'Creative'? This Formula Might Have The Answer" *The Huffington Post*, July 6, 2015.
- Devin Coldwewy "Computer Art Critic Picks Most Creative Paintings in History" *NBC News*, June 11, 2015.
- Benjamin Sutton "Can an Algorithm Determine Art History's Most Creative Paintings?" *Hyperallergic*, June 12, 2015.
- Marissa Fessenden "History's Most Creative Paintings, As Picked by a Computer", *Smithsonian Magazine*, June 18, 2015.
- Richard Gray "Move over art critics! Computer algorithm reveals the most original masterpieces of all time" *The Daily Mail*, June 16, 2015.
- Guelda Voien "Computer Program Ranks Relative 'Creativity' of Historical Paintings" *Observer*, June 23, 2015.
- Rob Waugh "A Computer Has Ranked The Human Race's 'Best' Art Works" *Yahoo News,* June 19, 2015.
- Marc Bain "Picasso = Genius: This algorithm can judge "creativity" in art as well as the experts" *Quartz*, June 11, 2015.
- Miguel Angel Criado "El Cristo de Goya, el cuadro más original para las máquinas" EL PAIS (Spain's top national news paper, appeared also in the Brazilian edition) June 17, 2015.
- "Los cuadros más creativos de la historia según la ciencia" ABC news paper (Spain third largest news paper)
- Stefania Medetti "Arriva l'algoritmo che analizza e cataloga l'arte" Panorama, Italy, June 18, 2015.
- Philip Ferrari "L'algoritmo che giudica le opere d'arte" Focus, Italy, June 15, 2015
- "Machine Vision Algorithm Chooses the Most Creative Paintings in History" MIT Technology Review, June 10, 2015

The post "*Which paintings were the most creative of their time? An algorithm may hold the answers*", published in the Conversation on July 2015, has been reposted in the following media outlets:

- *Time Magazine* - Idea's section on July 31st 2015 "How to Find Out Which Paintings Were the Most Creative of Their Time"
- *Newsweek* - Opinion section on August 2nd 2015 "What Makes a Picture Great? There's an Algorithm for That"
- *Discover Magazine* July 30th 2015 "Can You Teach Creativity to a Computer?"
- *Humanity+ media* on July 30th 2015 "Artificial Intelligence and Algorithmic Creativity"
- *Mashable* on July 30th 2015 "This algorithm is designed to measure the creativity of a painting"

The paper "Large-scale Classification of Fine-Art Paintings: Learning The Right Metric on The Right Feature" has received some media attention. Most prominent posts:

- "The Machine Vision Algorithm Beating Art Historians at Their Own Game" MIT Technology Review, May 11, 2015.
- Marissa Fessenden "Computers Are Learning About Art Faster than Art Historians" Smithsonian Magazine, May 13, 2015.
- Tanya Lewis "Art-ificial Intelligence? Algorithm Sorts Paintings Like a Person" Live Science, June 19, 2015

The paper "*Toward Automated Discovery of Artistic Influence*" has received extensive media coverage. Here are prominent posts about it:

- Haluka Maier-Borst "Looking for the art formula" *PM Magazine*, Germany, March 2015.
- Mohana Ravindranath, "Computer Science Putting Art Analysis on Faster Track," *The Washington Post*, Nov. 10, 2014.
- Mohana Ravindranath, "Can an algorithm tell us who influenced an artist?" *The Washington Post*, Nov. 9, 2014.
- Antonio Martínez Ron, "Este algoritmo quiere ser crítico de arte," *Vozpópuli*, Oct. 16, 2014 (in Spanish).
- Meghan Rosen, "Computer program reveals artists' influences," *Science News*, Oct. 13, 2014.
- Rosalind Mckever "Can artificial intelligence really identify artistic influence?", *Apollo-magazine*, September 19, 2014.
- Mostafa Heddaya, "Seeing Art History with Machine Eyes," *Hyperallergic*, Aug. 26, 2014.

- Zach Sokol, "An Intelligent Algorithm Made A Discovery That Slipped Past Art Historians For Years," *The Creators Project*, Aug. 26, 2014.
- Rafael Garcia "Scientists create computer program that analyzes painting and identifies influences between artists" article in portuguese, *Folha De S. Paulo*, August 24th, 2014
- Matthew Sparkes, "Could Computers Put Art Historians Out of Work?" *The Telegraph*, Aug. 18, 2014.
- "When A Machine Learning Algorithm Studied Fine Art Paintings, It Saw Things Art Historians Had Never Noticed," *The Medium - The Physics arXiv Blog*, Aug. 18, 2014.

Ph.D. Students Advised (graduated)

- Turgay Senlet, Ph.D. awarded 2015, "Visual Localization, Semantic Video Segmentation and Labeling Using Satellite Maps"

  Dr Senlet is currently at Google.
- Ishani Chakraborty, Ph.D. awarded 2013, "Object Category Detection and Recognition Through Topic Model Cascade."

  Dr. Chakraborty is currently at SRI, Princeton, NJ.
- Ali Elqursh, Ph.D. awarded 2013, "Online Non-rigid Motion and Scene Layer Segmentation."

  Dr. Elqursh is currently at Google
- Edinah Gnang, Ph.D. awarded 2013, "Computational aspects of the Combinatorial Nullstellensatz Method via a Polynomial Approach to Matrix and Hypermatrix Algebra."

  Dr. Gnang is currently a Golomb Assistant Professor of Mathematics at Purdue University.
- Marwan Torki, Ph.D. awarded 2011 "Learning The Manifolds of Local features and Their Spatial Arrangements."

  Dr. Torki is currently a faculty member at the Department of Computer Science, Alexandria University, Egypt.
- Toufiq Parag, Ph.D. awarded 2010 "Labeling Hypergraph-structured Data using Markov Network"

  Dr. Parag is currently with Howard Hughes Medical Institute, Janelia Research Campus.
- Zhipeng Zhao, Ph.D. awarded 2009 "Towards a Local-Global Visual Feature-Based Framework for Recognition."

  Dr. Zhao is currently at Symantec.
- Chan-Su Lee, Ph.D. awarded 2007 "Modeling Human Motion Using Manifold Learning and Factorized Generative Models."

  Dr. Lee is currently a faculty member at School of Electronic Eng., Communication Eng. & Computer Science, Yeungnam University, Korea.
- Ramana Isukapalli, Ph.D. – awarded 2006 "Learning Effective Interpretation Policies."

  Dr Isukapalli is currently with Lucent Technologies.

M.Sc. Students Advised:

- Ravneet Arrora M.Sc. awarded 2012 *"Towards Automated Classification of Fine-art Painting Style: a Comparative Study"*

- Gagan Gutam, M.Sc. awarded 2007 *"A Scalable And High Performance Image Search Engine Using Semantic And Structural Image-Keyword Association"*.

Publications:

Citations are according to Google scholar, on April 2016. Overall over 7600 citations, h-index = 31, i10-index = 65.

Books Authored:

[1] A. Elgammal *"Background Subtraction – Theory and Practice"* Morgan & Claypool Publishers, 2014.

Book and Journal Editorials:

[2] Q. Liu, X. Li, A. Elgammal, X. Hua, D. Xu, D. Tao, Guest Editor: special issue on video analysis in the Computer Vision and Image Understanding Journal (CVIU). 2009.

[3] A. Elgammal, B. Rosenhahn, and R. Klette, Editors Lecture Notes on Computer Science (LNCS) Volume on "Proceedings of the 2nd workshop on Human Motion - Understanding, Modeling, Capture and Animation". Springer, 2007.

