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EDUCATION

- PhD in Computer Application Technology, Harbin Institute of Technology, P. R. China, April, 2007.
- M.E. in Computation Mathematics, Harbin Institute of Technology, P. R. China, 2001.
- B.E. in Computation Mathematics and Its Application Software Developments, Harbin Institute of Technology, P. R. China, 1999.

RESEARCH INTERESTS

- Multimedia Signal Processing, Image/Video Coding and Processing, Multimedia Security, Wavelet Analysis

EXPERIENCES

- **08/2007 – Present: Assistant Professor**, School of Computer Science and Technology, Harbin Institute of Technology
- **06/2003 – 10/2005: Research Assistant, JDL DRM Group**, Worked on Digital Rights Management (DRM) on AVS (Audio-Video Standards in China)
- **Summer 2004: Intern, MSRA, Beijing, China**
Developed a data hiding algorithm in SVC
- **01/2000 – 04/2000: Intern, Peking University, Beijing, China**
Developed an algorithm based on wavelet in Payload Forecast Electric Power System

PUBLICATIONS

Journals:

1. Liu Shaohui, Han Lu, Yao Hongxun. Video watermarking algorithm for resisting collusion attacks. Journal of Communications, Vol.31, No.1: 14–19, 2010

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2. Wang Liang, Yao Hongxun and Liu Shaohui. Geometric and Algebraic Approaches of Planar Structure Recovery based on Properties of Dual Conic. IJPARI. Vol.23, No.8:1753-1771, 2009
3. Zhang Shengping, Yao Hongxun, Liu Shaohui. Dynamic Background subtraction based on local dependency histogram. IJPARI. Vol.23, No.7: 1397-1419, 2009
4. Liu Shaohui, Gong Long, Yao Hongxun. Universal Steganalysis Based on Multi-Dimensional Gradient Energy Against Space Domain Steganography. Journal of Computer Research and Development, 46(Suppl.): 68-172, 2009
5. Shaohui Liu, Hongxun Yao, Wen Gao, Yongliang Liu. An Image Fragile Watermark Scheme Based on Chaotic Image Pattern and Pixel-Pairs. Applied Mathematics and Computation. 2007, 185(2): 869~882
6. Shaohui Liu, Hongxun Yao, Wen Gao, Dingguo Yang, Minimizing the Distortion Spatial Data Hiding Based on Equivalence Class, LNCS Vol.4681: 667-678,2007
7. Tianhang Chen, Shaohui Liu, Hongxun Yao, Wen Gao. Spatial Video Watermarking Based on Stability of DC Coefficients. Lecture Notes in Artificial Intelligence, Springer-Verlag Berlin, 3930: 1033~1042, 2006
8. Lijun Wang, Hongxun Yao, Shaohui Liu, Wen Gao. An Adaptive Mapping Energy Video Watermarking Scheme in the Compressed Domain. Chinese Journal of Computers, 2005, 28(11): 1843~1852.
9. Lijun Wang, Hongxun Yao, Shaohui Liu, Wen Gao. Inter-Frame Differential Energy Watermarking of MPEG-4 Compressed Video. Computer Engineering and Applications. 2005, 41(9):52~55
10. Shaohui Liu, Hongxun Yao, Wen Gao. Steganalysis Based on Wavelet Texture Analysis. Journal of Fudan University (Natural Science), 2004, 43(5): 910~913
11. Liu Shaohui, Yao Hongxun, Gao Wen, Jiang Feng. Steganalysis of Images Created by Quantizing Wavelet Transform Coefficients. Journal of China Institute of Communications. 2004, 25 (7):71~77
12. Zhao Chaokui, Yao Hongxun, Liu Shaohui. A Digital Watermark Algorithm Based on Side-Information. Journal of China Institute of Communications, 2004, 25 (7):115~120

Patents:

1. Zhao Debin, Li Xiaoming, Liu Shaohui, Jiang Feng. " The Method to embed digital watermark and extract recoverable watermark in multimedia," China. Patent APP. No. 200910073397.6, Dec. 2009.
2. Hongxun Yao, Wen Gao, Feng Jiang, Yongliang Liu, Shaohui Liu, " The Method to embed digital watermark and extract recoverable watermark in multimedia," China. Patent No. 02132598.7, July. 2002.

