David Scott Doermann

Department of Computer Science and Engineering
School of Engineering and Applied Sciences
Institute for Artificial Intelligence and Data Science
University at Buffalo, Buffalo, NY

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Research Synopsis

My research interests include the analysis and processing of electronic documents and document images and the analysis, indexing, and retrieval of information from a range of sources, including images, video, and audio. Recent interests include the applications of deep learning, including generative adversarial networks to document and video analytics. I have contributed extensively to the document analysis research community on problems including page and zone segmentation, labeling, and classification, forms processing, signature detection and verification, handwriting modeling, quality estimation, enhancement, image-based indexing and retrieval, and mobile device applications. My research related to images and video includes image quality estimation, detection and recognition of scene text in images and video, the segmentation and retrieval of compressed sequences of video based on structure and motion, video sequence visualization, genre classification, dynamic event detection, performance evaluation, video-over-IP, wireless video, and pervasive networking and computing and media forensics. I have worked extensively with related technologies for audio analysis and speech recognition. My general interests involve applying language-understanding techniques and constraints for context-aware analysis of various forms of signal-based media. Recent applications of deep learning include generative adversarial networks to document and video analytics, Neural Architecture Search (NAS), Adversarial AI, Edge Computing, and Neural Network Optimization

Education

University of Maryland, College Park

Doctor of Philosophy in Computer Science **May 1993**

Thesis: Document Image Understanding: Integrating Recovery and Interpretation
Advisor: Dr. Azriel Rosenfeld

Master of Science in Computer Science **December 1989**

Bloomsburg University of Pennsylvania

Bachelor of Science in Computer Science **December 1986**

Bachelor of Science in Mathematics

Professional Experience

University at Buffalo
Buffalo, New York

Professor, Empire Innovation in Artificial Intelligence and Machine Learning **August 2018-present**
Department of Computer Science and Engineering

Teaching and Research focused on advancing university initiatives in Artificial Intelligence, Computer Vision, Pattern Recognition and Machine Learning.

Director, University at Buffalo Artificial Intelligence and Data Science Institute **September 2018-present**
Director, Engineering Science MS – AI Program **September 2019-present**

Amber Video
San Francisco, California
Technical Advisor **August 2018 - Present**

Defense Advanced Research Project Agency (DARPA)
Arlington, VA
Program Manager **April 2014 – April 2018**
Developed, selected, and oversaw research and transition funding in the areas of computer vision, human language technologies, and voice analytics by coordinating performers on all of the projects, orchestrating consensus, evaluating cross-team management, and continuing to meet fluid program objectives.

University of Maryland College Park
College Park, Maryland
Research Scientist (Emeritus as of September 2018) **December 2008 – August 2018**
Associate Research Scientist **April 2000-December 2008**
Director, Language, and Media Processing Laboratory **April 1996 – August 2018**
Adjunct Member of the Graduate Faculty **December 1994 – August 2018**
Assistant Research Scientist **April 1993 - April 2000**
Established the Laboratory for Language and Media Processing to serve the growing demand of the intelligence community by working with interdisciplinary teams of faculty and students from computer science, engineering, linguistics, and the iSchool. Worked extensively with undergraduate and graduate students in Computer Science and Engineering to complete research requirements for BS, MS and PHD Degrees. Worked with various government organizations in both unclassified and classified environments to develop transition technologies to operational environments

University of Salford, Manchester UK
Royal Academy of Engineering – Distinguished Visiting Fellow **2011-2013**
Topic: Practical systems for mass-digitization using cloud computing.

Applied Media Analysis, Inc.
College Park, Maryland
President/Co-Founder **2001–2014**
Focused the need for a cross-platform implementation of computer vision algorithms on mobile devices and developed the architecture to port basic image processing and document analysis capabilities to various devices from a wide range of manufacturers. Provided various levels of program support by providing annotated language data for training and evaluation.

Consulting (long term):
Consulted in the areas of Document Image Understanding, Document Retrieval, Image Processing, and System Integration.
National Security Agency Advisory Board (NSAAB), Ft. Meade, Maryland
Advanced Resource Technologies, Inc, Alexandria, Virginia
Presearch Inc, Fairfax, Virginia
Department of Atmospheric Chemistry, NASA Goddard Space Flight Center - Greenbelt, Maryland.

Legal Consulting:
Served as an expert on contracting disputes and as a document expert to in various matters related to document image analysis, optical character recognition technologies, pattern recognition, image processing and computer vision.

Expert Consultant – Engaged by Wiley Rein and Fielding, 2005 – Analysis of technology in Federal Contracting Award Dispute

Expert Consultant – Engaged by Perkins Coie, 2006 – Examination of Duplicate Document Images per court Order to remove near duplicate document images from discovery material.

