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Comp. Sci. and Engr. Dept.
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RESEARCH INTERESTS

Biomedical Image Analysis, Computer Vision, Computer Graphics, Machine Learning

EDUCATION

Rutgers, the State University of New Jersey, New Brunswick, NJ, 2001 – 2006
Ph.D. in Computer Science, Awarded May 2006

Adviser: Prof. Dimitris N. Metaxas

Rutgers, the State University of New Jersey, New Brunswick, NJ, 1999 – 2001
M.S. in Computer Science, May 2001

Tsinghua University, Beijing, China, 1994 – 1999
B.E. in Computer Science, June 1999

PROFESSIONAL EXPERIENCE

Assistant Professor, Lehigh University, Bethlehem, PA, 08/2006 – present

Staff Scientist, Siemens Medical Solutions USA, Inc., Malvern, PA, 08/2005 - 08/2006

Research Assistant, Rutgers University, New Brunswick, NJ, 08/2002 – 06/2005

Teaching Assistant, Rutgers University, New Brunswick, NJ, 08/1999 – 05/2002

Summer Intern, Siemens Corporate Research, Inc., Princeton, NJ, 2001 and 2003

Research Programmer, Tsinghua University, Beijing, China, 1998-1999

PUBLICATIONS

Articles in Refereed Journals

Xiaolei Huang, Dimitris Metaxas, “Metamorphs: Deformable Shape and Appearance Models,” In *IEEE Trans. Pattern Analysis and Machine Intelligence* (TPAMI), Vol. 30, No. 8, pp. 1444-1459, 2008.

Yaoyao Zhu, Xiaolei Huang, Wei Wang, Daniel Lopresti, L. Rodney Long, Sameer Antani, Zhiyun Xue, George Thoma, “Balancing the Role of Priors in Multi-Observer Segmentation Evaluation,” In *Journal of Signal Processing Systems: Special Issue on Biomedical Imaging*, Springer New York, May 2008.

Xiaolei Huang, Nikos Paragios, Dimitris Metaxas, “Shape Registration in Implicit Spaces using Information Theory and Free Form Deformations,” In *IEEE Trans. on Pattern Analysis and Machine Intelligence* (TPAMI), Vol. 28, No. 8, pp. 1303-1318, 2006.

Yang Wang, Xiaolei Huang, Chan-Su Lee, Song Zhang, Zhiguo Li, Dimitris Samaras, Dimitris Metaxas, Ahmed Elgammal, and Peisen Huang, “High Resolution Acquisition, Learning and Transfer of Dynamic 3-D Facial Expressions,” In *Computer Graphics Forum*, 23(3):677-686, 2004. Also in *Eurographics*, 2004.

Book Chapters

Xiaolei Huang, Chenyang Xu, Yulin Song, “Fast Nonrigid Image Registration using Salient Region Feature and Free Form Deformations,” In *Encyclopedia of Healthcare Information Systems*, N. Wickramasinghe and E. Geisler (Editors), Medical Information Science Reference, 2008.

Dimitris Metaxas, Xiaolei Huang, Ting Chen, “Integrating Shape and Texture in Deformable Models: From Hybrid Methods to Metamorphs,” In *Mathematical Models in Computer Vision: The Handbook*, N. Paragios, Y. Chen and O. Faugeras (Editors), Springer, 2005.

Nikos Paragios, Maxin Taron, Xiaolei Huang, Mikael Rousson, and Dimitris Metaxas, "On the Representation of Shapes Using Implicit Functions," In *Statistics and Analysis of Shapes*, H. Krim and A. Yezzi (Editors), Springer Verlag, 2005.

Selected Conference Papers

Tian Shen, Yaoyao Zhu, Xiaolei Huang, Junzhou Huang, Dimitris Metaxas, Leon Axel, "Active Volume Models with Probabilistic Object Boundary Prediction Module," to appear in *Proc. of the 11th Annual International Conf. on Medical Image Computing and Computer Assisted Intervention*, MICCAI'08, 2008.

Junzhou Huang, Zhen Qian, Xiaolei Huang, Dimitris Metaxas, Leon Axel, "Tag Separation in Cardiac Tagged MRI," to appear in *Proc. of the 11th Annual International Conf. on Medical Image Computing and Computer Assisted Intervention*, MICCAI'08, 2008.