Proposals for Standards:

1. Liu Shaohui, Liu Yongliang, "A Review of Watermark Hardware Implementation". AVS-DRM, M1575, 2005
2. Liu Shaohui, Liu Yongliang, "A DRM Content Format for AVS". AVS-DRM, M1576, 2005
3. Liu Shaohui, Liu Yongliang, "A DRM Framework for AVS-DRM". AVS-DRM, M1577, 2005
4. Liu Yongliang, Liu Shaohui, "A Suggested AVS Content Management Standard". AVS-DRM, M1555, 2005

Conferences:

1. Bineng Zhong, Shaohui Liu, Hongxun Yao, Baochang Zhang: Multi-resolution background subtraction for dynamic scenes. IEEE ICIP 2009
2. Bineng Zhong, Hongxun Yao, Shaohui Liu: Neighboring image patches embedding for background modeling. IEEE ICIP 2009:
3. Xiaoshuai Sun, Hongxun Yao, Rongrong Ji, Shaohui Liu: Photo Assessment based on Computational Visual Attention Model. ACM Multimedia 2009:541-544
4. Bineng Zhong, Shaohui Liu, Hongxun Yao: Local spatial co-occurrence for background subtraction via adaptive binned kernel estimation. ACCV 2009
5. Shaohui Liu, Lin Ma, Hongxun Yao, Debin Zhao: Universal Steganalysis based on Statistical Models using Reorganization of Block-based DCT Coefficients. IAS 2009: 778-781
6. Shengping Zhang, Hongxun Yao, Shaohui Liu: Spatial-temporal nonparametric background subtraction in dynamic scenes. IEEE ICME 2009, pp:518-521, June 28 2009- July 3, 2009
7. Shengping Zhang, Hongxun Yao, Shaohui Liu: Dynamic background modeling and subtraction using spatio-temporal local binary patterns. ICIP 2008: 1556-1559
8. Shengping Zhang, Hongxun Yao, Shaohui Liu, Xilin Chen, Wen Gao: A covariance-based method for dynamic background subtraction. ICPR 2008: 1-4
9. Shaohui Liu, Tianhang Chen, Hongxun Yao and Wen Gao. A Real-time Video Watermarking Using Adjacent Luminance Blocks Correlation Based on Compressed Domain. Proceedings of IEEE International Conference on Intelligent Information Hiding and Multimedia Signal Processing, Harbin, China, 833~836, Aug., 2008.
10. Rongrong Ji, Hongxun Yao, Shaohui Liu, Jicheng Wang, Pengfei Xu: A Novel Retrieval Refinement and Interaction Pattern by Exploring Result Correlations for Image Retrieval. Adaptive Multimedia Retrieval 2007: 85-94, LNCS Vol.4918, 2008