Invited and Refereed Book Chapters:

[4] A. Elgammal *"Homeomorphic Manifold Analysis (HMA): Untangling Complex Manifolds"* - Advances in Imaging & Electron Physics – Elsevier – Vol 187, 2015.

[5] A. Elgammal *"Statistical Models for Background Subtraction"* in "Background Modeling and Foreground Detection for Video Surveillance", CRC, 2014

[6] A. Elgammal and A. Elqursh *"Background Subtraction for Moving Cameras"* in "Background Modeling and Foreground Detection for Video Surveillance", CRC, 2014

[7] A. Elgammal *"Background Subtraction – Theory and Practice"* in "Wide Area Surveillance - Real Time Motion Detection Systems", Vijayan K. Asari (Ed.), Springer, 2013

[8] M. Torki and A. Elgammal *"Learning Image Manifolds from Local Features"* in "Manifold Learning theory and Applications", Yunqian Ma and Yun Fu (Eds.), CRC press, March 2012.

[9] A. Elgammal and C.-S. Lee *"Human Motion Analysis Application of Manifold Learning"* in "Manifold Learning theory and Applications" Yunqian Ma and Yun Fu (Eds.), CRC press, March 2012.

[10] A. Elgammal *"Figure-ground segmentation - pixel-based"* in "Guide to Visual Analysis of Humans: Looking at People", Th. B. Moeslund, A. Hilton, V. Krüger, L. Sigal (Eds.), Springer.

[11] A. Elgammal *"Motion analysis for gait recognition"* Biometrics Encyclopedia, Springer 2009.

[12] A. Elgammal, Crystal Muang, and Dunxu Hu*"Skin Detection"* Biometrics Encyclopedia, Springer, 2009. [*cited 75 times*]

[13] A. Elgammal and C.-S. Lee, *"The Role of Manifold Learning in Human Motion Analysis*", in "Human Motion - Understanding, Modeling, Capture and Animation". Springer – Computational Imaging Series. Springer, 2007. [*cited 21 times*]

Journal Publications:

[14] B. Saleh and A. Elgammal *"Large-scale Classification of Fine-Art Paintings: Learning The Right Metric on The Right Feature",* Journal of Digital Art History – In press 2015.

[15] P. Vepakomma and A. Elgammal *"A fast algorithm for manifold learning by posing it as a symmetric diagonally dominant linear system"*, Applied and Computational Harmonic Analysis Journal, in press 2015.

[16] C-S. Lee, A. Elgammal, and M. Torki *"Learning Representations from Multiple Manifolds"*, Pattern Recognition, in press 2015.

[17] M. Elhoseiny and A. Elgammal *"Generalized Twin Gaussian Processes using Sharma-Mittal Divergence",* Machine Learning Journal, Springer – in press 2015.

[18] H. Zhang, T. El-Gaaly, Z. Jiang, A. Elgammal *"Factorization on View-Object Manifold for Joint Object Recognition and Pose Estimation"* Computer Vision and Image Understanding Journal (CVIU), Volume 139, October 2015, Pages 89–103.

[19] X. Peng, J. Huang; Q. Hu; S. Zhang; A. Elgammal, and D. Metaxas *"From Circle to 3-Shpere: Robust Head Pose Estimation by Instance Parameterization"* Computer Vision and Image Understanding Journal (CVIU), Volume 136, July 2015, Pages 92–102.

[20] S. Huang, Y. Yu, D. Yang, A. Elgammal and D. Yang, *"Collaborative Graph Embedding: A Simple Way to Generally Enhance Subspace Learning Algorithms"*, IEEE Transactions on Circuits and Systems for Video Technology (TCSVT), in press 2015.

[21] S. Huang, A. Elgammal, J. Lu, D. Yang, *"Cross-Speed Gait Recognition Using Speed-Invariant Gait Templates and Globality-Locality Preserving Projections"*, IEEE Transactions on Information Forensics and Security (TIFS), Volume 10, Issue 10, October 2015, pages 2071 - 2083.

[22] M. Elhoseiny and A. Elgammal *"Text to Multi-level MindMaps: A Novel Method for Hierarchical Visual Abstraction of Natural Language Text"*, Multimedia Tools and Applications Journal, Springer, April 2015.

[23] H. Zhang, Z. Jiang, and A. Elgammal *"Satellite Recognition and Pose Estimation Using Homeomorphic Manifold Analysis"* IEEE Transactions on Aerospace and Electronic Systems (TAES) – 2014

[24] B. Saleh, K. Abe, R. Arora, A. Elgammal *"Toward Automated Discovery of Artistic Influence"*, Multimedia Tools and Applications – Springer, 2014.

[25] Haopeng Zhang, Zhiguo Jiang, and Ahmed Elgammal *"Vision-Based Pose Estimation for Cooperative Space Objects"*, Acta Astronautica, Volume 91, October–November 2013, Pages 115–122.

[26] A. Elgammal and C.-S Lee *"Homeomorphic Manifold Analysis (HMA): Generalized Separation of Style and Content on Manifolds"*, Image and Vision Computing Journal, April 2013 - **Editor Choice Article.**

[27] C.-S Lee and A. Elgammal *"Non-linear factorised dynamic shape and appearance models for facial expression analysis and tracking"*, IET- Computer Vision, Volume 6, Issue 6, November 2012, pp 567-580.

[28] C.-S. Lee and A. Elgammal *"Style Adaptive Contour Tracking of Human Gait Using Explicit Manifold Models"* Machine Vision and Applications Journal, May 2012, Volume 23, Issue 3, pp 461-478.

[29] E. K. Gnang, A. Elgammal, V. Retakh *"A Spectral Theory for Tensors"* The Annales de la Faculté des Sciences de Toulouse, Sér. 6, 20 no. 4 (2011), p. 801-841. arXiv:1008.2923v4 [math.SP]

[30] C.-S. Lee and A. Elgammal "*Dynamic Shape Analysis: Bilinear and Multilinear Human Identification with Temporal Normalization*", International Journal of Pattern Recognition and Artificial Intelligence (IJPRAI), Volume 24, Issue 7, November 2010, pp. 1133-1157.

[31] C.-S. Lee and A. Elgammal *"Coupled Visual and Kinematics Manifold Models for Human Motion Analysis"* International Journal on Computer Vision (IJCV). Volume 87, Numbers 1-2, March 2010.

[*cited 56 times*]

[32] C.-S. Lee and A. Elgammal *"Tracking People on a Torus*" IEEE Transaction on Pattern Analysis and Machine Intelligence (TPAMI), Volume 31, Number 3, March 2009.

[*cited 74 times*]

[33] C.-S. Lee and A. Elgammal *"Dynamic shape outlier detection for human locomotion"* Computer Vision and Image Understanding Journal (CVIU). Volume 113, Issue 3, March 2009.

[34] Z. Zhao, A. Vashist, A. Elgammal, I. Muchnik and C. Kulikowski *"Combinatorial and Statistical Methods for Part Selection for Object Recognition"* International Journal of Computer Mathematics. Volume 84, Issue 9, September 2007, pages 1285-1297.

[35] A. Elgammal and C.-S. Lee "*Nonlinear Manifold Learning for Dynamic Shape and Dynamic Appearance*" Computer Vision and Image Understanding (CVIU) special issue on generative model based vision. Volume 106, Number I, April 2007, pages 31-46.

[*cited 53 times*]

[36] V. S. N. Prasad, L. S. Davis, S. D. Tran, A. Elgammal "Edge affinity for pose-contour matching" Computer Vision and Image Understanding Journal (CVIU) Volume 104, Issue 1, October 2006, Pages: 36-47.