Junzhou Huang, Xiaolei Huang, Dimitris Metaxas, "Simultaneous Image Transformation and Sparse Representation Recovery," In *Proc. of the IEEE Computer Society Conf. on Computer Vision and Pattern Recognition*, CVPR'08, pp. 1-8, 2008.

Junzhou Huang, Xiaolei Huang, Dimitris Metaxas, "Optimization and Learning for Registration of Moving Dynamic Textures," In *Proc. Of IEEE Int'l Conf. on Computer Vision*, ICCV'07, pp. 1-8, 2007.

Junzhou Huang, Xiaolei Huang, Dimitris Metaxas, and Leon Axel, "Adaptive Metamorphs Model for 3D Medical Image Segmentation," In *Proc. of the 10th Annual International Conf. on Medical Image Computing and Computer Assisted Intervention*, MICCAI'07, 2007.

Lior Wolf, Xiaolei Huang, Ian Martin, and Dimitris Metaxas, "Patch-based Texture Edges and Segmentation," In *Proc. of the 9th European Conf. on Computer Vision*, ECCV'06, LNCS 3952, pp. 481-493, 2006.

Weijun He, Xiaolei Huang, Dimitris Metaxas, and Xiaoyou Ying, "Efficient Learning by Combining Confidence-rated Classifiers to Incorporate Unlabeled Medical Data," In *Proc. of the 8th Annual Int'l Conf. on Medical Image Computing and Computer Assisted Intervention*, MICCAI'05, LNCS-3749, pp. 745-752, 2005.

Xiaolei Huang, Dimitris Metaxas, and Ting Chen, "MetaMorphs: Deformable Shape and Texture Models," In *Proc. of the IEEE Computer Society Conf. on Computer Vision and Pattern Recognition*, CVPR'04, pp. 496-503, 2004.

Xiaolei Huang, Zhiguo Li, and Dimitris Metaxas, "Learning Coupled Prior Shape and Appearance Models for Segmentation," In *Proc. of the 7th Annual Int'l Conf. on Medical Image Computing and Computer Assisted Intervention*, MICCAI'04, LNCS-3216, pp. 60-69, 2004.

Xiaolei Huang, Nikos Paragios, and Dimitris Metaxas, "Establishing Local Correspondences towards Compact Representations of Anatomical Structures," In *Proc. of the 6th Annual Int'l Conf. on Medical Image Computing and Computer Assisted Intervention*, MICCAI'03, LNCS-2879, pp. 926-934, 2003.

Manish Singh, and Xiaolei Huang, "Computing Layered Surface Representations: An Algorithm for Detecting and Separating Transparent Overlays," In *Proc. of the IEEE Computer Society Conf. on Computer Vision and Pattern Recognition*, CVPR'03, pp. 11-18, 2003.

Other Refereed Conference/Workshop Papers

Yaoyao Zhu, Xiaolei Huang, Daniel Lopresti, L. Rodney Long, Sameer Antani, Zhiyun Xue, and George Thoma, "Web-Based Multi-Observer Segmentation Evaluation Tool," In *Proc. Of the 21st IEEE Int'l Symposium on Computer-Based Medical Systems*, CBMS'08, pp. 167-169, 2008.

Yusuf Artan, Xiaolei Huang, "Combining Multiple 2ν -SVM Classifiers for Tissue Segmentation," In *Proc. of the IEEE Int'l Symposium on Biomedical Imaging: From Nano to Macro*, ISBI'08, pp.

488-491, 2008.

Junzhou Huang, Xiaolei Huang, Dimitris Metaxas, and Leon Axel, "Dynamic Texture based Heart Localization and Segmentation in 4-D Cardiac Images," In *Proc. of the IEEE Int'l Symposium on Biomedical Imaging: From Nano to Macro*, ISBI'07, pp. 852-855, 2007.

Kazunori Okada, Xiaolei Huang, "Robust Click-Point Linking: Matching Visually Dissimilar Local Regions," In *Proc. Of IEEE International Workshop on Beyond Multiview Geometry: Robust Estimation and Organization of Shapes from Multiple Cues*, 2007.