Expert Witness – Wrote expert reports and provided deposition testimony on behalf of the Plaintiff in GTX Corp vs. Kofax Image Products et. al. Worked with Perkins Coie LLP, 2006-2008 on issues related to document cleaning and enhancement in patent 7,016,536

Expert Witness – Wrote expert Reports, provided deposition testimony, and provided trial testimony on behalf of the defendant in Nuance Communications vs. Abbyy Software. Worked with Finnegan Henderson Farabow Garrett & Dunner LLP, 2011-2013 on issues related to optical character recognition (OCR) technologies in the patents 5,381,489, 6,038,342, 5,261,009

Expert Witness – Retained by Latham & Watkins LLP to provide analysis, reports, and possible testimony on behalf of the defendants Capital One vs. Intellectual Ventures regarding US Patent 7,260,587

Expert Witness – Testifying invalidity expert for patents in Key Duplication trial of The Hillman Group, Inc. v. KeyMe, LLC, 2020-2021

Expert Witness – Currently retained for patent infringement litigation in the area of image retrieval

Expert Witness – Currently retained for patent infringement litigation in the area of mobile and remote document systems

External Leadership, Honors and Service

DARPA ISAT Study Group **2021-Present**

Elected Member selected to identify new areas of development and to recommend future research directions

State of New York Governors Commission on Artificial Intelligence, Robotics and Automation representing the SUNY System **2019-2021**

Bethania Kids

Board of Directors **2018-Present**

Rochester Institute of Technology, Rochester, NY

Industry Advisory Board of the Department of Computer Science **2018-Present**

Research Grants and Contracts

Principal Investigator/Co-Principal Investigator

Center for Identification Technology Research – Generation of High Resolution Morphed Faces for Evaluation
National Science Foundation, 7/21-6/21

Center for Identification Technology Research – Deep Fakes
National Science Foundation, 9/20-9/21

Multi-media Analytics Leading to Intent and Semantic Evidence (MALISE)
SRI/DARPA, 8/20-8/24

Center for Identification Technology Research – Fmonet
National Science Foundation, 3/20-3/21

SPIR: Applications of Machine Learning to HVAC Service Diagnostics and Performance Optimization
NorthPark Innovations Group, 02/19-02/20

Scalable Video Retrieval
National Science Foundation, 10/13-10/14, $234,225

Document Image Quality Estimation, Enhancement, Classification and Retrieval
National Science Foundation, 10/13-10/14, $234,225

EAGER: Large Scale Document Image Triage, Indexing and Retrieval,
National Science Foundation, 10/12-10/13, $300,000

EAGER: Video Analytics for Large Heterogeneous Repositories
National Science Foundation, 10/12-10/13, $214,195

ADALT – Automatic Detection of Anomalies in Lexical Text
Center for the Advanced Study of Language,, 9/10-3/13, 225,000

Tools for Document Analysis Metadata Extraction
Department of Defense, 1/08-12/10, $700,000

MADCAT Arabic Document Image Analysis
DARPA/BBN, 12/07-12/13, $1,650,000

Best of Breed OCR Evaluation
Army Research Laboratory, 11/07 – 10/08, $100,000

Advanced CIR Algorithm for Forensic Analysis II,
MIPS, w/ Advanced Digital Forensic Solutions, Inc., 06/07-05/08, $77,777

CLEAT: A Classification, Enhancement and Analysis Tool,
Singapore Centre for Strategic Infocom Tech., 12/06-12/07, $200,000

Bridge Map & Gazetteer Optical Character Recognition,
Sarnoff Corp., 09/06-09/07, $75,000

Integration of DocLib Components as Web Services,
Universities-Illinois Institute of Technology, 06/06-02/07, $50,000

Handwriting Recognition Technology Assessment,
Central Intelligence Agency, 05/06-4/07, $94,075

Advanced CIR Algorithm for Forensic Analysis,
MIPS, w/ Advanced Digital Forensic Solutions, Inc., 02/06-01/07, $77,777

Integration of DocLib Components as Web Servicer,
Illinois Institute of Technology, 03/05-04/07, $50,000

BRIDGE
Center for the Advanced Study of Language, 07/04-06/06, $667,000

Evaluation and Improvement of MT Using Parallel Corpra,
Mitre Corporation, 05/01-01/03, $100,000

Defect Detection and Classification
KLA-Tencor, 9/00-02/03,$ 125,000

Automated Modeling and Analysis of Structured Documents,
Panasonic Information Technologies, 01/01-03/02. $35,000

Intelligent Set-Top Processing,
Philips Research Laboratory, 06/00-09/01, $55,000

Task Specific Evaluation of Digital Libraries
University of Maryland Baltimore County, 01/00-11/01, $99,641