11. Rongrong Ji, Hongxun Yao, Shaohui Liu, Liang Wang. Genetic Algorithm Based Optimal Block Mapping Method for LSB Substitution. Proceedings of IEEE International Conference on Intelligent Information Hiding and Multimedia Signal Processing, Pasadena, USA, 215~218, Dec. 2006.
12. Rongrong Ji, Hongxun Yao, Shaohui Liu, Liang Wang. A New Steganalysis Method for Adaptive Spread Spectrum Steganography. Proceedings of IEEE Int. Conference on Intelligent Information Hiding and Multimedia Signal Processing, Pasadena, USA, 365~368, Dec. 2006.
13. Liu Shaohui, Yao Hongxun, Gao Wen. Robust Digital Watermarking based on Contourlet Transform. The 4th International Conference on Wavelet Analysis and its Applications (WAA 2005), Macao, Nov. 30 - Dec. 2, 2005
14. Tianhang Chen, Shaohui Liu, Hongxun Yao, Wen Gao. Robust Video Watermarking Based on DC Coefficients of Selected Blocks. Proceedings of International Conference Machine Learning and Cybernetics, Guangzhou, China, 6:5273~5278, Aug. 2005.
15. Liu Shaohui, Chen Tianhang, Yao Hongxun, Gao Wen. A Variable Depth LSB Data Hiding Technique in Images. Proceedings of IEEE International Conference on Machine Learning and Cybernetics, Shanghai, China, 7: 3990~3994, Aug. 2004.
16. Shaohui Liu, Hongxun Yao, Wen Gao. Steganalysis Based on Texture Analysis and Neural Network. Proceedings of IEEE World Congress on Intelligent Control and Automation, Hangzhou, China, 5: 4066~4069, Jun. 2004.
17. Shaohui Liu, Hongxun Yao, Wen Gao. RST- Invariant Digital Watermarking to Face Image Database. Proceedings of International Conference on Wavelet Analysis & Its Applications, Chongqing, China, 2: 269~274, May 2004.
18. Shaohui Liu, Hongxun Yao, Wen Gao. Blind Watermarking Based on Coset and Scale Quantization in Dwt Domain. Proceedings of International Conference on Wavelet Analysis & Its Applications, Chongqing, China, 2: 344~349, May 2004.
19. Lijun Wang, Hongxun Yao, Shaohui Liu, Wen Gao. Mapping Energy Video Watermarking Algorithm Based on Compressed Domain. Proceedings of the Pacific-Rim Conference on Multimedia(PCM2004), Tokyo, Japan, Lecture Notes in Computer Science, Springer-Verlag Berlin, 3333: 433~440, Dec. 2004.
20. Hui Han, Hongxun Yao, Shaohui Liu, Yan Liu. A Fragile Image Watermarking Based on Mass and Centroid. Proceedings of the Pacific-Rim Conference on Multimedia(PCM2004), Tokyo, Japan, Lecture Notes in Computer Science, Springer-Verlag Berlin, 3333: 441~448, Dec. 2004.

21. Hui Han, Hongxun Yao, Shaohui Liu, Yan Liu. A Fragile Watermarking Based on Knapsack Problem. Proceedings of the Pacific-Rim Conference on Multimedia (PCM2004), Tokyo, Japan, Lecture Notes in Computer Science, Springer-Verlag Berlin, 3333: 771~776, Dec. 2004.
22. Liu Yongliang, Wen Gao, Shaohui Liu. Secure Watermark Detection Schemes. Proceedings of IEEE the 10th Asia-Pacific Conference on Communications, Beijing, China, 2: 631-633, Aug. 2004.
23. Liu Yongliang, Wen Gao, Shaohui Liu. Multimedia Security in the Distributed Environment. Proceedings of IEEE the 10th Asia-Pacific Conference on Communications, Beijing, China, 2: 639-642, Aug. 2004.
24. Wang Lijun, Yao Hongxun, Liu Shaohui, Gao Wen. Inter-Frame Differential Energy Video Watermarking Algorithm Based on Compressed Domain. Proceedings of International Conference Image Analysis and Recognition, Porto, Portugal, Lecture Notes in Computer Science, Springer-Verlag Berlin, 3212: 778~785, Sep. 2004.
25. Liu Yazhou, Gao Wen, Yao Hongxun, Liu Shaohui, Wang Lijun. Fast Moving Region Detection Scheme in Ad Hoc Sensor Network. Proceedings of International Conference Image Analysis and Recognition, Porto, Portugal, Lecture Notes in Computer Science, Springer-Verlag Berlin, 3212: 520~527, Sep. 2004.
26. Jie Chen, Hongxun Yao, Wen Gao, Shaohui Liu. A Robust Watermarking Method Based on Wavelet and Zernike Transform. Proceedings of the IEEE International Symposium on Circuits and Systems, Vancouver, Canada, 2: 173~176, May 2004.
27. Yazhou Liu, Wen Gao, Hongxun Yao, Shaohui Liu. A Texture-Based Tamper Detection Scheme by Fragile Watermark. Proceedings of the IEEE International Symposium on Circuits and Systems, Vancouver, Canada, Vancouver, Canada, 2: 177~180, May 2004.
28. Liu Shaohui, Yao Hongxun, Gao Wen. Neural Network Based Steganalysis in Still Images. Proceedings of IEEE International Conference on Media & Expo, Baltimore, USA, 2: 509~512, July 2003.
29. Shaohui Liu, Hongxun Yao, Xiaopeng Fan, Wen Gao. Steganalysis of Images Created in Wavelet Domain Using Quantization Modulation. Proceedings of Int. Conf. Wavelet Analysis & Its Applications, Chongqing, China, 1: 251~256, Mar. 2003.
30. Yongliang Liu, Wen Gao, Zao Wang, Shaohui Liu. A Lattice Based General Blind Watermark Scheme. Proceedings of the Information and Communications Security, Hohhot, China, Lecture Notes in Computer Science, Springer-Verlag Berlin, 2836: 136~144, Oct. 2003.
31. Yongliang Liu, Hongxun Yao, Wen Gao, Yaxiao Song, Shaohui Liu. System Identification for Nonlinear Control Using Lifted Wavelet.