Junzhou Huang, Xiaolei Huang, Dimitris Metaxas, and Debarata Banerjee, "3D Tumor Shape Reconstruction from 2D Bioluminescence Images," In *Proc. of the IEEE Int'l Symposium on Biomedical Imaging: From Nano to Macro*, ISBI'06, pp. 606-609, 2006.

Haiying Guan, Toshiro Kubota, Xiaolei Huang, Xiang Sean Zhou, Matthew Turk, "Automatic Hot Spot Detection and Segmentation in Whole Body FDG-PET Images," In *Proc. of the IEEE Int'l Conf. on Image Processing*, ICIP'06, pp. 85-88, 2006.

Xiaolei Huang, Zhen Qian, Rui Huang, and Dimitris Metaxas, "Deformable-model based Textured Object Segmentation," In *Proc. of the 4th Int'l Workshop on Energy Minimization Methods in Computer Vision and Pattern Recognition* EMCCVPR'05, LNCS-3757, pp. 119-135, 2005.

Xiaolei Huang, Yiyong Sun, Dimitris Metaxas, Frank Sauer, and Chenyang Xu, "Hybrid Image Registration based on Configurational Matching of Scale-Invariant Salient Region Features," In *Second IEEE Workshop on Image and Video Registration*, IVR'04, 2004.

Xiaolei Huang, Song Zhang, Yang Wang, Dimitris Metaxas, and Dimitris Samaras, "A Hierarchical Framework for High Resolution Facial Expression Tracking," In *Third IEEE Workshop on Articulated and Nonrigid Motion*, ANM'04, 2004.

Chenyang Xu, Xiaolei Huang, Arun Krishnan, and Sanjiv Samant, "An Automated Image-based Method for Multi-Leaf Collimator Positioning Verification in Intensity Modulated Radiation Therapy," In *Proc. of the Int'l Conf. on Diagnostic Imaging and Analysis*, ICDIA'02, 2002.

Other Publications

Xiaolei Huang, Wei Wang, Zhiyun Xue, Sameer Antani, L. Rodney Long, Jose Jeronimo, "Cluster Features for Lesion Detection in Digital Cervigrams," In *Proc. Of SPIE, Medical Imaging: Image Processing*, Vol. 6914, 2008.

Yulin Song, Xiaolei Huang, Boris Mueller, and Borys Mychalczak, "Phase Impact Factor: A Novel Parameter for Determining Optimal CT Phase in 4D Radiation Therapy Treatment Planning for Mobile Lung Cancer," In *Proc. Of SPIE, Medical Imaging: Visualization, Image-guided Procedures, and Modeling*, Vol. 6918, 2008.

Wei Qu, Xiaolei Huang, Yuanyuan Jia, "Segmentation in Noisy Medical Images Using PCA Model Based Particle Filtering," In *Proc. Of SPIE, Medical Imaging: Image Processing*, Vol. 6914, 2008.

Vaclav Potesil, Xiaolei Huang, Xiang Sean Zhou, "Automated tumor delineation using joint PET/CT information," In *Proc. Of SPIE, Medical Imaging: Computer-aided Diagnosis*, Vol. 6514, 2007.

Xiaolei Huang, Xiang Sean Zhou, Arun Krishnan, "The efficacy of computer detection of kidney in PET/CT images and kidney SUV statistics in PET images," In *Radiological Society of North America Scientific Assembly and Annual Meeting*, RSNA'06.

Xiaolei Huang, Dimitris Metaxas, Lata G. Menon, Philipp Mayer-Kuckuk, Joseph R. Bertino, and Debarata Banerjee, "Recovering 3D Tumor Locations from 2D Bioluminescence Images and Registration with CT Images," In *Proc. of the Biomedical Optics Conference: Multimodal Biomedical Imaging*, Vol. 6081, 2006.

Zhen Qian, Xiaolei Huang, Dimitris Metaxas, Ting Chen, Leon Axel, "Robust Segmentation of 4D

Cardiac MRI-tagged Images via Spatio-temporal Propagation,” In *Proc. Of SPIE, Medical Imaging: Physiology, Function and Structure from Medical Images*, Vol. 5746, pp. 580-591, 2005.