Document Image Decomposition and Support,
Department of Defense, 06/93-12/96, $907,987

Investigator

Development and Evaluation of Search Technology for Discovery of Evidence in Civil Litigation
NSF, 6/11-5/13, $1,116,000

Language and Media Processing Laboratory,
Department of Defense, 09/96-04/07, $9,051,812

Event Modeling and Recognition for (Mutli-Prespective) Recognition,
Department of the Interior, 09/06-09/07, $200,000

ARDA Workshop-VERAAE,
Northrop-Grumman, 06/05-06/06, $70,000

Multilingual Access to Large Spoken Archives (MALACH),
National Science Foundation, 9/01-8/07, $3,300,000 (Investigator)

Activity Detection by Video Content Evaluation (ADVICE),
Department of Defense, 08/00-12/02, $898,380
Video Frame Ranking Toolkit
Hitachi Corporation, 9/01-8/02, $50,000

Video Detection of Events,
Philips Laboratories, 10/98-09/99, $50,000

Automated Video Analysis and Retrieval,
Philips Laboratory, 05/95-02/98, $75,000

Ph.D. Thesis Supervised

Kamran Etemad	*Multi-Scale Discriminant Analysis and Recognition of Signals and Image*s, 1996 (w/ Rama Chellappa)
Omid Kia	*Document Image Compression and Analysi*s, 1997 (w/ Rama Chellappa)
Vikrant Kobla	*Automated Analysis of MPEG-Compressed Vide*o, 1999 (w/ Azriel Rosenfeld)
Huiping Li	*Automated Processing and Analysis of Text in Digital Vide*o, 2000 (w/ Rama Chellappa)
Katherine Guo	*Forgery Detection by Local Correspondenc*e, 2000 (w/ Azriel Rosenfeld)
Christian Shin	*The Roles of Document Structure in Document Image Retrieval and Classificatio*n, 2000 (w/ Azriel Rosenfeld)
Huanfeng Ma	*Adaptive Analysis sand Processing of Structured Multilingual Documents*, 2005 (w/ Rama Chellappa)
Yefeng Zheng	*Handwriting Identification, Matching and Indexing in Noisy Document Images,* 2005 (w/ Rama Chellappa)
Jian Liang	*Analysis of Camera Based Document Images*, 2006 (w/ Rama Chellappa)
Burcu Karagol-Ayan	*Lexical Acquisition from Bi-Lingual Dictionaries*, 2007 *(*w/ Amy Weinberg)
Guangyu Zhu	*Document Indexing and Retrieval using Logos and Signatures,* 2009 (w/ Rama Chellappa)
Xu Liu	*Mobile Document Image Analysis*, 2008 (w/ Larry Davis)
Mudit Agrawal	*Adaptive Algorithms for the Automated Processing of Document Images* (w/ Larry Davis)
Jayant Kumar	*Efficient Machine Learning Methods for Document Image Analysis*, 2013 (w/ Larry Davis)
Peng Ye	*Feature Learning and Active Learning for Image Quality Assessment*, 2014 (w/ Rama Chellappa)
Le Kang	*Document and Natural Image Applications of Deep Learning*, 2015 (w/ Rama Chellappa)
Rajiv Jain	*Searching Heterogeneous Document Image Collections*, 2015 (w/ Larry Davis)
Sungmin Eum	*Image and Video Analytics for Document Processing and Event Recognition*, 2016 (w/ Joseph Jaja)

Courses Taught

CSE 473/573 - Introduction to Computer Vision and Image Processing (Spring 2019, Spring 2020, Spring 2021, Spring 2022)
CSE 610 - Automated Analysis of Sporting Event Videos (Spring 2022, Summer 2022)
CSE 199 – Internet, Computing, and Society (Fall 2021)
CSE 510 - Edge Intelligence & Computing (Spring 2021)
EAS 595LEC - Special Topics Fundamentals of Artificial Intelligence (Spring 2020)
CSE 728 Seminar - Applications of Generative Adversarial Networks (Fall 2019)
CSE 728 Seminar - Legal, Ethical and Social Issues in Artificial Intelligence (Spring 2019)
CMSC 828D - Automated Document and Video Analysis, (Various)
LBSC 690 - Information Technology, (Various)
SPIE Short Course: Document Image Processing and Analysis on Android Devices

Professional Activities

Editorial

Founding Editor-in-Chief: Int. Journal on Document Analysis and Recognition 1995-2005
Managing Editor: Int. Journal on Document Analysis and Recognition 2005-present