[37] Y. Wang, X. Huang, C.-S. Lee, S. Zhang, Z. Li, D. Samaras, D. Metaxas, A. Elgammal, P. Huang *"High Resolution Acquisition, Learning and Transfer of Dynamic 3D Facial Expressions"*, Computer Graphics Forum, Volume 23 Issue 3 2004, page 677.

[***cited 136 times***]

[38] A. Elgammal, R. Duraiswami and L. S. Davis *"Efficient Kernel Density Estimation Using the Fast Gauss Transform with Applications to Color Modeling and Tracking"* IEEE transactions on Pattern Analysis and Machine Intelligence (TPAMI), Volume 25, number 11, November 2003, pages 1499- 1504.

[***cited 198 times***]

[39] A. Elgammal, R. Duraiswami, D. Harwood and L. S. Davis "*Background and Foreground Modeling using Non-parametric Kernel Density Estimation for Visual Surveillance*" Proceedings of the IEEE, Volume 90 number 7, July 2002, pages 1151- 1163.

[***cited 1379 times***][Selected as one of the most cited papers in the proceedings of the IEEE]

Refereed Conference Publications: (*In the field of computer vision, certain conferences and workshops are highly selective and rigorously double-blind reviewed by three reviewers and a chair. Conference papers are typically full papers (8-12 pages) and are published in archival proceedings. For this reason, conference papers are considered primary publications.*)

[40] B. Saleh, A. Elgammal, J. Feldman and A. Farhadi *"Toward a Taxonomy and Computational Models of Abnormalities in Images"*, AAAI 2016 – ***recipient of the Outstanding Student Paper Award.***

[41] M. Ehoseiny and J. Liu and H. Cheng and H. Sawhney and A. Elgammal *"Zero Shot Event Detection by Multimodal Distributional Semantic Embedding of Videos"*, AAAI 2016.

[42] M. Elhoseiny and A. Elgammal "Overlapping Domain Cover for Scalable and Accurate Regression Kernel Machines", the 26th British Machine Vision Conference (BMVC'15), September 2015. [oral presentation]

[43] A. Elgammal and B. Saleh "Quantifying Creativity in Art Networks", the 6th International Conference on Computational Creativity (ICCC'15), Park City, Utah, June 29-July 2nd 2015. [oral presentation]

[44] M. Elhoseiny and A. Elgammal *"Generalized Twin Gaussian Processes using Sharma-Mittal Divergence"* – European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML PPKDD'15), Porto, Portugal, September 2015. [oral presentation]

[45] M. Elhoseiny, S. Huang, and A Elgammal "Weather Classification with Deep Convolution Neural Networks", IEEE International Conference on Image Processing (ICIP'15), Quebec City, September 2015. [oral presentation]

[46] S. Huang, M. Elhoseiny, A. Elgammal, D. Yang "*Learning Hypergraph-regularized Attribute Predictors*", Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'15**), Boston, June 2015.

[47] P. Vepakomma and A. Elgammal *"Iterative Embedding with Robust Correction using Feedback of Error Observed"* 4th Workshop on Machine Learning for Interactive Systems (MLIS), held in conjunction with the International Conference on Machine Learning (ICML) 2015, Lille, France, July 2015. [oral presentation]

[48] S. Huang, M. Gao, D. Yang, X. Huang, A. Elgammal and X. Zhang, "*Unbalanced Graph-based Transduction on Superpixels for Automatic Cervigram Image Segmentation*", IEEE International Symposium on Biomedical Imaging (ISBI'15), New York, April 2015. [oral presentation]

[49] T. El-Gaaly, V. Froyen, A. Elgammal, J. Feldman, M. Singh *"A Bayesian Approach to Perceptual 3D Object-Part Decomposition Using Skeleton-Based Representations"* Proceedings of the 29th AAAI Conference (**AAAI'15**), Austin, Texas, January 2015. [oral presentation]

[50] S. Huang, A. Elgammal, M. Elhoseiny, D. Yang, X. Zhang, "Improving Non-Negative Matrix Factorization via Ranking Its Bases", IEEE international conference on Image Processing (ICIP), 2014

[51] A. Bakry and A. Elgammal "Untangling Object-View Manifold for Multiview Recognition and Pose Estimation" The 13th European Conference on Computer Vision (**ECCV'14)** September 2014**.**

[52] E. L. Spratt and A. Elgammal "Computational Beauty: Aesthetic Judgment at the Intersection of Art and Science" 2nd Workshop on When Vision Meets Art (VisArt) in Conjunction with ECCV 2014, Springer LNCS. [oral presentation]

[53] T. Senlet, T. El-Gaaly, A. Elgammal "Hierarchical Semantic Hashing: Visual Localization from Buildings on Maps" 22nd International Conference on Pattern Recognition (ICPR) 2014.

[54] T. El-Gaaly, M. Torki, A. Elgammal "Spatial-Visual Label Propagation for Local Feature Classification" 22nd International Conference on Pattern Recognition (ICPR) 2014 [oral presentation].

[55] B. Saleh, K. Abe and A. Elgammal "Knowledge Discovery of Artistic Influences: A Metric Learning Approach" The Fifth International Conference on Computational Creativity - ICCC 2014 [oral presentation]

[56] C. Tonde and A. Elgammal "Simultaneous Twin Kernel Learning using Polynomial Transformations for Structured Prediction", Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'14)** June 2014.

[57] S. Huang, A. Elgammal, L. Huangfu, D. Yang, X. Zhang, "Globality-Locality Preserving Projections for Biometric Data Dimensionality Reduction", IEEE conference on Computer Vision and Pattern Recognition Workshop on Biometrics, 2014

[58] M. Elhoseiny, B. Saleh, and A. Elgammal "Write a Classifier: Zero Shot Learning Using Purely Textual Descriptions", IEEE International Conference on Computer Vision (**ICCV'13)**

[59] A. Elqursh and A. Elgammal "Online Motion Segmentation using Dynamic Label Propagation", IEEE International Conference on Computer Vision, (**ICCV'13)**

[60] Sheng Huang, Ahmed Elgammal, and Dan Yang "Learning Speed Invariant Gait Template via Thin Plate Spline Kernel Manifold Fitting", the British Machine Vision Conference (BMVC'13), September 2013.

[61] Kanako Abe, Babak Saleh and Ahmed Elgammal "An Early Framework for Determining Artistic Influence" The 2nd International Workshop on Multimedia for Cultural Heritage, MM4CH Naples, Italy 2013. [oral presentation]

[62] Praneeth Vepakomma and Ahmed Elgammal "Embedding Super-Symmetric Tensors of Higher-Order Similarities of High-Dimensional Data", ECML/PKDD 2013 Workshop on Tensor Methods for Machine Learning, Prague September 2013.

[63] Haopeng Zhang, Tarek El-Gaaly, Ahmed Elgammal, Zhiguo Jiang "Joint Object and Pose Recognition Using Homeomorphic Manifold Analysis" twenty-seventh AAAI Conference on Artificial Intelligence (**AAAI'13**), July 2013 [oral presentation].

[64] Babak Saleh, Ali Farhadi, Ahmed Elgammal "Object-Centric Anomaly Detection by Attribute-Based Reasoning", Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'13**), June 2013.

[65] Amr Bakry, Ahmed Elgammal "Manifold Kernel Partial Least Squares for Lipreading and Speaker identification", Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'13**), June 2013.

[66] Ishani Chakraborty, Ahmed Elgammal, and Randall Burd "Video based Activity Recognition in Trauma Resuscitation", the 10th IEEE International Conference on Automatic Face and Gesture Recognition (FG'2013), Shanghai, China, April 2013.

[67] T. Senlet and A. Elgammal "*Segmentation of Occluded Sidewalks in Satellite Images*", 21st International Conference on Pattern Recognition (ICPR'12), Tsukuba Science City, Japan, November 2012.

