M. MURAT DUNDAR

Curriculum Vitae

Computer & Information Science Department, Purdue University
School of Informatics, Indiana University
IUPUI
Address: 723 W. Michigan St., Indianapolis, IN 46202
Tel: 317-274-2724, Fax: 317-274-9742
e-mail: dundar@cs.iupui.edu
Web: http://www.cs.iupui.edu/~dundar

Research Interests:

Machine learning and statistical pattern recognition with applications to biomedical informatics and hyperspectral data analysis.

Education:

Ph. D. Electrical and Computer Engineering, **Purdue University**, West Lafayette, IN, May 2003.
Thesis: Toward An Optimal Analysis of Hyperspectral Data,
Advisor: Prof. David Landgrebe

M.S. Electrical and Computer Engineering, **Purdue University**, West Lafayette, IN, Jan 1999.

M.S. Systems and Control Institute, **Bogazici University**, Istanbul, Turkey, June 1999.
Thesis: Investigation of Adaptive Fuzzy Control Strategies for Nonlinear Plants
Advisor: Prof. Yorgo Istefanapulos

B. S. Electrical and Electronics Engineering, **Bogazici University**, Istanbul, Turkey, June 1997.

Professional Experience:

06/2003 – 07/2008: Staff Scientist, **Siemens Medical Solutions, Inc. USA**, Malvern, PA
Computer Aided Diagnosis & Knowledge Solutions

06/2002 – 08/2002: Summer Intern, **Los Alamos National Labs.**, Los Alamos, New Mexico
Integrating Spatial contiguity into the design of Support Vector Machines

01/2001 – 12/2002: Research Assistant, **Purdue University**, West Lafayette, Indiana
Data modelling in the presence of limited training data, learning from unlabeled data.

06/2001 – 08/2001: Summer Intern, **Los Alamos National Labs.**, Los Alamos, New Mexico
Modelling and design of a superconductor cavity for RF field accelerators.

06/2000 – 08/2000: Summer Intern, **Los Alamos National Labs.**, Los Alamos, New Mexico
Modelling and design of a superconductor cavity for RF field accelerators.

10/1997 - 06/1998: Research Assistant, **Bogazici University**, Istanbul, Turkey
Real-time implementation of an Adaptive Fuzzy Control Algorithm for the Ball and Beam system.

Teaching Experience:

01/1999 – 12/2001: Teaching Assistant, **Purdue University**, West Lafayette, Indiana
Lab Instructor for a Digital logic design course: Held preliminary sessions,

prepared quizzes; graded quizzes and lab notebooks

01/2002 – 05/2003: Teaching Assistant, **Purdue University**, West Lafayette, Indiana
Course on hardware design language, (VHDL) Senior Project course

01/1998 – 06/1998: Teaching Assistant, **Bogazici University**, Istanbul, Turkey
Lab Instructor for a Power Electronics course

Invited Book Chapter:

Murat Dundar and Glenn Fung, "Kernel Fisher Discriminant for Remote Sensing Data Analysis", To appear in Kernel Methods for Remote Sensing Data Analysis. Edited by Gustavo Camps-Valls and Lorenzo Bruzzone, John Wiley & Sons.

Journal Papers:

Murat Dundar, Glenn Fung, Balaji Krishnapuram, Bharat Rao, "Multiple Instance Learning Algorithms for Computer Aided Diagnosis", IEEE Transactions on Biomedical Engineering, Volume 55, No. 3, pp 1005-1015, March 2008.

L.Bogoni, P.Cathier, Murat Dundar, A.Jerebko, S.Lakare, J.Liang, S.Periaswamy, M.Baker and M.Macari, "CAD for Colonography: A tool to address a growing need," The British Journal of Radiology, 78 (2005), pp57-62.

Murat Dundar and David Landgrebe, "A Cost-effective Semi-supervised Classifier Approach with Kernels," IEEE Transactions on Geoscience and Remote Sensing, Volume 42, No. 1, pp 264-270, January, 2004.

Murat Dundar and David Landgrebe, "Toward an Optimal Supervised Classifier for the Analysis of Hyperspectral Data," IEEE Transactions on Geoscience and Remote Sensing, Volume 42, No. 1, pp 271-277, January, 2004.

Murat Dundar and David Landgrebe, "A Model Based Mixture Supervised Classification Approach in Hyperspectral Data Analysis," IEEE Transactions on Geoscience and Remote Sensing, Volume 40, No. 11, pp 269 -2699, December 2002.