Conference Leadership

General Chair: Int. Conference on Document Analysis and Recognition, 2023
General Chair: Int. Conference on Document Analysis and Recognition, 2013
General Chair: Int. Conference on Mobile and Ubiquitous Multimedia, 2004
General Chair: Summit on Arabic and Chinese Handwriting, 2006

Co-General Chair: Int. Workshop on Document Analysis Systems, 2010
Co-General Chair: Int. Workshop on Camera Based Document Analysis and Recognition, 2005-2007
Co-General Chair: Center for Discrete Mathematics and Theoretical Computer Science Workshop on Video Mining, 2002

Organizer and General Chair: Symposium on Document Image Understanding Tech, 1995-2005

Program Chair: Int. Conf. on Document Analysis and Recognition, 2007

Track Chair: Multimedia and Document Analysis, Processing and Retrieval, Int. Conference on Pattern Recognition, 2010
Track Chair: Int. Conf. on Multimedia & Expo 2006

Area Chair: Document Analysis, Biometrics and Pattern Recognition Applications, Int. Conference on Pattern Recognition, 2014
Area Chair: Document Analysis Track, Int. Conference on Pattern Recognition, 2012
Member: Int. Conference on Document Analysis and Recognition Awards Committee, 2007-2007

Publicity Chair: Int. Conf. on Document Analysis and Recognition, 2017
Publicity Chair: Int. Conf. on Document Analysis and Recognition, 2005, 2011

Conference Committees

Program Committee: Int. Workshop on Frontiers in Arabic Handwriting Recognition, 2010
Program Committee: Int. Conference on Advances in Multimedia, 2009, 2010
Program Committee: Int. Conference on Document Analysis and Recognition, 1999-2017
Program Committee: Int. Conference on Frontiers in Handwriting Recognition, 2012
Program Committee: SPIE-Document Recognition and Retrieval, 1997-2014
Program Committee: Int. Workshop on Video Mining, 2008
Program Committee: Int. Workshop on Mobile Multimedia Processing, 2008, 2010
Program Committee: Int. Conference on Information Sciences, Signal Processing and It's Applications 2007
Program Committee: Int. Conference on Image and Video Retrieval, 2009
Program Committee: Int. Workshop on Document Analysis Systems, 2002- 2008, 2012-2014
Program Committee: Digital Access to Textual Cultural Heritage, 2014
Program Committee: Multilingual OCR, 2011-2013
Program Committee: SPIE-Multimedia on Mobile Devices, 2005-2010
Program Committee: Int. Workshop on Service-Oriented Community Coordinated Multimedia, 2009
Program Committee: Int. Symposium on Signal Processing 2007
Program Committee: Annual ACM Symposium on Applied Computing –Document Engineering

2006-2007, 2010 -2012
Program Committee: Int. Workshop on Graphics Recognition 2001-2013
Program Committee: Int. Conference on Mobile and Ubiquitous Multimedia, 2001-2003, 2007-2008, 2011-2012
Program Committee: Workshop on Analytics for Noisy Unstructured Text Data, 2006-2011
Program Committee: LCPR 2006
Program Committee: Document Image Analysis for Libraries, 2006
Program Committee: Int. Conference on Pattern Recognition, 2002, 2004, 2006
Program Committee: Annual ACM Symposium on Applied Computing 2005
Program Committee: CBDAR 2005, 2011, 2013
Program Committee: IEEE Int. Conference on Multimedia & Expo, 2005, 2006
Program Committee: Int. Conference on Multimodal Interfaces 2005
Program Committee: ACM Symposium on Applied Computing 2005
Program Committee: Int. Conference on Image Analysis and Processing 1999-2005
Program Committee: IEEE Int. Symposium on Multimedia Software Engineering 2004
Program Committee: Int. Workshop on Distributed Shared Memory on Clusters 2003
Program Committee: Int. Workshop on Multimedia Data and Document Engineering 2003
Program Committee: Second Int. Workshop on Web Document Analysis 2001, 2003
Program Committee: Document Layout Interpretation and its Applications, 1999-2003
Program Committee: Int. Workshop on Information Retrieval 2001
Program Committee: Event, 2001
Program Committee: DIAUDD, 1999
Program Committee: Int. Workshop on Performance Evaluation Issues in Multilingual OCR, 1999
Program Committee: Brazilian Symposium on Document Image Analysis, 1997
Program Committee: Workshop on Syntactic & Structural Pattern Recognition, 1995

Other Activities

IAPR Publications and Publicity Committee, 2001-2014
Chair, IAPR Publications and Publicity Committee, 2010-2014

External Examiner: Alan McCabe, Handwritten Signature Verification Using Complementary Statistical Models", School of Information Technology, James Cook University of North Queensland, November 2003.
External Examiner: Jarvi Sadri Automatic Segmentation and Recognition of Unconstrained Handwritten Numeral Strings, Doctoral Thesis, Computer Science Department, Concordia University, Montreal, April 2007.