[68] T. Elgaaly, M. Torki, A. Elgammal and M. Singh "*RGBD Object Pose Recognition Using Local-Global Multi-Kernel Regression*", 21st International Conference on Pattern Recognition (ICPR'12), Tsukuba Science City, Japan, November 2012.

[69] A. Elqursh and A. Elgammal "*Video Figure Ground Labeling*", 21st International Conference on Pattern Recognition (ICPR'12), Tsukuba Science City, Japan, November 2012.

[70] R. Aroara and A. Elgammal "*Towards Automated Classification of Fine-Art Painting Style: A Comparative Study*", 21st International Conference on Pattern Recognition (ICPR'12), Tsukuba Science City, Japan, November 2012.

[71] A. Elqursh and A. Elgammal "*Single Axis Relative Rotation from Orthogonal Lines*", 21st International Conference on Pattern Recognition (ICPR'12), Tsukuba Science City, Japan, November 2012.

[72] A. Elqursh and A. Elgammal "*Online Moving Camera Background Subtraction*", The 12th European Conference on Computer Vision (**ECCV'12**), Florence, Italy, October 2012. [*cited 32 times*]

[73] T. Senlet and A. Elgammal, "*Satellite Image Based Precise Robot Localization on Sidewalks*," in 2012 IEEE International Conference on Robotics and Automation (ICRA'12), Minneapolis, USA, May 2012 [oral presentation]

[74] M. Torki and A. Elgammal *"Regression from Local Features for Viewpoint and Posture Estimation"*, The 13th IEEE International Conference on Computer Vision (**ICCV'11**), Barcelona, Spain, October 2011. [cited 30 times]

[75] T. Senlet and A. Elgammal *"A Framework for Global Vehicle Localization Using Stereo Images and Satellite and Road Maps"*, 2nd IEEE Workshop on Computer Vision in Vehicle Technology: From Earth to Mars, in conjunction with ICCV, Barcelona, Spain, 2011.

[76] T. Parag and A. Elgammal. *"Higher Order Markov Networks for Model Estimation"*, In Proceedings of International Symposium on Visual Computing (ISVC'11) 2011, LNCS-Volume 6938.

[77] T. Parag and A. Elgammal *"Supervised Hypergraph Labeling"* Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'11**), June 2011.

[78] A. Elqursh and A. Elgammal *"Line-Based Relative Pose Estimation"* Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'11**), June 2011.

[79] S. Smaldone, C. Tonde, V. K. Ananthanarayanan, A. Elgammal, and L. Iftode *"The Cyber-Physical Bike: A Step Towards Safer Green Transportation"* 12th Workshop on Mobile Computing Systems and Applications (HotMobile) 2011. [oral presentation]

[80] M. Torki, A. Elgammal, and C-S. Lee "Learning a Joint Manifold Representation from Multiple Data Sets" Proceedings of the International Conference on Pattern Recognition (ICPR'10), August 2010.

[81] I. Chakraborty and A. Elgammal *"Object Localization by Propagating Connectivity via Superfeatures"* Proceedings of the International Conference on Pattern Recognition (ICPR'10), August 2010.

[82] M. Torki and A. Elgammal *"One-Shot Multi-Set Non-rigid Feature-Spatial Matching"* Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'10**), June 2010. [*cited 23 times*]

[83] M. Torki and A. Elgammal *"Putting Local Features on a Manifold"* Proceedings of the IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'10**), June 2010. [*cited 17 times*]

[84] I. Chakraborty and A. Elgammal *"Contour segment matching by integrating intra and inter shape cues of objects"* Proceedings of the British Machine Vision Conference (BMVC'09), London, UK, Sept 2009.

[85] Z. Zhao and A. Elgammal *"Information Theoretic Key Frame Selection for Action Recognition"* Proceedings of the British Machine Vision Conference (BMVC'08), Sept 2008. [*cited 23 times*]

[86] Z. Zhao and A. Elgammal *"Human Activity Recognition from Frames' Spatiotemporal Representation"* Proceedings of the International Conference on Pattern Recognition (ICPR'08). Dec. 2008. [Oral presentation.]

[87] Z. Zhao and A. Elgammal *"Spatiotemporal Pyramid Representation for Recognition of Facial Expressions and Hand Gestures"* Proceedings of the International Conference on Automatic Face and Gesture Recognition (FG'08), Sept 2008.

[88] T. Parag, F. Porikli and A. Elgammal *"Adaptive Linear Weak Classifiers for Online learning and Tracking"* IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'08**).

[*cited 38 times*]

[89] C.-S. Lee, A. Elgammal and D. Metaxas "*Nonlinear dynamic shape and appearance models for facial motion tracking"* Proceedings of the 2nd Pacific Rim conference on Advances in image and video technology, Santiago, Chile 2007. LNCS-Volume 4872

[90] C.-S. Lee and A. Elgammal *"Modeling View and Posture Manifolds for Tracking"* In Proceedings of the International Conference on Computer Vision (**ICCV'07**), Rio de Janeiro, Brazil October 14-21 2007 [oral presentation]

[***cited 111 times***]

[91] A. Elgammal *"Human-centered Multimedia, Representations and Challenges"* In Proceedings of the 1st ACM international Workshop on Human-Centered Multimedia, in conjunction with ACM- Multimedia (Santa Barbara, California, USA, October 27 - 27, 2006). HCM '06. pages 11-18. ***Invited Position Paper***. [*cited 21 times*]

[92] C.-S. Lee and A. Elgammal *"Body Pose Tracking From Uncalibrated Camera Using Supervised Manifold Learning"* NIPS- Workshop on Evaluation of Articulated Human Motion and Pose Estimation. EHuM06. [*cited 22 times*]

[93] T. Parag and A. Elgammal *"Unsupervised Learning of Boosted Tree Classifier using Graph Cuts for Hand Pose Recognition"* the 17th British Machine Vision Conference (BMVC'06), Edinburgh, September 4-7 2006. Volume III, pages 1259-1269

[94] C.-S. Lee, Y. Wang, X. Huang, Z. Li, A. Kanaujia, A. Elgammal, Dimitris Samaras, Dimitris Metaxas, Xiangfeng Gu, and Peisen Huang, *"Subtle Facial Expression Synthesis using Motion Manifold Embedding and Nonlinear Decomposable Generative Models"*, The ACM SIGGRAPH/ Eurographics Symposium on Computer Animation (SCA), Vienna, Austria, September 2-4, 2006.

[95] Z. Zhao and A. Elgammal, *"A statistically selected Part-Based Probabilistic Model for Object Recognition"*, International Workshop on Intelligent Computing in Pattern Analysis/Synthesis, (IWICPAS'06). Xi'an, China, August 25-26, 2006. LNCS 4153, pages 95-104.

[96] R. Isukapalli, A. Elgammal and R. Greiner *"Learning Policies for Efficiently Identifying Objects of Many Classes"* The 18th International Conference on Pattern Recognition (ICPR'06), Hong Kong, August 21-24, 2006. volume III, pages 356-361.