Technical Conferences:

Jinbo Bi, Tao Xiong, Shipeng Yu, Murat Dundar, Bharat Rao, "An Improved Multi-task Learning Approach with Applications in Medical Diagnosis", Proceedings of the 18th European Conference on Machine Learning (ECML'08), 2008

Murat Dundar, Matthias Wolf, Sarang Lakare, Marcos Salganicoff, Vikas Raykar "Polyhedral Classifiers for Target Detection: A Case Study: Colorectal Cancer", International Conference on Machine Learning, Helsinki, Finland, July 5-9 2008 (Acceptance Rate: 27%, Oral Presentation)

Vikas Raykar, Balaji Krishnapuram, Jinbo Bi, Murat Dundar "An Improved Multiple Instance Classification Algorithm with Automatic Feature Selection for Computer Aided Diagnosis", International Conference on Machine Learning, Helsinki, Finland, July 5-9 2008 (Acceptance Rate: 27%, Oral Presentation)

Murat Dundar, Jinbo Bi, "An AND-OR Framework for Learning a Cascade Classifier", IEEE Computer Society Conference on Computer Vision and Pattern Recognition (CVPR '07), 18-23 June 2007, Minneapolis, Minnesota, USA (Acceptance Rate: 4.8%, Oral Presentation)

Murat Dundar, Balaji Krishnapuram, Jinbo Bi, Bharat Rao, "Learning from Non-IID Data", In proceedings of the 20th International Joint Conference on Artificial Intelligence (IJCAI 2007), Hyderabad, India, January 6-12, 2007 (Acceptance Rate: 15.7%, Oral Presentation).

Glenn Fung, Murat Dundar, Balaji Krishnapuram, Bharat Rao, "Multiple Instance Algorithms for Computer Aided Diagnosis", Advances in Neural Information Processing Systems 19 (NIPS 2006), Vancouver, CA, 2006 (Acceptance Rate: 24%, Poster Presentation).

Murat Dundar, James Theiler, and Simon Perkins. ``Incorporating Spatial Contiguity into the Design of a Support Vector Machine Classifier." In Proceedings of IEEE International Geoscience and Remote Sensing Symposium (IGARSS '06), 364-367 (Invited Paper).

Jinbo Bi, Glenn Fung, Murat Dundar, Bharat Rao, "Semi-Supervised Mixture of Kernels via LPBoost Methods", In Proceedings of the Fifth IEEE international Conference on Data Mining (ICDM '05). IEEE Computer Society, November 27 - 30, 2005, Washington, DC, 569-572. (Acceptance Rate: 28%).

Murat Dundar, Glenn Fung, Jinbo Bi, Sandilya Sathyakama, Bharat Rao, "Sparse Fisher Discriminant Analysis for Computer Aided Detection", SIAM International Data Mining Conference (SDM '05), 2005, Newport Beach, CA, USA (Acceptance Rate: 40%, Poster Presentation).

Glenn Fung, Murat Dundar, Jinbo Bi, and R. Bharat Rao, "A fast iterative algorithm for fisher discriminant using heterogeneous kernels" In Proceedings of the Twenty-First international Conference on Machine Learning (ICML '04), July 04 - 08, 2004, Banff, Alberta, Canada, vol. 69. ACM Press, New York, NY, 40 (Acceptance Rate: 32%, Oral presentation).

Murat Dundar and David Landgrebe, "A Kernel-based Supervised Classifier for the Analysis of Hyperspectral Data," IEEE Workshop on Advances in Techniques for Analysis of Remotely Sensed Data, Greenbelt MD, October 2003.

Medical/Clinical Conferences:

Murat Dundar, Matthias Wolf, Sarang Lakare, and Marcos Salganicoff, "Training a CAD Classifier with Different Polyp Morphologies for Virtual Colonoscopy", MICCAI 2008 Workshop on Computational and Visualization Challenges in the New Era of Virtual Colonoscopy, September 2008.

Sarang Lakare, Matthias Wolf, Murat Dundar, A. Jerebko, Luca Bogoni, and Marcos Salganicoff, "Evaluation of a Prototype Colonic Polyp Detection System on Polyps Submerged in Tagged Material", European Congress of Radiology, ECR 2008, March 2008, Abstract accepted for oral presentation.

Matthias Wolf, Sarang Lakare, Murat Dundar, Luca Bogoni, and Marcos Salganicoff, "Performance analysis of a CAD system on at, sessile, and pedunculated polyps", European Congress of Radiology, ECR 2008, March 2008. Abstract accepted for oral presentation.

Luca Bogoni, A. Barbu, Sarang Lakare, Murat Dundar, Matthias Wolf, and L. Lu, "Learning based Component for Suppression of False Positives located on the Ileo Cecal Valve: Evaluation of Performance on 802 CTC Cases", In Scientific Assembly and Annual Program of Radiological Society of North America (RSNA), November 2007. Abstract accepted for oral presentation.