Dimitris Metaxas, Ting Chen, Xiaolei Huang, and Leon Axel, “Cardiac Segmentation from MRI-Tagged and CT Images,” In *Proc. of the 8th WSEAS International Conf. on Computers, special session on Imaging and Image Processing of Dynamic Processes in biology and medicine*, also in WSEAS Transactions on Computers, 2004.

HONORS AND AWARDS

- Sigma Xi Scientific Research Honor Society Lehigh University Inductee, 2008
- Outstanding Reviewer Award at the Int'l Conf. on Computer Vision (ICCV), 2007
- Minority Junior Faculty Award for Career Enhancement, Christian R. and Mary F. Lindback Foundation, 2007
- DIMACS Award for Student-initiated Research Projects, Rutgers University, 2002
- Tsinghua Excellent Student Scholarships, Tsinghua university, 1995,96,97,98

RESEARCH FUNDING

- “A Physically-based Heart Model for Segmentation, Motion Analysis and Disease Classification,” Christian R. and Mary F. Lindback Foundation, \$20,000, 6/1/2007 - 5/31/2008.
- “Novel Methods and Applications for Chemical Image Analysis,” Air Products and Chemicals, Inc., PI, \$55,000, 9/1/2007 - 8/31/2009.
- “Segmentation of Uterine Cervix Images by Support Vector Machine Methods,” National Library of Medicine - National Institute of Health, PI, \$24,900, 9/20/2007 - 9/19/2008.
- “Novel Methods and Applications for Chemical Image Analysis,” Pennsylvania Infrastructure Technology Alliance, PI, \$44,000, 3/1/2008 - 8/31/2009.

TEACHING AND RESEARCH ADVISING

Courses Taught

Instructor, Computer Science and Engineering Dept., Lehigh University

- CSE-313: Computer Graphics, Fall 2006
- CSE-398/498: Image Analysis and Graphics, Spring 2007
- CSE-313: Computer Graphics, Fall 2007
- CSE-398/498: Image Analysis and Graphics, Spring 2008

Teaching Assistant, Computer Science Dept., Rutgers University

- CS-428: Introduction to Computer Graphics, Fall 2000
- CS-112: Data Structures, Summer 2000
- CS-440: Introduction to Artificial Intelligence, Fall 1999
- CS-314: Principles of Programming Languages, Spring 2000
- CS-336: Principles of Database Management Systems, Spring 2001
- CS-520: Introduction to Artificial Intelligence, Fall 2001
- CS-352: Internet Technology, Spring 2002

Instructor, Governor’s School of Engineering and Technology Program, NJ, Summer 2002

Research Advising

Doctoral Students

Wei Wang, Lehigh university, 2006 - present

Yaoyao Zhu, Lehigh university, 2007 - present (co-advising with Prof. D. Lopresti)

Tian Shen, Lehigh university, 2007 - present

Hongsheng Li, Lehigh university, 2008 - present

Other Research Advising

Yusuf Artan, Lehigh university, 2007 (independent study)

Nikolai Moukhine, Lehigh university, 2007 (independent study)

Thomas Boinot, Lehigh university, 2007 (independent study)
Christopher Hamilton, Lehigh university, 2007 (senior project)
Samuel Wechsler, Lehigh university, 2007 (senior project)

PROFESSIONAL SERVICES

- Program committee member for IEEE International Conf. on Advanced Video and Signal Based Surveillance (AVSS), 2008
- Program committee member for IEEE Computer Society Conf. on Computer Vision and Pattern Recognition (CVPR), 2007, 2008
- Scientific review committee member for Internatinal Conf. on Medical Image Computing and Computer-Assisted Intervention (MICCAI), 2006, 2007, 2008
- Program committee member for IEEE International Conf. on Computer Vision (ICCV), 2007
- Reviewer for journals: IEEE Transactions on Pattern Analysis and Machine Intelligence, International Journal of Computer Vision, Medical Image Analysis, Computer Vision and Image Understanding, Machine Vision and Applications, IEEE Transactions on Image Processing, Graphical Models