[97] I. Chakraborty and A. Elgammal *"Combining Low and High Level Features for Object Recognition"* The 18th International Conference on Pattern Recognition (ICPR'06), Hong Kong, August 21-24, 2006. [oral presentation]

[98] C.-S. Lee and A. Elgammal, *"Nonlinear Shape and Appearance Models for Facial Expressions Analysis and Synthesis"*, The 18th International Conference on Pattern Recognition (ICPR'06), Hong Kong, August 21-24, 2006. volume I, pages 497-502. [oral presentation] [*cited 28 times*]

[99] C.-S. Lee and A. Elgammal, *"Simultaneous Inferring View and Body Pose Using Torus Manifolds"*, The 18th International Conference on Pattern Recognition (ICPR'06), Hong Kong, August 21-24, 2006. volume III, pages 489-494. [*cited 38 times*]

[100] C.-S. Lee, A. Elgammal and D. Metaxas, *"Synthesis and Control of High Resolution Facial Expressions for Visual Interactions"*, IEEE 2006 International Conference on Multimedia & Expo (ICME'06), pp.64-67, Toronto Canada July 9-14, 2006. pages 65-68. [oral presentation]

[101] C.-S. Lee, A. Elgammal *"Shape Outlier Detection Using Pose Preserving Dynamic Shape Models"* In Proc. of ICML Workshop on Machine Learning Algorithms for Surveillance and Event Detection. June 29, 2006. [oral presentation]

[102] C.-S. Lee and A. Elgammal, *"Carrying Object Detection Using Pose Preserving Dynamic Shape Model"*, IV Conference of Articulated Motion and Deformable Objects (AMDO), Mallorca, Spain July 11-14, 2006. LNCS-Volume 4069, pages 315-325. [oral presentation]

[103] C.-S. Lee and A. Elgammal, *"Human Motion Synthesis by Motion Manifold Learning and Motion Primitive Segmentation"*, IV Conference of Articulated Motion and Deformable Objects (AMDO), Mallorca, Spain July 11-14, 2006. LNCS-Volume 4069, pages 464-473.

[oral presentation] [cited 27 times]

[104] Z. Zhao, A. Vashist, A. Elgammal, I. Muchnik and C. Kulikowski *"Discriminative Part Selection using Combinatorial and Statistical Models for Part-Based Object Recognition"* Beyond Patches Workshop in conjunction with CVPR'06, 17th of June 2006. [oral presentation]

[105] T. Parag, A. Elgammal and A. Mittal *"A Framework for Feature Selection for Background Subtraction"* IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'06**) – New York City, June 17-22, 2006. volume II, pages 1916-1923

[*cited 61 times*]

[106] R. Isukapalli, A. Elgammal and R. Greiner *"Learning Efficient Multiclass Object Detection Hierarchy"* 9th European Conference on Computer Vision (**ECCV'06**), Graz, Austria May 7 - 13, 2006. LNCS-Volume 3951 Vol. I, pages 352-364.

[*cited 30 times*]

[107] N. Ravi, P.Shankar, A. Frankel, A. Elgammal and L. Iftode *"Indoor Localization Using Camera Phones"*, in the Proceedings of the 7th IEEE Workshop on Mobile Computing Systems and Applications, WMCSA'06, April 2006. pages 1-7.

[*cited 70 times*]

[108] C.-S. Lee and A. Elgammal *"Gait Tracking Recognition using Person-Dependent Dynamic Shape Model"*, 7th International Conference Automatic Face and Gesture Recognition, (FGR'06) Southampton, UK, April 10-12 2006. pages 553-559

[109] R. Isukapalli, A. Elgammal and R. Greiner *"Learning to Identify Facial Expression during Detection using Markov Decision Process"*, 7th International Conference Automatic Face and Gesture Recognition, (FGR'06) Southampton, UK, April 10-12 2006. pages 305-310

[110] I. Awasthi and A. Elgammal *"Learning Nonlinear Manifolds of Dynamic Textures"*, International Conference on Computer Vision Theory and Applications (VISAPP'06), 25 - 28 February, 2006, Setúbal, Portugal. Pages 243-250.

[111] C.-S. Lee and A. Elgammal *"Facial Expression Analysis using Nonlinear Decomposable Generative Models"* in IEEE International Workshop on Analysis and Modeling of Faces and Gestures (AMFG'05), held in conjunction with ICCV'05, Beijing, China on October 16, 2005. LNCS-Volume 3723, pages 17-31.

[oral presentation] [*cited 42 times*]

[112] R. Isukapalli, A. Elgammal, and R. Greiner *"Learning a Dynamic Classification Method to Detect Faces and Identify Facial Expression"* in IEEE International Workshop on Analysis and Modeling of Faces and Gestures (AMFG'05), held in conjunction with ICCV'05, Beijing, China on October 16, 2005. LNCS-Volume 3723, pages 70-84.

[oral presentation] [cited 36 times]

[113] C.-S. Lee and A. Elgammal *"Homeomorphic Manifold Analysis: Learning Decomposable Generative Models for Human Motion Analysis*" Workshop on Dynamic Vision (WDV'05), held in conjunction with ICCV'05, Beijing, China on October 22, 2005. LNCS-Volume 4358, pages 100–114. [oral presentation]

[114] C.-S. Lee and A. Elgammal *"Style Adaptive Bayesian Tracking Using Explicit Manifold Learning"* in the British Machine Vision Conference (BMVC'05), pages 739-748.

[115] A. Elgammal *"Learning to Track: Conceptual Manifold Map for Closed-Form Tracking"* IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'05**) San Diego, CA, June 20-26, 2005, volume I, pages 724-730. [*cited 22 times*]

[116] C.-S. Lee and A. Elgammal *"Towards Scalable View-Invariant Gait Recognition: Multilinear Analysis for Gait"* Audio- and Video-based Biometric Person Authentication (AVBPA'05), July 20 - 22, 2005. LNCS-Volume 3546, pages 395-405. [*cited 25 times*]

[117] V. Shet, V. Shiv Naga Prasad, A. Elgammal, L. S. Davis, Y. Yacoob, *"Multi-Cue Exemplar-Based Nonparametric Model for Gesture Recognition"*, 4th Indian Conference on Computer Vision, Graphics and Image Processing (ICVGIP'04), December 16-18, 2004, pages 656-662. Kolkata, India. *Recipient of Honorary Mention for Best Paper Award*.

[118] Y. Wang, X. Huang, C.-S. Lee, S. Zhang, Z. Li, D. Samaras, D. Metaxas, A. Elgammal, P. Huang *"High Resolution Acquisition, Learning and Transfer of Dynamic 3D Facial Expressions"*, in the proceedings of the annual Eurographics Conference - **Eurographics 2004**.

[***cited 136 times***]

[119] A. Elgammal, C.-S. Lee "*Separating Style and Content on a Nonlinear Manifold*" IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'04**), Washington, DC, June 26-July 2nd, 2004, volume I, pages 478-485. [oral presentation]

[***cited 178 times***]

[120] A. Elgammal, C.-S. Lee "*Inferring 3D Body Pose from Silhouettes using Activity Manifold Learning*" IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'04**), Washington, DC, June 26-July 2nd, 2004, volume II, pages 681-688.

[***cited 408 times***]

[121] A. Elgammal "*Nonlinear Manifold Learning for Dynamic Shape and Dynamic Appearance*" 2nd International Workshop on Generative-Model based vision. GMBV'04, Washington DC, USA, June 2004 in association with CVPR'04. [*cited 10 times*]

[122] A. Elgammal, C.-S. Lee "*Gait Style and Gait Content: Bilinear Model for Gait Recognition Using Gait Re-sampling*", Proceedings of the Sixth IEEE International Conference on Automatic Face and Gesture Recognition (FGR'04) Seoul, Korea, May17-19, 2004. pages 147-152.

[*cited 59 times*]

[123] A. Elgammal, V. Shet, Y. Yacoob, and L. S. Davis "*Learning Dynamics for Exemplar-based Gesture Recognition*" IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'03**), Madison, Wisconsin, June 16-22, 2003, volume I, pages 571-578.

[oral presentation][***cited 118 times***]

[124] A. Elgammal, R. Duraiswami, and L. S. Davis "*Probabilistic Tracking in Joint Feature-Spatial Spaces*" IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'03**), Madison, Wisconsin, June 16-22, 2003. Volume I, pages 781-788.