Luca Bogoni, Matthias Wolf, Sarang Lakare, Murat Dundar, A. Jerebko, and Marcos Salganicoff, "Automated Polyp Detection: An Evaluation of a CAD System in over 1200 Cases", In Scientific Assembly and Annual Program of Radiological Society of North America (RSNA), November 2007. Abstract accepted for oral presentation.

Luca Bogoni, Matthias Wolf, Sarang Lakare, Murat Dundar, "Automatic polyp detection in over 1000 CTC cases: Clean and tagged performance", European Congress of Radiology, ECR 2007, March 2007. Abstract accepted for oral presentation.

Wolf, Lakare, Dundar, Bogoni, Salganicoff, "Automated polyp detection: An evaluation of a CAD system on flat, sessile, and pedunculated polyps", ISVC 2007

Sarang Lakare, Matthias Wolf, Luca Bogoni, Adrian Barbu, Murat Dundar, Le Lu, Marcos Salganicoff, "Evaluation of a Learning-based Component for Suppression of False Positives Located on the Ileo Cecal Valve or Rectal Tube", ISVC 2007

Murat Dundar, B. Krishnapuram, Matthias Wolf, Sarang Lakare, Luca Bogoni, J. Bi, and R. B. Rao, "Training a CAD classifier with correlated data" Proceedings of SPIE 6514, 65140H (2007)

Matthias Wolf, P. Cathier, Sarang Lakare, Murat Dundar, and Luca Bogoni, "Efficient detection of polyps in CT colonography", Proceedings of SPIE 6514, 651408 (2007)

Sarang Lakare, A. Barbu, Murat Dundar, Matthias Wolf, Luca Bogoni, and D. Comaniciu, "Learning-based Component for Suppression Rectal Tube False Positives: Evaluation of Performance on 780 CTC Cases", In Scientific Assembly and Annual Program of Radiological Society of North America (RSNA), November 2006. Abstract accepted for oral presentation.

Matthias Wolf, A. Krishnan, Marcos Salganicoff, J. Bi, Murat Dundar, G. Fung, J. Stoeckel, S. Periaswamy, H. Shen, P. Herzog, D. P. Naidich, "CAD Performance Analysis for Pulmonary Nodule Detection on Thin-slice MDCT Scans DOC", Computer Assisted Radiology and Surgery (CARS '05), Proceedings of the 19th International Congress and Exhibition Berlin, Germany, June 22 - 25, 2005.

P.Cathier , S.Periaswamy, A.Jerebko, Murat Dundar, J.Liang, G.Fung, J.Stoeckel, T. Venkata, R.Amara, A.Krishnan, B.Rao, A.Gupta, E.Vega, S.Laks, A.Megibow, M.Macari, and L.Bogoni, "CAD for Polyp Detection: an Invaluable Tool to Meet the Increasing Need for Colon-Cancer Screening", Computer Assisted Radiology and Surgery (CARS 04). Proceedings of the 18th International Congress and Exhibition, Chicago, USA, June 23-26, 2004.

Murat Dundar, G. Fung, Luca Bogoni, M. Macari, A. Megibow, B. Rao, "A Methodology for Training and Validating a CAD System and Potential Pitfalls," Computer Assisted Radiology and Surgery (CARS '04). Proceedings of the 18th International Congress and Exhibition, Chicago, USA, June 23-26, 2004.

Luca Bogoni, A. Jerebko, Murat Dundar, J. Lee, M. Baker, M. Macari, "A Multisite Study to Evaluate CAD's Performance in Polyp Detection", In Scientific Assembly and Annual Program of Radiological Society of North America (RSNA), November 2004. Abstract accepted for oral presentation..

Luca Bogoni, A. Jerebko, P. Cathier, S. Periaswamy, Murat Dundar, J. Liang, G. Fung, B. Rao, A. Megibow and M. Macari, "Automatic Polyp Detection: CAD System Performance", 14th Annual Meeting of the European Society of Gastrointesinal and Abdominal Radiology (ESGAR '04), June 15 - 18, Geneva, Switzerland.

Matthias Wolf, A. Krishnan, Marcos Salganicoff, J. Bi, Murat Dundar, G. Fung, J. Stoeckel, S. Periaswamy, H. Shen, P. Herzog, D. P. Naidich, "CAD Performance Analysis for Pulmonary Nodule Detection on Thin-slice MDCT Scans DOC", 14th Annual Meeting of the European Society of Gastrointesinal and Abdominal Radiology (ESGAR '04), June 15 - 18, Geneva, Switzerland.

