Lixin Duan

BASIC INFORMATION

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RESEARCH INTERESTS

- Machine Learning: Transfer learning, multiple instance learning, multiple kernel learning, many class learning
- Computer Vision: Image and video categorization
- Medical Image Analysis: Ocular image classification

PROFESSIONAL EXPERIENCE

Amazon, Seattle, Washington, United States

Machine Learning Scientist Dec 2014 – present

- Developing machine learning algorithms and computer software for Amazon products.

Institute for Infocomm Research, Singapore

Scientist Jul 2013 – Oct 2014

- Developed machine learning algorithms and computer software for the automatic diagnosis of ocular related diseases such as glaucoma, pathological myopia, etc., which benefits the people in Singapore and Southeast Asia.

SAP Research, Singapore

Researcher Aug 2012 – Jun 2013

- Developed data mining algorithms and computer software based on SAP technologies.

Nanyang Technological University, Singapore

Project Officer Oct 2011 – Jul 2012

- Developed machine learning algorithms for computer vision applications such as image retrieval and classification.

Nanyang Technological University, Singapore

Research Assistant Aug 2008 – Sep 2011

- Developed transfer learning algorithms to solve various computer vision tasks (*e.g.*, consumer video recognition by learning from web images/videos and object recognition) and text categorization (*e.g.*, document classification and email spam filtering). In our proposed learning methods, source domain information is encoded through different ways (*e.g.*, multiple kernel learning techniques, pre-learned classifiers, and transformation metrics) and effectively used to learn robust target classifiers for transfer learning problems.
- Developed multiple instance learning algorithms to re-rank web images by using their noisy surrounding tags, where the ground-truth labels of web images are not available. In our method, we first retrieve the relevant/irrelevant web images based on keyword search. We then model this problem as a multiple instance learning problem by using the retrieved images to construct training bags. We generalized the bag constraints to better deal with the re-ranking task, which were effectively solved by our proposed algorithms.
- Worked on near duplicate image identification. A two-stage approach was developed to measure the similarity between any two images with each being divided into increasingly finer blocks at multiple scales. In the first stage, the block-level distances were computed between two images. And in the second stage, the image-level distance were computed based on the block-level distances.

Education

Nanyang Technological University, Singapore

Ph.D. in Computer Engineering — Aug 2008 – Jun 2012

Thesis: Transfer Learning for Visual Recognition and Text Categorization

University of Science and Technology of China, Hefei, China

B.Eng. in Electronic Engineering and Information Science — Sep 2004 – Jul 2008

Honors and Awards

- Outstanding Reviewer Award, IEEE International Conference on Computer Vision and Pattern Recognition 2012
- Doctoral Consortium (Mentor: Prof. Trevor Darrell, University of California, Berkeley), IEEE International Conference on Computer Vision and Pattern Recognition 2012
- Best Student Paper Award, IEEE International Conference on Computer Vision and Pattern Recognition 2010
- Best Student Paper Award (second prize), Pattern Recognition and Machine Intelligence Association, Singapore 2010
- Fellowship Award (one of the twenty-five winners in the Asia-Pacific region), Microsoft Research Asia 2009
- Student Scholarship, International Conference on Machine Learning 2009