[***cited 188 times***]

[125] S.-N. Lim, A. Elgammal, L. S. Davis *"A Scalable Image-Based Multi-Camera Visual Surveillance System"* IEEE International Conference on Advanced Video and Signal Based Surveillance (AVSS'03) Miami, FL, July 21-22, 2003. Page 205.

[*cited 46 times*]

[126] S.-N. Lim, A. Elgammal, L. S. Davis "*Image-based Pan-Tilt Camera Control in a Multi-Camera Surveillance Environment*" IEEE International Conference on Multimedia & Expo (**ICME'03**) Baltimore, MD, July 6-9, 2003. Volume I, pages 645-648.

[*cited 38 times*]

[127] A. Elgammal, V. Shet, Y. Yacoob, L. S. Davis "*Exemplar-Based Tracking and Recognition of Arm Gestures*", 3rd International Symposium on Image and Signal Processing and Analysis (ISPA), Rome, Italy 2003.

[128] A. Elgammal, V. Shet, Y. Yacoob, L. S. Davis, *"Gesture Recognition using a Probabilistic Framework for Pose Matching"* The Seventh International Conference on Control, Automation, Robotics and Vision, (ICARCV'02), Singapore in December 2-5, 2002. Volume 2, pages 763-769.

[129] A. Elgammal, R. Duraiswami and L. S. Davis, "*Efficient Non-parametric Adaptive Color Modeling Using Fast Gauss Transform*" IEEE Computer Society Conference on Computer Vision and Pattern Recognition (**CVPR'01**), Kauai, Hawaii, December 2001. Volume II, pages 563-570. [*cited 66 times*]

[130] A. Elgammal, L. S. Davis "*Probabilistic Framework for Segmenting People under occlusion*". IEEE 8th International Conference on Computer Vision (**ICCV'01**), Vancouver, Canada July 9-12, 2001. Volume I, pages 145-152.

[***cited 239 times***]

[131] A. Elgammal, R. Duraiswami and L. S. Davis *"Efficient Kernel Density Estimation Using the Fast Gauss Transform with Applications to Segmentation and Tracking"*. Second International Workshop on Statistical and Computational Theories of Vision, in conjunction with IEEE 8th International Conference on Computer Vision, Vancouver, Canada July 9-12, 2001. [*cited 14 times*]

[132] A. Elgammal and M. A. Ismail, "*Techniques for Language Identification for Hybrid Arabic-English Document Images*", IEEE Sixth International Conference on Document Analysis and Recognition (ICDAR'01), Seattle, Washington, U.S.A. September 10-13, 2001. Pages 1100-1104. [oral presentation] [*cited 50 times*]

[133] A. Elgammal and M. A. Ismail, "*A Graph-Based Segmentation and Feature-extraction Framework for Arabic Text Recognition*", IEEE Sixth International Conference on Document Analysis and Recognition (ICDAR'01), Seattle, Washington, U.S.A. September 10-13, 2001. Pages 622-626. [*cited 38 times*]

[134] A. Elgammal, D. Harwood, L. S. Davis "*Non-parametric Model for Background Subtraction*" Proceedings of the 6th European Conference on Computer Vision (**ECCV'00**), June/July 2000. Volume II, pages 751-767.

[***cited 2130 times***]

[135] M. Abdelmottaleb and A. Elgammal "*Face Detection in Complex Environment from Color Images*", 6th IEEE International conference on Image Processing (**ICIP'99**), October 1999.

[***cited 102 times***]

[136] A. Elgammal, D. Harwood, L. S. Davis "*Non-parametric Model for Background Subtraction*" Frame Rate Application Workshop, September 1999, in conjunction with IEEE 7th International Conference on Computer Vision (ICCV'99), Kerkyra, Greece, September 1999.

Other Publications:

[137] A. Elgammal "Which paintings were the most creative of their time? An algorithm may hold the answers" The Conversation – July 2015. (Also published by Newsweek and Times Magazines)

[138] A. Elgammal "Computer science can only help -not hurt- art historians" The Conversation - December 2014

[139] B. Saleh, K. Abe and A. Elgammal "A Computer Vision System for Artistic Influence Mining" Robohub - November 2014

[140] Emily L. Spratt and Ahmed Elgammal, "The Digital Humanities Unveiled: Perceptions Held by Art Historians and Computer Scientists about Computer Vision Technology," arXiv:1411.6714

[141] S. Smaldone, C. Tonde, V. K Ananthanarayanan, A. Elgammal, L. Iftode "Improving Bicycle Safety through Automated Real-Time Vehicle Detection" Department of computer science technical report, Rutgers University DCS-TR-665-2010

[142] C.-S. Lee and A. Elgammal *"Tracking People on a Torus"* Department of computer science technical report, Rutgers University DCS-TR-611- 2007.

[143] I. Awasthi and A. *Elgammal "Dynamic Textures Using Non-Linear Dimensionality Reduction"*, ICGST International Conference on Graphics, Vision and Image Processing (GVIP'05) 19-21 December 2005.

[144] C. Yang, R. Duraiswami, A. Elgammal and L. Davis *"On-Line Kernel-Based Tracking in Joint Feature-Spatial Spaces""* Demonstration in the IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 2004 (CVPR'04)

[*cited 24 times*]

[145] A. Elgammal *"Nonlinear Generative Models for Dynamic Shape and Dynamic Appearance"* Department of computer science technical report, Rutgers University DCS-TR-549- 2004

[146] Ph.D. Dissertation *"Efficient Nonparametric Kernel Density Estimation for Real-time Computer Vision"* Department of computer science. University of Maryland, College Park.

[147] A. Elgammal *"Real-time algorithms for visual surveillance"* Department of computer science technical report CS-TR # 4314. University of Maryland, College Park.

[148] D.M. Lyons, T. Brodsky, E. Cohen-Solal and A. Elgammal, *"Video Content Analysis for Surveillance Applications"*, Philips Digital Video Technologies Workshop 2000.

[149] M.Sc. thesis "Bilingual (Arabic/Latin) Document Image analysis with Font independent Arabic Character Recognition", Faculty of Engineering, University of Alexandria. July 1996.

Selected Talks and Presentations:

- *Invited Talk:* Authentication in Art Congress 2016, **Louwman Museum**, the Hauge, Netherland. May 2016
- *Invited Talk:* **University of California Santa Cruz**, Quantifying Creativity: Art through the Eyes of Computation. October 19th 2015
- *Invited Talk:* Philips Research – July 2015
- *Invited Presentation:* **Rijksmuseum** First Biannual Workshop on Computational Art History, June 2015, Amsterdam, Netherlands. Title: *"Computational Art History at the Macro Level"*
- *Conference Presentation:* "Quantifying Creativity in Art Networks", The Sixth International Conference on Computational Creativity, June 2015.
- *Invited Talk:* DIMACS, Rutgers, June 2015.
- *Invited Talk*: **Temple University**, February 20th 2015
- *Talk:* THATCamp: The Humanities and Technology Camp, New York February 10th 2015.
- *Conference Presentation*: *"Knowledge Discovery of Artistic Influences: A Metric Learning Approach"* The fifth International Conference on Computational Creativity, May 2014.
- *Invited Talk*: Applied Communication Sciences (previously Telcordia) – November 28th 2012
- *Invited Talk*: Sarnoff – Princeton NJ - November 21st 2012
- *Invited Talk*: **North Carolina State University**, Title: *"On the Role of Manifold in Human Motion Analysis",* March 27th, 2009.
- *Conference Presentation: "Modeling View and Posture Manifolds for Tracking",* the International Conference on Computer Vision ICCV'07, Rio de Janeiro, Brazil, October 2007.
- *Talk:* **UIUC**, Title: *"On the Role of Manifold in Human Motion Analysis"*, April 20th 2007
- *Talk:* **CMU**, Title: *"On the Role of Manifold in Human Motion Analysis",* April 2nd 2007.
- *Invited Talk:* **University of Miami**, Title: *"On the Role of Manifold in Human Motion Analysis",* March 28th, 2007.
- *Talk:* Rutgers- RUCCS-IGERT Perceptual Science Series. Title: *"On the Role of Manifold in Human Motion Analysis"*. November 27th 2006.
- *Talk:* **University of Toronto**. Title: *"On the Role of Manifold in Human Motion Analysis"* on November 10, 2006.
- *Talk*: **USC**. Title: *"On the Role of Manifold in Human Motion Analysis",* November, 2006.
- *Talk*: **Caltech**. Title: *"On the Role of Manifold in Human Motion Analysis"*, November, 2006.
- *Talk*: **UCLA**. Title: *"On the Role of Manifold in Human Motion Analysis"*, October, 2006.
- ***Invited Position Paper Presentation:*** workshop on Human-centered Multimedia in conjunction with ACM- Multimedia 2006. *Title: "Human-centered Multimedia, Representations and Challenges" on October 27th, 2006.*
- *Conference Presentation: "Nonlinear Shape and Appearance Models for Facial Expressions"*, The 18th International Conference on Pattern Recognition (ICPR), Hong Kong, August , 2006.
- *Conference Presentation: "Combining Low and High Level Features for Object Recognition"*, The 18th International Conference on Pattern Recognition (ICPR), Hong Kong, August , 2006.

- *Invited Talk*: **Dagstuhl Workshop** Human Motion - Understanding, Modeling, Capture and Animation. Title: *"On the Role of Manifold in Human Motion Analysis"* on June 11, 2006.
- *Invited Talk:* **Stevens Institute of Technology**. Title: *"Nonlinear Generative Models for Dynamic Shape and Dynamic Appearance"*. On May 1st, 2006.
- *Invited Talk:* **Cairo University.** Title: *"Nonlinear Generative Models for Dynamic Shape and Dynamic Appearance"*. On December 26th 2005.
- *Invited Talk:* **University of Delaware**. Title: *"Nonlinear Generative Models for Dynamic Shape and Dynamic Appearance"*. On November 21st 2005.
- *Conference Presentation:* Workshop on Dynamic Vision (WDV05), held in conjunction with ICCV'05. Title *"Homeomorphic Manifold Analysis: Learning Decomposable Generative Models for Human Motion Analysis"* on October 22, 2005.
- *Conference Presentation:* IEEE International Workshop on Analysis and Modeling of Faces and Gestures (AMFG'05), held in conjunction with ICCV'05. Title: *"Learning a Dynamic Classification Method to Detect Faces and Identify Facial Expression"* on October 16, 2005.
- *Conference Presentation:* IEEE International Workshop on Analysis and Modeling of Faces and Gestures (AMFG'05), held in conjunction with ICCV'05. Title: *"Facial Expression Analysis using Nonlinear Decomposable Generative Models"* on October 16, 2005.
- *Conference Presentation:* IEEE conference on Audio- and Video-based Biometric Person Authentication (AVBPA'06). Title: *"Towards Scalable View-Invariant Gait Recognition: Multilinear Analysis for Gait"*. On July 21st, 2005.
- *Invited Talk:* **Brooklyn Polytechnic University.** Title: *"Nonlinear Generative Models for Dynamic Shape and Dynamic Appearance"*. April 8th 2005.
- *Demonstration:* IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 2004 (CVPR'04) *"On-Line Kernel-Based Tracking in Joint Feature-Spatial Spaces"* Changjiang Yang, Ramani Duraiswami, Ahmed Elgammal and Larry Davis
- *Conference Presentation:* The Second International Workshop on Generative-Model based vision. GMBV 2004, Washington DC, USA, June 2004 in association with CVPR'04. Title: "*Nonlinear Generative Models for Dynamic Shape and Dynamic Appearance*"
- *Conference Presentation:* IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 2004 (CVPR'04) "*Separating Style and Content on a Nonlinear Manifold*" June 27, 2004.
- *Invited Talk:* **IBM Watson** Research Laboratory *"Real-time Algorithm for Visual Surveillance"*, April 29, 2004 .
- *Invited Talk:* **Drexel University** *"Nonlinear Decomposable Generative Models for Dynamic Shape and Dynamic Appearance"*, April 22, 2004.
- *Invited Talk:* **University of Maryland**, College Park *"Nonlinear Decomposable Generative Models for Dynamic Shape and Dynamic Appearance"* February 27, 2004 - invited
- *Conference Presentation:* IEEE Computer Society Conference on Computer Vision and Pattern Recognition, 2003 (CVPR'03) *"Learning Dynamics for Exemplar-Based Gesture Recognition"* July 11, 2003
- *Conference Presentation:* Second International Workshop on Statistical and Computational Theories of Vision, *"Efficient Kernel Density Estimation Using the Fast Gauss Transform with Applications to Segmentation and Tracking"* in conjunction with IEEE 8th International Conference on Computer Vision, Vancouver, Canada July 9-12, 2001.
- Philips Research Laboratory, August 2000

Teaching:

Rutgers University:

- Undergraduate:
  - Introduction to Digital Imaging and Multimedia: Spring 2008, Fall 2009 – Fall 2015.
  - Discrete Structure II (206): Spring 2007.
  - Design and Analysis of Algorithms (344), Spring 2006.
  - Discrete Structures I (205): Fall 2002, Fall 2003, Fall 2004, Fall 2009.
- Graduate:
  - Machine Learning (536): Fall 2005, Spring 2007.
  - Seminar: Readings in Object Recognition: Fall 2006.
  - Computer Vision (534): Spring 2004, Spring 2005, Fall 2007, Spring 2010 – Spring 2016.
  - Seminar in Computer Vision (Looking at People): Spring 2002.

Curriculum Development:

- Developed a new undergraduate course on multimedia and image computing – offered for the first time on Spring 2008 and reoffered in Fall 2009. It was added to the regular computer science curriculum in 2010.
- Developed a new advanced computer vision course at the department of computer science, Rutgers University – Spring 2003. The course title is "Looking at People" and it covers different topics related to the analysis of humans (detection, tracking and identification) in images and videos.
- Developed a new seminar "Readings on Object Recognition" – offered in fall 2006

Educational Program Developing and Administering:

- Director of the Master Program at the Department of Computer Science (Spring 2014 — present).

  During my term as director of the MS program I took the role in expanding the program from a small-size program accepting 20 students a year to a large-scale program accepting 125 students a year. My role also involved re-designing the curriculum to cope with the expansion and the trends in the computer science field.

Instructed and Assisted in teaching:

University of Maryland, College park:

- Fall 2000: Computer Vision.
- Fall 1997: Object Oriented Programming in C++.

Rutgers University:

- Fall 1996, Spring 1997: Introduction to computer science

University of Alexandria, Egypt:

- Sept 1993- Aug 1996: Theory of computation, Algorithms, stochastic processes, discrete mathematics, data structures, database systems, computer architecture, and digital design.

Rutgers University Committees

- Department of Computer Science Hiring Committee 2014/2015.
- Faculty of Art and Science advisory committee to review Appointments and Promotions (A&P): Fall 2009 –2011.
- Faculty of Art and Science Scholarship Committee: Fall 2007 - 2008.