SCHOLARLY PRESENTATIONS AND INVITED TALKS

- “Simultaneous Image Transformation and Sparse Representation Recovery,” at IEEE Int’l Conf. on Computer Vision and Pattern Recognition, Anchorage, AK, Jun. 2008.
- “Cluster Features for Lesion Detection in Digital Cervigrams,” at SPIE Medical Imaging: Image Processing Conference, San Diego, CA, Feb. 2008.
- “Free-form Deformable Shape and Appearance Models,” at Boston University, Boston, MA, Sept. 2007.
- “Robust Click-point Linking: Matching Visually Dissimilar Local Regions,” at IEEE Workshop on Beyond Multiview Geometry, BMG’07, Minneapolis, MN, Jun. 2007.
- “Free-form Deformable Shape and Appearance Models,” at City College and the Graduate Center, City University of New York, New York, NY, May 2007.
- “CISL: Cervical Image Segmentation by Learning from Ground Truth Database,” at National Library of Medicine, Bethesda, MD, Mar. 2007.
- “Using Implicit Shape Representation for Registration and Segmentation,” at Stevens Institute of Technology, Hoboken, NJ, Nov. 2006.
- “Free Form Deformable Models,” at Univ. of North Carolina - Chapel Hill, Chapel Hill, NC, Apr. 2006.
- “Free Form Deformable Models,” at Lehigh University, Bethlehem, PA, Mar. 2006.
- “Deformable Model based Textured Object Segmentation,” at Energy Minimization in Computer Vision and Pattern Recognition Workshop, St. Augustine, FL, Oct. 2005.
- “Integrating Shape and Appearance for Deformable Modeling and Segmentation,” at Siemens Corporate Research, Princeton, NJ, Feb. 2005.
- “Integrating Shape and Appearance for Deformable Modeling and Segmentation,” at Siemens Medical Solutions, Malvern, PA, Mar. 2005.
- “Hybrid Image Registration using Salient Region Features,” at Siemens Corporate Research, Princeton, NJ, Jul. 2004.
- “Metamorphs: Deformable Shape and Texture Models,” at IEEE Int’l Conf. On Computer Vision and Pattern Recognition, Washington D.C., Jun. 2004.
- “Hybrid Image Registration based on Configurational Matching of Scale-invariant Salient Region Features,” at Second IEEE Workshop on Image and Video Registration, Washington D.C., Jun. 2004.
- “Establishing Local Correspondences towards Compact Representations of Anatomical Structures,” at Annual Int’l Conf. on Medical Image Computing and Computer Assisted Intervention, Montreal, Canada, Nov. 2003.

- “Computing Layered Surface Representations: An Algorithm for Detecting and Separating Transparent Overlays,” at IEEE Int’l Conf. on Computer Vision and Pattern Recognition, Madison, WI, Jun. 2003.

PATENTS

C. Xu, X. Huang, Y. Sun and F. Sauer, “Method and System for Hybrid Rigid Registration based on Joint Correspondences between Scale-Invariant Salient Region Features,” Patent issued as USP 7,362,920 on Apr. 22, 2008.

K. Okada, X. Huang, A. Krishnan, X. Zhou, “Robust Click-Point Linking with Geometric Configuration Context: Interactive Localized Registration Approach,” Patent Pending, filed in Mar. 2007, U.S. Serial No. 11/705,375. Also filed in Germany and China.

X. Huang, X. Zhou, A. Jerebko, A. Krishnan, H. Guan, T. Kubota, V. Potesil, “System and Method for Whole Body Landmark Detection, Segmentation and Change Quantification in Digital Images,” Patent pending, filed in Oct. 2006, U.S. Serial No. 11/542,477.

D. Metaxas, D. Banerjee, and X. Huang, “System and Method for Visualizing Three-dimensional Tumor Locations and Shape from Two-dimensional Bioluminescence Images,” Patent pending, filed in Sept. 2005, U.S. Serial No. 60/715,610.

C. Xu, X. Huang, Y. Sun, “Fast Parametric Non-rigid Image Registration Based on Feature Correspondences,” Patent pending, filed in Mar. 2005, U.S. Serial. No. 11/099,143.

C. Xu, X. Huang, Y. Sun, C. Ched’hotel, J. Guehring, F. Sauer, and S. Vogt, “Method and System for Fast Hybrid Rigid Registration of 2D/3D Medical Images,” Patent pending, filed in Sept. 2004, U.S. Serial No. 10/946,204.