Reviewer: National Science Foundation
Reviewer: Computer Vision and Pattern Recognition
Reviewer: Graphical Models and Image Processing
Reviewer: IEEE Transactions on Pattern Analysis and Machine Intelligence
Reviewer: Pattern Recognition
Reviewer: Pattern Recognition Letters

Awards and Recognition

Award for Excellence: The Under Secretary of Defense (Acquisition, Technology and Logistics) for support to the CENTCOM Technology Tiger Team. Transition of key technology to deployed troops.

Results Matter, 2016: Presented to a program manager by the Director of DARPA for successful program development, implementation and transition that exemplifies the DARPA mission of preventing strategic surprise.

Best Student Paper: Sungmin Eum and David Doermann, "Content Selection Using Frontalness Evaluation of Multiple Frames", International Conference on Pattern Recognition, 2016 (Piero Zamperoni Award)

Fellow of the IEEE: for contributions to Research and development of automatic analysis and processing of document page imagery 2014

Fellow of the IAPR: for contributions to the field of document image analysis and in recognition of service to the IAPR, 2014

Distinguished Visiting Fellowship, Royal Academy of Engineering: Practical systems for mass-digitization using cloud computing. University of Salford, Manchester UK, 2011-2013

Best Student Paper: Jayant Kumar, Peng Ye and David Doermann. "Learning Document Structure for Retrieval and Classification." International Conference on Pattern Recognition, 2012

Best Student Paper Award: Mudit Agrawal and David Doermann. "Context-Aware and Content-Based Dynamic Voronoi Page Segmentation", International Workshop on Document Analysis systems, 2011

Best Paper Award: Xu Liu, David Doermann and Huiping Li, "Imaging as an Alternative Data Channel for Camera Phones" International Conference on Mobile and Ubiquitous Multimedia, 2006

Best Student Paper: Yi Li, Yefeng Zheng, David Doermann and Stefan Jaeger, "A New Algorithm for Detecting Text Line in Handwritten Documents", International Workshop on Frontiers in Handwriting Recognition, 2006

Honorary Doctorate of Technology Sciences: University of Oulu for contributions to digital media processing and document analysis research, 2002.

University of Maryland Invention of the Year Finalist: 2007 and 2009.

Pattern Recognition 1994 Outstanding Paper Honorable Mention.

Journal Publications

J62. Z. Zhang, Y. Zhu, R. Rai, and D. Doermann, "PIMNet: Physics-Infused Neural Network for Human Motion Prediction," IEEE Robotics and Automation Letters, vol. 7, no. 4, pp. 8949–8955, Oct. 2022, doi: 10.1109/LRA.2022.3188892.

J61. J. Hyysalo et al., "Smart mask–Wearable IoT solution for improved protection and personal health," Internet of Things, vol. 18, p. 100511, 2022.

J60. J. Zhao et al., "Data-adaptive binary neural networks for efficient object detection and recognition," Pattern Recognition Letters, vol. 153, pp. 239–245, 2022.

J59. S. Xu, C. Liu, B. Zhang, J. Lü, G. Guo, and D. Doermann, "BiRe-ID: Binary Neural Network for Efficient Person Re-ID," ACM Transactions on Multimedia Computing, Communications, and Applications (TOMM), vol. 18, no. 1s, pp. 1–22, 2022.

J58. Y. Zhai et al., "Adaptive Two-Stream Consensus Network for Weakly-Supervised Temporal Action Localization," IEEE Transactions on Pattern Analysis & Machine Intelligence, no. 01, pp. 1–16, 2022.

J57. H. Chen et al., "Binarized neural architecture search for efficient object recognition," International Journal of Computer Vision, vol. 129, no. 2, pp. 501–516, 2021.

J56. R. Wang, B. Zhang, L. Zhuo, Q. Ye, and D. Doermann, "Cogradient Descent for Dependable Learning," arXiv preprint arXiv:2106.10617, 2021.

J55. S. Xue, H. Chen, C. Xie, B. Zhang, X. Gong, and D. Doermann, "Fast and Unsupervised Neural Architecture Evolution for Visual Representation Learning," IEEE Computational Intelligence Magazine, vol. 16, no. 3, pp. 22–32, 2021.

J54. J. Zhao et al., "Data-Adaptive Binary Neural Networks for Efficient Object Detection and Recognition," Pattern Recognition Letters, 2021.

J53. M. Mao, Y. Tian, B. Zhang, Q. Ye, W. Liu, and D. Doermann, "IffDetector: inference-aware feature filtering for object detection," IEEE Transactions on Neural Networks and Learning Systems, 2021.