Patents Filed:

System and method for a sparse kernel expansion for a Bayes classifier
Patent Inventors: **Murat Dundar**, Glenn Fung, Jinbo Bi, R. Bharat Rao
Applicaton #: 20050197980 Class: 706016000 (USPTO)

System and method for an iterative technique to determine fisher discriminant using heterogenous kernels
Patent Inventors: Glenn Fung, **Murat Dundar**, Jinbo Bi, R. Bharat Rao
Applicaton #: 20050177040 Class: 600407000 (USPTO)

System and method for elimination of irrelevant and redundant features to improve Computer Aided Diagnosis performance
Patent Inventor: **Murat Dundar**
Applicaton #: 20050281457 Class: 382159000 (USPTO)

Systems and methods for automated diagnosis and decision support for breast imaging
Inventors: Glenn Fung, Krishnan Sriram, **Murat Dundar**, R. Bharat Rao
Application #: 20050049497

Performance adjustments in medical decision support systems
Patent Inventors: Sriram Krishnan, **Murat Dundar**, R. Bharat Rao
Applicaton #: 20060210133 Class: 382128000 (USPTO)

Characterization of cardiac motion with spatial relationship
Patent Inventors: Maleeha Qazi, Mustafa Kamasak, **Murat Dundar**, Glenn Fung, Sriram Krishnan, R. Bharat Rao
Applicaton #: 20060247544 Class: 600508000 (USPTO)

Systems and methods for multiple instance learning for computer aided detection
Inventors: R. Bharat Rao, **Murat Dundar**, Balaji Krishnapuram, Glenn Fung
Applicaton #: 20070189602

System and method for joint optimization of cascaded classifiers for computer aided detection
Application #: 20080147577 Class: 706 12 (USPTO)
Inventors: **Murat Dundar** and Jinbo Bi

Multiple Instance Logistic Regression with Automatic Feature Selection for Computer Aided Diagnosis of Lung Carcinoma
Inventors: Vikas Raykar, Balaji Krishnapuram, **Murat Dundar**, Bharat Rao

Polyhedral Classifier for Target Detection A Case Study: Colorectal Cancer
Inventors: **Murat Dundar**, Matthias Wolf, Sarang Lakare, Marcos Salganicoff

Professional Activities:

Reviewer for IEEE Transactions on Geoscience and Remote Sensing, Image Processing, Aerospace and Electronic Systems
Outside reviewer for KDD 2004, SIAM 2006
Technical Program Committee for IGARSS 2005, IGARSS 2008

Awards:

Ranked 158th among more than 1,000,000 high school graduates in the university entrance examination in 1993

Awarded a governmental fellowship to pursue graduate studies in US in 1998, ranked in top 20 among over 10,000 participants in the "Examination for Graduate Study Abroad".

Istanbul Chamber of Industry Scholarship, 1994-1997.
Sabanci Foundation Scholarship, 1993-1994
Finans Bank Scholarship, 1994-1997

US Resident Status:

Permanent resident.

References:

Dr. Bharat Rao
Computer Aided Diagnosis & Therapy
Department Head
Siemens Medical Solutions, Inc. USA
Malvern, PA 19355
Phone: 610-448-1655
e-mail: bharat.rao@siemens.com

Dr. Glenn Fung
Senior Scientist
Computer Aided Diagnosis & Therapy
Siemens Medical Solutions, Inc. USA
4909 Woodburn Dr.
Madison WI 53711
Phone: 608-6301884 (C), 608-2787780 (W)
e-mail: glenn.fung@siemens.com

Prof. David Landgrebe
Professor Emeritus
Electrical and Computer Engineering
Purdue University
West Lafayette, IN 47906
Phone:765 494 3486
e-mail: landgreb@ecn.purdue.edu

Prof. Jon Atli Benediktsson
Department of Electrical and Computer Engineering
Editor, IEEE Transactions on Geoscience and Remote Sensing
University of Iceland
Hjardarhaga 2-6
107 Reykjavik
Iceland
Tel. 354-525-4670
Fax. 354-525-4632
e-mail: benedikt@hi.is

Dr. James Theiler
Research Scientist
Los Alamos National Labs., NIS-2
Los Alamos, NM 87545
Phone: 505 665-5682
e-mail: jt@lanl.gov

Dr. Simon Perkins
Vice President for Research & Development
UltraSpectral Inc.
5701 Carmel Ave. NE, Suite C
Albuquerque, NM 87113
Phone: 505-412-2267
e-mail: simon.perkins@ultraspectral.com