Journal Publications

1. Shenghua Gao, **Lixin Duan**, and Ivor W. Tsang, "DEFEATnet – A Deep Conventional Image Representation for Image Classification," *to appear in IEEE Transactions on Circuits and Systems for Video Technology*, 2015.
2. Zhuo Zhang, Ruchir Srivastava, Huiying Liu, Xiangyu Chen, **Lixin Duan**, Damon Wing Kee Wong, Chee Keong Kwoh, Tien Yin Wong, and Jiang Liu, "A Survey on Computer Aided Diagnosis for Ocular Diseases," *BMC Medical Informatics and Decision Making*, vol. 14, no. 80, August 2014.
3. Wen Li, **Lixin Duan**, Dong Xu, and Ivor W. Tsang, "Learning with Augmented Features for Supervised and Semi-supervised Heterogeneous Domain Adaptation," *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, vol. 36, no. 6, 1134–1148, June 2014.
4. Jianyi Liu, Yao Ma, **Lixin Duan**, Fangfang Wang, and Yuehu Liu, "Hybrid Constraint SVR for Facial Age Estimation," *Signal Processing*, vol. 94, pp. 576–582, January 2014.
5. Xinxiao Wu, Dong Xu, **Lixin Duan**, Jiebo Luo, and Yunde Jia, "Action recognition using multi-level features and latent structural SVM," *IEEE Transactions on Circuits Systems for Video Technology (T-CSVT)*, vol. 23, no. 8, 1422–1431, February 2013.
6. **Lixin Duan**, Dong Xu, Ivor W. Tsang, and Jiebo Luo, "Visual Event Recognition in Videos by Learning from Web Data," *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, vol. 34, no. 9, pp. 1667–1680, September 2012.
7. **Lixin Duan**, Ivor W. Tsang, and Dong Xu, "Domain Transfer Multiple Kernel Learning," *IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)*, vol. 34, no. 3, pp. 465–479, March 2012.
8. **Lixin Duan**, Dong Xu, and Ivor W. Tsang, "Domain Adaptation from Multiple Sources: A Domain-Dependent Regularization Approach," *IEEE Transactions on Neural Networks and Learning Systems (T-NNLS)*, vol. 23, no. 3, pp. 504–518, March 2012.
9. **Lixin Duan**, Wen Li, Ivor W. Tsang, and Dong Xu, "Improving Web Image Search by Bag-based Re-ranking," *IEEE Transactions on Image Processing (T-IP)*, vol. 20, no. 11, pp. 3280–3290, November 2011.

10. Dong Xu, Tat Jen Cham, Shuicheng Yan, **Lixin Duan**, and Shih-Fu Chang, "Near Duplicate Identification with Spatially Aligned Pyramid Matching," *IEEE Transactions on Circuits Systems for Video Technology (T-CSVT)*, vol. 20, no. 8, pp. 1068–1079, August 2010.

Conference Publications

1. Xiangyu Chen, Yanwu Xu, **Lixin Duan**, Zhuo Zhang, Damon Wing Kee Wong, and Jiang Liu, "Multiple Ocular Diseases Classification with Graph Regularized Probabilistic Multi-label Learning," *in Proceedings of the Asian Conference on Computer Vision (ACCV)*, vol. 9006, pp. 127–142, 2014.
2. **Lixin Duan**, Yanwu Xu, Lin Chen, Damon Wing Kee Wong, Jiang Liu, and Tien Yin Wang, "Incorporating Privileged Genetic Information for Fundus Image Based Glaucoma Detection," *in Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, vol. 8674, pp. 204–211, 2014.
3. Yanwu Xu, **Lixin Duan**, Damon Wing Kee Wong, Tien Yin Wang, and Jiang Liu, "Optic Cup Segmentation for Glaucoma Detection Using Low-Rank Superpixel Representation," *in Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, vol. 8673, pp. 788–795, 2014.
4. Jun Cheng, **Lixin Duan**, Damon Wing Kee Wong, Dacheng Tao, Masahiro Akiba, and Jiang Liu, "Speckle Reduction in Optical Coherence Tomography by Image Registration and Matrix Completion," *in Proceedings of the International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, vol. 8673, pp. 162–169, 2014.
5. Jun Cheng, **Lixin Duan**, Damon Wing Kee Wong, Masahiro Akiba, and Jiang Liu, "Speckle Reduction in Optical Coherence Tomography by Matrix Completion using Bilateral Random Projection," *in Proceedings of the International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, pp. 186–189, 2014.
6. Yanwu Xu, Ying Quan, Ruoying Li, **Lixin Duan**, Lin Chen, Huiying Liu, Damon Wing Kee Wong, Jiang Liu, Mani Baskaran, Shamira Perera, Tin Aung, and Tien Yin Wong, "Local Patch Reconstruction Framework for Optic Cup Localization in Glaucoma Detection," *in Proceedings of the International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, pp. 5418–5421, 2014.
7. Lin Chen, **Lixin Duan**, and Dong Xu, "Event Recognition in Videos by Learning From Heterogeneous Web Sources," *in Proceedings of the IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 2666–2673, 2013.
8. Wen Li, **Lixin Duan**, Ivor W. Tsang, and Dong Xu, "Co-Labeling: A New Multi-view Learning Approach for Ambiguous Problems," *in Proceedings of the International Conference on Data Mining (ICDM)*, pp. 419–428, 2012.
9. Lin Chen, **Lixin Duan**, Ivor W. Tsang, and Dong Xu, "Efficient Discriminative Learning of Class Hierarchy for Many Class Prediction," *in Proceedings of the Asian Conference on Computer Vision (ACCV)*, pp. 274–288, 2012.
10. **Lixin Duan**, Dong Xu, and Ivor W. Tsang, "Learning with Augmented Features for Heterogeneous Domain Adaptation," *in Proceedings of the International Conference on Machine Learning (ICML)*, pp. 711–718, 2012.
11. Wen Li, **Lixin Duan**, Ivor W. Tsang, and Dong Xu, "Batch Mode Adaptive Multiple Instance Learning for Computer Vision Tasks," *in Proceedings of the IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 2368–2375, 2012.
12. **Lixin Duan**, Dong Xu, and Shih-Fu Chang, "Exploiting Web Images for Event Recognition in Consumer Videos: A Multiple Source Domain Adaptation Approach," *in Proceedings of the IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 1338–1345, 2012.