J52. C. Liu et al., "Rectified Binary Convolutional Networks with Generative Adversarial Learning," Int J Comput Vis, Jan. 2021.

J51. Z. Zhang, R. Rai, S. Chowdhury, and D. Doermann, "MIDPhyNet: Memorized infusion of decomposed physics in neural networks to model dynamic systems," *Neurocomputing*, vol. 428, pp. 116–129, Mar. 2021, doi: 10.1016/j.neucom.2020.11.042.

J50. H. Chang, Y. Chen, B. Zhang, and D. Doermann, "Multi-UAV Mobile Edge Computing and Path Planning Platform Based on Reinforcement Learning," IEEE Transactions on Emerging Topics in Computational Intelligence, 2021

J49. Zhang, Duona, Wenrui Ding, Baochang Zhang, Chunhui Liu, Jungong Han, and David Doermann. 2021. "Learning Modulation Filter Networks for Weak Signal Detection in Noise." Pattern Recognition vol. 109, p. 107590, Jan. 2021

J48. H. Chen, B. Zhang, X. Zheng, J. Liu, R. Ji, D. Doermann, G. Guo, and others, "Binarized neural architecture search for efficient object recognition," International Journal of Computer Vision, vol. 129, no. 2, pp. 501–516, 2021.

J47. W. Zhao, T. Ma, X. Gong, B. Zhang, and D. Doermann, "A Review of Recent Advances of Binary Neural Networks for Edge Computing," IEEE Journal on Miniaturization for Air and Space Systems, pp. 1–1, 2020.

J46. A. Behjat, C. Zeng, R. Rai, I. Matei, D. Doermann, and S. Chowdhury, "A physics-aware learning architecture with input transfer networks for predictive modeling," Applied Soft Computing, vol. 96, p. 106665, Nov. 2020.

J45. Davila, K, S Setlur, D Doermann, UK Bhargava, and V Govindaraju. 2020. "Chart Mining: A Survey of Methods for Automated Chart Analysis." IEEE Transactions on Pattern Analysis and Machine Intelligence.

J44. Liu, C., Ding, W., Hu, Y., Xia, X., Zhang, B., Liu, J. and Doermann, D., 2020. Circulant Binary Convolutional Networks for Object Recognition. IEEE Journal of Selected Topics in Signal Processing.

J43. Bhowmik, S., Sarkar, R., Das, B. and Doermann, D., 2019. GiB: A Game Theory Inspired Binarization Technique for Degraded Document Images. IEEE Transactions on Image Processing, 28(3), pp.1443-1455

J42. Shibaprasad Sen, Ankan Bhattacharyya, Pawan Kumar Singh, Ram Sarkar, Kaushik Roy, and David Doermann. "Application of Structural and Topological Features to Recognize Online Handwritten

Bangla Characters." ACM Transactions on Asian and Low-Resource Language Information Processing (TALLIP) 17, no. 3 (2018): 20.

J41. Showmik Bhowmik, Ram Sarkar, Mita Nasipuri, and David Doermann. "Text and non-text separation in offline document images: a survey." International Journal on Document Analysis and Recognition (IJDAR) 21, no. 1-2 (2018): 1-20.

J40. Sungmin Eum, and David Doermann, Planar content selection in images and videos using frontalness, In Pattern Recognition Letters, 2017, ISSN 0167-8655, https://doi.org/10.1016/j.patrec.2017.08.020.

J39. Jingtao Xu, Peng Ye, Qiaohong Li, Haiqing Du, Yong Liu, and David Doermann, Blind image quality assessment based on high order statistics aggregation, IEEE Transactions on Image Processing 25 (2016), no. 9, 4444-4457.

J38. Qixiang Ye and David Doermann, Text detection and recognition in imagery: A survey, IEEE transactions on pattern analysis and machine intelligence 37 (2015), no. 7, 1480-1500.

J37. Roy, Ankush, Biswajit Halder, Utpal Garain, and David S. Doermann. "Machine-assisted authentication of paper currency: an experiment on Indian banknotes." International Journal on Document Analysis and Recognition (IJDAR) 18, no. 3 (2015): 271-285.

J36. Jayant Kumar, Peng Ye, and David Doermann, Structural similarity for document image classification and retrieval, Pattern Recognition Letters 43 (2014), 119-126.

J35. Mudit Agrawal and David Doermann. "Clutter noise removal in binary images." International Journal on Document Analysis and Recognition, 16, pp. 351-369, December 2013.

J34. Ankush Roy, Biswaiit Halder, Utpal Garain and David Doermann. "Automatic Authentication of Banknotes." IEEE Transactions on Information Forensics & Security, 2012.