- Department of Computer Science Master Advising Committee 2014-present
- Department of Computer Science Hiring Committee 2013/2014.
- Department of Computer Science Hiring Committee 2011/2012.
- Department of Computer Science Academic Planning Committee 2011/2012.
- Department of Computer Science, award committee: Fall 2009/2010.
- Department of Computer Science, Graduate Admission Committee: 2009/2010.
- Department of Computer Science, Graduate Committee: Fall 2006 – Fall 2009--present.
- Department of Computer Science, Undergraduate Curriculum Committee: January 2004-Fall 2006

Member of Ph.D. Committees (Sample)

- Lin Zhong (Rutgers CS – Advisor: Dimitris Metaxas)
  Ph.D. defense committee member, February 2015,
  "Single Image deblurring with or without face prior and its applications"
- Seha Kim (Rutgers Psychology – Advisor: Jacob Feldman)
  Ph.D. defense external committee member, April 2015,
  "Inference of 3D Shape from Line Drawing"
- Mustafa Gokhan Uzunbas (Rutgers CS – Advisor: Dimitris Metaxas)
  Ph.D. defense committee member, December 2014,
  "Automatic and Interactive Segmentations Using Deformable and Graphical Models"
- Wenjia Yuan (Rutgers ECE – Advisor Kristen Dana)
  Ph.D. defense external committee member, September 2014
  "Computational Photography Methods for Visual MIMO"
- Baiyang Liu (Rutgers CS – Advisor: Casimir Kulikowski)
  Ph.D. defense committee member, September 2014,
  "Selection-based Dictionary Learning for Sparse Representation in Visual Tracking"
- Mingchen Gao (Rutgers CS – Advisor: Dimitris Metaxas)
  Ph.D. defense committee member, June 2014,
  "Cardiac Reconstruction and Analysis from High Resolution CT Images"
- Peter Borosan (Rutgers CS – Advisor: Andrew Nealen)
  Ph.D. defense committee member, November 2013,
  "Automatic Meshing and Rigging for the Creation and Deformation of 3D Shapes"
- John Wilder (Rutgers Psychology – Advisor: Jacob Feldman)
  Ph.D. defense external committee member, October 2013,
  "The influence of complexity on the detection of contours"
- Ali Elqursh (Rutgers CS - Primary Advisor)
  Ph.D. defense committee Chair, July 2013
  "Online Non-rigid Motion and Scene Layer Segmentation"
- Thang Le (Rutgers CS – Advisor: Casimir Kulikowski)
  Ph.D. defense committee member, August 2011,

"Clustering by Graph Density Variation Analysis with Density-based Cluster Validity Indices"

- Begumhan Turgut (Rutgers CS – Advisor: Rich Martin)
  Ph.D. defense committee member, August 2011,
  "Advances In Instantaneous and Dynamic Localization In Indoor Environments"
- Peng Yang (Rutgers CS – Advisor: Dimitris Metaxas)
  Ph.D. defense committee member, March 2011,
  "Facial Expression Analysis"
- Stephen Merritt (Rutgers Anthropology)
  Ph.D. defense external committee member, October 2010,
  "Experimental butchery factors' influence on cut mark cross-sectional size: implications for Early Stone Age carnivory"
- Jiankuan Ye (Rutgers CS - Advisor: Casimir Kulikowski)
  Ph.D. defense committee member, October 2010,
  "*An Experimental Study and Geometrical Analysis on a Linear Programming Support Vector Machine*"
- Zhiguo Li (Rutgers CS- Advisor: Dimitris Metaxas)
  Ph.D. defense committee member, July 2010,
  "*Video-based Facial Expression Analysis*"
- Yuchi Huang (Rutgers CS- Advisor: Dimitris Metaxas)
  Ph.D. defense committee member, July 2010,
  "Hypergraph Based Visual Object Categorization and Segmentation"
- Atul Kanaujia (Rutgers CS- Advisor: Dimitris Metaxas)
  Ph.D. defense committee member, December 2009,
  "Conditional Models For 3D Human Pose Estimation".
- Qi Wei (Rutgers CS - Advisor: Dinesh Pai)
  Ph.D. defense committee member, December 2009,
  "Biomechanical Modeling and Simulation of Human Eye Movement".
- Nikita Lytkin (Rutgers CS - Advisor: Casimir Kulikowski)
  Ph.D. defense committee member, September 20009,
  "Variance-based Clustering Methods and Higher Order Data Transformations and Their Applications".
- Zhipeng Zhao (Rutgers CS – Primary Advisor)
  Ph.D. defense committee Chair, September 2009,
  "Towards a Local-Global Visual Feature-Based Framework for Recognition".
- Kooksang Moon (Rutgers CS - Advisor: Vladimire Povlovic)
  Ph.D. defense committee member, December 2008,
  "Coupled Embedding Of Sequential Processes Using Gaussian Process Models".
- Konstantinos Kleisouris (Rutgers CS - Advisor: Rich Martin)
  Ph.D. defense committee member, September 2008,

"Improving the Speed and Accuracy of Indoor Localization".

- Erica Briscoe (Rutgers, Dept. of Psychology - Advisor: Jacob Feldman),
  External Ph.D. defense committee member, August 2008.
  "Shape Skeletons and Shape Similarity"
- Minyoung Kim (Rutgers CS - Advisor: Vladimire Povlovic)
  Ph.D. defense committee member, April 2008
  "Discriminative Models and Dimensionality Reduction for Regression".
- Su Chen (Rutgers CS - Advisor: Muthu. Muthukrishnan)
  Ph.D. defense committee member, February 2008,
  "Data Compression in Dynamic Systems".
- Nishkam Ravi (Rutgers CS - Advisor: Liviy Iftode)
  Ph.D. defense committee member, December 2007,
  "Bootstrapping Location-aware Personal Computing".
- Gagan Gutam (Rutgers CS - Primary Advisor)
  M.Sc. defense committee Chair, May 2007
  "A Scalable And High Performance Image Search Engine Using Semantic And Structural Image-Keyword Association"
- Chan Su Lee (Rutgers CS - Primary Advisor)
  Ph.D. defense committee Chair, May 2007
  "Modeling Human Motion Using Manifold Learning and Factorized Generative Models"
- Hossein Mahoor (Universty of Miami - Advisor Mohamed Abdel-mottaleb)
  External Ph.D. defense committee member, April 2007,
  "A multimodal approach for face modeling and recognition"
- Akshay Vashist (Rutgers CS - Advisor: Casimir Kulikowski)
  Ph.D. defense committee member, September 2006,
  "Multipartite Graph Clustering for Structured Clustering and Automating Ortholog Extraction"
- Ramana Isukapalli (Rutgers CS - Advisor: Ahmed Elgammal)
  Ph.D. defense committee member, August 2006,
  "Learning Effective Interpretation Policies"
- Rong Zhao (Rutgers CS - Advisor: Dimitris Metaxas)
  Ph.D. defense committee member, April 2006,
  "Image and Video Classification"
- HwaSeob Joseph Yun (Rutgers CS - Advisor: Casimir Kulikowski)
  Ph.D. defense committee member, April 2006,
  "Consistent Triplets in Graph Clustering for Protein Sequence Analysis"
- Ishan Awathi (Rutgers, Dept. of Electrical and Computer Engineering - Advisor: Ivan Marsic)
  Master thesis committee member, March 2006,
  "Nonlinear Models for Dynamic Textures"
- Jing Wang: (Rutgers, Dept. of Electrical and computer engineering - Advisor: Kristin Dana),

Ph.D. defense committee external member, August 2005,
"Modeling Surface Geometry"

- Subarna Sadhukhan (Rutgers CS- Advisor: Dinesh Pai)
  Master thesis committee member, March 2005,
  "Hand Grasp Tracking Using the Tango"