13. Wen Li, **Lixin Duan**, Dong Xu, and Ivor W. Tsang, "Text-Based Image Retrieval using Progressive Multi-Instance Learning," *in Proceedings of the IEEE International Conference on Computer Vision (ICCV)*, pp. 2049–2055, 2011.
14. Xinxiao Wu, Dong Xu, **Lixin Duan**, Jiebo Luo, "Action Recognition using Context and Appearance Distribution Features," *in Proceedings of the IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 489–496, 2011.
15. **Lixin Duan**, Ivor W. Tsang, Dong Xu, and Jiebo Luo, "Visual Event Recognition in Videos by Learning from Web Data," *in Proceedings of the IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 1959–1966, 2010. **(Best Student Paper Award at CVPR 2010; Best Student Paper Award of PREMIA, Singapore 2010)**
16. **Lixin Duan**, Ivor W. Tsang, Dong Xu, and Tat-Seng Chua, "Domain Adaptation from Multiple Sources via Auxiliary Classifiers," *in Proceedings of the International Conference on Machine Learning (ICML)*, pp. 289–296, 2009.
17. **Lixin Duan**, Ivor W. Tsang, Dong Xu, and Stephen J. Maybank, "Domain Transfer SVM for Video Concept Detection," *in Proceedings of the IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 1375–1381, 2009.

Academic Services

Conference Program Committee:

IEEE International Conference on Multimedia and Expo (ICME)	2012–2015
International Joint Conference on Artificial Intelligence (IJCAI)	2013, 2015
Association for the Advancement of Artificial Intelligence (AAAI)	2015
Asian Conference on Computer Vision (ACCV)	2014
ECCV Workshop on Transferring and Adapting Source Knowledge in Computer Vision (TASK-CV)	2014
ACM Multimedia (ACM MM)	2013

Conference Reviewer:

IEEE International Conference on Computer Vision and Pattern Recognition (CVPR)	2012–2015
European Conference on Computer Vision (ECCV)	2012, 2014
Annual Conference on Neural Information Processing Systems (NIPS)	2014, 2015
IEEE International Conference on Computer Vision (ICCV)	2013
IEEE International Conference on Multimedia and Expo (ICME)	2010

Journal Reviewer:

International Journal of Computer Vision (IJCV)

IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)

IEEE Transactions on Neural Network and Learning Systems (T-NNLS)

IEEE Transactions on Image Processing (T-IP)

IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT)

IEEE Transactions on Multimedia (T-MM)

IEEE Transactions on Cybernetics

ACM Transactions on Multimedia Computing, Communications and Applications (TOMM)

Computer Vision and Image Understanding (CVIU)

Image and Vision Computing (IMAVIS)

Information Sciences
Machine Vision and Applications (MVAP)
Pattern Recognition Letters
Signal Processing
Neurocomputing
Journal of Signal Processing Systems