J33. Peng Ye and D. Doermann. "No-Reference Image Quality Assessment using Visual Codebooks." IEEE Transactions on Image Processing, 21:7, pp. 3129-3138, July 2012.

J32. T. Steinherz, D. Doermann, E. Rivlin and N. Intrator. Off-Line Loop Investigation for Handwriting Analysis. IEEE Transactions on Pattern Analysis and Machine Intelligence, 31(2), pages 193-209, February 2009.

J31. L. Yi, Y. Zheng, D. S. Doermann and S. Jaeger. Script-Independent Text Line Segmentation in Freestyle Handwritten Documents. IEEE Transactions on Pattern Analysis and Machine Intelligence, pages 1313-1329, August 2008.

J30. Xu Liu, D. Doermann and Huiping Li. VCode - Pervasive Data Transfer Using Video Barcode. IEEE Transactions on Multimedia, 10(3), pages 361-371, April 2008.

J29. Xu Liu and David Doermann. Mobile Retriever: Access to Digital Documents from their Physical Source. International Journal on Document Analysis and Recognition, 11(1), pages 19-27, September 2008.

J28. Guangyu Zhu, Yefeng Zheng, David Doermann and Stefan Jaeger. Signature Detection and Matching for Document Image Retrieval. IEEE Transactions on Pattern Analysis and Machine Intelligence, 31(11), pages 2015-2031, November 2009.

J27. Guangyu Zhu, Xiaodong Yu, Yi Li and David Doermann. Language Identification for Handwritten Document Images Using A Shape Codebook. Pattern Recognition, 42, pages 3184-3191, December 2009.

J26. Daniel DeMenthon and David Doermann. Video Retrieval of Near-Duplicates using k-Nearest Neighbor Retrieval of Spatio-Temporal Descriptors. Multimedia Tools and Applications (MTAP), 30, 2006.

J25. J. Liang, D. DeMenthon and D. Doermann. Mosaicing of Camera-captured Documents without Pose Restriction. Computer Vision and Image Understanding, 2006. (Submitted).

J24. J. Liang, D. DeMenthon and D. Doermann. Geometric Rectification of Camera-captured Document Images. IEEE Transactions on Pattern Analysis and Machine Intelligence, July 2006. (Submitted).

J23. Y. Zheng and D. Doermann. Robust Point Matching for Nonrigid Shapes By Preserving Local Neighborhood Structures. IEEE Transactions on Pattern Analysis and Machine Intelligence, 28(4), pages 643-649, April 2006.

J22. Y. Zheng, H. Li and D. Doermann. A Parallel Line Detection Algorithm Based on HMM Decoding. IEEE Transactions on Pattern Analysis and Machine Intelligence, 27(5), pages 777-792, 2005.

J21. J. Liang, D. Doermann and H. Li. Camera-Based Analysis of Text and Documents: A Survey. International Journal on Document Analysis and Recognition, 7(2+3), pages 83-104, July 2005.

J20. M. Balcells-Capellades, D. DeMenthon and D. Doermann. An Appearance-based Approach for Consistent Labeling of Humans and Objects in Video. Pattern Analysis and Applications, pages 1433-7451, November 2004. (http version available online from Springer, printed version 2005).

J19. W. Byrne, D. Doermann, M. Franz, S. Gustman, J. Hajic, D. Oard, M. Picheny, J. Psutka, B. Ramabhadran, D. Soergel, T. Ward, and W.-J. Zhu. Automatic Recognition of Spontaneous Speech for Access to Multilingual Oral History Archives. IEEE Transactions on Speech and Audio Processing, Special Issue on Spontaneous Speech Processing, 12(4), pages 420-435, July 2004.

J18. Y. Zheng, H. Li, and D. Doermann. Machine Printed Text and Handwriting Identification in Noisy Document Images. IEEE Transactions on Pattern Analysis and Machine Intelligence, 26(3), pages 337-353, 2004.

J17. H. Ma, and D. Doermann. Adaptive Hindi OCR Using Generalized Hausdorff Image Comparison. ACM Transactions on Asian Language Information Processing, 26(2), pages 198-213, 2004.

J16. H. Ma, B. Karagol-Ayan, D. Doermann, D. Oard, and J. Wang. Parsing and Tagging of Bilingual Dictionaries. Traitement Automatique Des Langues, 44(2), pages 125-150, 2003.

J15. K. Guo, D. Doermann and A. Rosenfeld. Forgery Detection by Local Correspondence. International Journal on Pattern Recognition and Artificial Intelligence, 15(4), pages 579-641, 2001.

J14. C. Shin, D. Doermann, and A. Rosenfeld. Classification of Document Pages Using Structure-Based Features. International Journal on Document Analysis and Recognition, 3(4), pages 232-247, 2001.