The Sixth Joint Conference on Information Sciences, Durham, USA, 437~441, Mar. 2002.

32. Wu Boying, Liu Shaohui, Deng Zhongxing. Computations Of Inverse Problem by Using Wavelet in Multi-Layer Soil. Proceedings of International Conference on Wavelet Analysis & Its Applications, Hongkong, China, Lecture Notes in Computer Science, Springer-Verlag Berlin, 2251: 411~417, Nov. 2001.

Thesis:

1. S.H. Liu, "Research on Information Hiding and Steganalysis Technology in Image and Video," PhD Thesis, Harbin Institute of Technology, Apr. 2007.
2. S.H. Liu, "Applications of Wavelet in Numerically Solving Equations and Computing Parameters in Multi-Layer Soil", Dissertation of Master Degree, Harbin Institute of Technology, July 2001.
3. S. H. Liu, "Applications of Neural Network in Payload Forecast Electric Power System ", Dissertation of Bachelor Degree, Computational Mathematics and Application Software Development, Harbin Institute of Technology, July 1999.

RESEARCH GRANTS:

1. The National Natural Science Foundation of China(NSFC) Grant (2009-2011)
2. The Specialized Research Fund for Young Teacher in the Doctoral Program of Higher Education of China(2009-2011)
3. Development Program for Outstanding Young Teachers in Harbin Institute of Technology (2008-2010)
4. The National Basic Research Program of China (2009-2013) (With Prof. Wen Gao)
5. The National Natural Science Foundation of China (NSFC) Grant(2005-2007) (With Prof. Hongxun Yao)
6. The Specialized Research Fund for the Doctoral Program of Higher Education of China(2006-2009) (With Prof. Hongxun Yao)
7. MSRA Cooperation Research Grant (2006-2007) (With Prof. Hongxun Yao)
8. ETRI International Cooperation Research Grant(2001-2003) (With Prof. Hongxun Yao)

TEACHING EXPERIENCE:

- Multimedia Technologies: Fall 2006, Spring 2007, Spring 2008, Spring 2009.
- Digital Image Processing: Fall 2008, Fall 2009.

PROFESSIONAL ACTIVITIES:

- Editor for
 - Recent Patents on Signal Processing
- Reviewer for
 - Journal of Software and System
 - Computer Vision and Image Understanding
 - Information Sciences
 - IEEE Transactions on Multimedia
 - IEEE Multimedia Magazine
 - IEEE Signal Processing Letters
 - ETRI Journal
 - Signal Processing: Image Communication
 - International Journal of Network Security
 - Journal of Image and Graphics
 - Journal of Imaging
- Reviewer for Several Conferences