J13. O. Kia and D. Doermann. Residual coding in document image compression. IEEE Transactions on Image Processing, 9(6):961–969, 2000.

J12. H. Li, D. Doermann, and O. Kia. Automatic text detection and tracking in digital video. IEEE Transactions on Image Processing - Special Issue on Image and Video Processing for Digital Libraries, 9(1):147–156, 2000.

J11. O. Kia and D. Doermann. Document image coding for processing and retrieval. Journal of VLSI Signal Processing, 20:121–135, 1998.

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J9. D. Doermann. The Indexing and Retrieval of Document Images: A Survey. Computer Vision and Image Understanding, 70(3), pages 287-298, 1998.

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C5. D. S. Doermann and V. Varma. Simulating pressure variations in handwriting. In Proceedings Modeling and Simulation Conference, pages 2141–2148, Pittsburgh, PA, 1992.
C4. D. S. Doermann (with Igor J. Eberstein). Use of the Goddard Massively Parallel Processor for acid rain modeling. AGU, Spring Meeting, 1991.
C3. D. S. Doermann and A. Rosenfeld. Mailpiece preprocessing: The population of character parts. In Proceedings of the USPS Advanced Technology Conference, pages 961–972, 1990.
C2. D. S. Doermann (with I. J. Eberstein and R. W. Stewart). Calculated chemical effects of the El Chichon eruption on the middle stratosphere. AGU, Spring Meeting, Baltimore, MD, 1990.
C1. D. S. Doermann (with I. J. Eberstein and R. W. Stewart). Random walk plume model with chemistry using the Goddard Massively Parallel Processor, SIAM Conference on Applied Probability in Science and Engineering, New Orleans, LA, March 5-9, 1990.

Invited Contributions

Keynote Talks

K7. Document Integrity in an AI World, Virtual Milano, ICPR, 2021
K6. Image and Video Forensics", Workshop on Information Forensics, Abu-Dhabi, UAE, 2016
K5. The Role of Document Analysis in the Paperless Office: One perspective", Nancy, France, 2015
K4. The Emerging Impact of Document Image Classification and Retrieval", International Conference on Multimedia Technology, Guangzhou, China 2013
K3. The evolution of Document Authentication", International Conference on Frontiers in Handwriting Recognition, Kolkata, India 2010.
K2. Progress in Camera Based Document Image Analysis. International Conference on Document Analysis and Recognition, Edinburgh, UK, 2003.
K1. Document Image Understanding, International Symposium on Document Image Management, Curitiba, Brazil, 1998

Invited Talks

I13. D. Doermann: Computer Forensics for Document Images, Summer School on Document Analysis, 2018.
I12. D. Doermann: Document Image Classification and Retrieval, iDIPS Summer School, 2014
I11. Y. Zheng, H. Li, and D. Doermann. Background Line Detection with a Stochastic Model. Symposium on Document Image Understanding Technology (SDIUT'03), pages 97-109, APR 2003.
I10. H. Ma, B. Karagol-Ayan, and D. Doermann. Segmenting and Tagging Structured Content. Symposium on Document Image Understanding Technology (SDIUT'03), pages 53-64, APR 2003.
I9. D. Doermann, and G. Zi. Groundtruth Image Generation from Electronic Text (Demonstration). Symposium on Document Image Understanding Technology (SDIUT'03), pages 309-312, APR 2003.
I8. C. Shin and D. Doermann. Classification of document page images. In SDIUT99, pages 166–175, 1999.

I7. D. S. Doermann. “Indexing Video Databases”, University of Oulu, Oulu, Finland, 1998.
I6. D. S. Doermann. “Document Image Understanding”, 3rd Annual Intelligence Community Information and Classification Management Conference, College Park, Maryland 1997.
I5. D. S. Doermann. “Media Processing Research at Maryland”, Symposium on Document Image Understanding Technology, Annapolis, MD, 1997.
I4. D. S. Doermann. “Document and Video Understanding at Maryland”, Symposium on Document Image Under-standing Technology, Bowie, MD, 1995.
I3. D. S. Doermann. “Analysis of Structured Documents”, DIMUND Workshop on Page Decomposition, Character Recognition and Data Standards, Harpers Ferry, WV, 1993.
I2. D. S. Doermann. “The DIMUND Document Information Server”, DIMUND Workshop on Page Decomposition, Character Recognition and Data Standards, Harpers Ferry, WV, 1993.
I1. D. S. Doermann. “Recovery in Document Image Analysis”, Advanced Information Processing and Analysis Symposium, Tysons Corner, VA, 1993.

I have reviewed and certify that this curriculum vitae is a current and accurate statement of my professional record.

July 1, 2022

David S. Doermann

Date