Ph.D. Gyemin Lee

Contact Information

University of Michigan
Computer Science Engineering
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Research Interests

Machine Learning, Pattern Recognition, and Statistical Signal Processing
transfer learning, kernel methods, dimension reduction, statistical file matching, support vector machines, optimization, biomedical applications

Academic Appointments

Postdoctoral Research Fellow October 2011–present
Computer Science and Engineering, **University of Michigan**
- Advisor : Prof. Zeeshan Syed, Dr. Hitinder Gurm
- Refining Clinical Predictive Models through Transfer Learning
- One-plus-class Support Vector Machines

Education

University of Michigan, Ann Arbor, Michigan

Ph.D., Electrical Engineering and Computer Science September 2011
- Thesis: "Machine Learning for Flow Cytometry Data Anlaysis"
- Advisor: Prof. Clayton Scott

M.S., Electrical Engineering and Computer Science April 2007
- Major: Signal processing, Minor: Mathematics

Seoul National University, Seoul, Korea

B.S., Electrical Engineering February 2001
- Thesis: "Implementation of H.263 with VHDL" *Graduated Cum Laude*
- Advisor : Prof. Kiyoung Choi

Journal Publications

[J4] **G. Lee** and C. Scott, "EM algorithms for multivariate Gaussian mixture models with truncated and censored data," *Computational Statistics and Data Analysis*, 56(9):2816–2829, 2012.

[J3] **G. Lee**, W. Finn and C. Scott, "Statistical file matching of flow cytometry data," *Journal of Biomedical Informatics*, 44(4):663–676, 2011.

[J2] G. Blanchard, **G. Lee** and C. Scott, "Semi-Supervised Novelty Detection," *Journal of Machine Learning Research (JMLR)*, 11:2973–3009, 2010.

[J1] **G. Lee** and C. Scott, "Nested support vector machines," *IEEE Trans. Signal Processing*, 58(3):1648–1660, 2010.

Conference Publications

[C7] **G. Lee**, I. Rubinfeld and Z. Syed, "Adapting Surgical Models to Individual Hospitals using Transfer Learning," accepted to *IEEE ICDM 2012 workshop on Biological Data Mining and its Applications in Healthcare (BioDM)*, 2012.

[C6] **G. Lee**, H. Gurm and Z. Syed, "Predicting Complications of Percutaneous Coronary Intervention using a Novel Support Vector Method," accepted for oral presentation to *IEEE Conference on Healthcare Informatics, Imaging, and Systems Biology (HISB)*, 2012. **Best Paper Award**.

[C5] C. Chia, Z. Karam, **G. Lee**, I. Rubinfeld, Z. Syed, "Improving Surgical Models through One/Two Class Learning," accepted for oral presentation to *International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, 2012.

[C4] G. Blanchard, **G. Lee** and C. Scott, "Generalizing from Several Related Classification Tasks to a New Unlabeled Sample," *Advances in Neural Information Processing Systems (NIPS)*, pages 2178–2186, 2011.

[C3] **G. Lee**, L. Stoolman and C. Scott, "Transfer Learning for Automatic Gating of Flow Cytometry Data," *JMLR Workshop and Conference Proceedings* 27:155–166, 2012. Also to appear in *Challenges in Machine Learning* series of Microtome. Accepted to *ICML 2011 Workshop on Unsupervised and Transfer Learning* (oral presentation). **Pascal2 Best Student Paper Award**.

[C2] **G. Lee** and C. Scott, "Nested support vector machines," *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2008)*, pages 1985–1988, 2008.

[C1] **G. Lee** and C. Scott, "The one class support vector machine solution path," *Proc. IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2007)*, 2:II-521–II-524, 2007.

Professional Experience

University of Michigan, Ann Arbor, MI
Post Doctoral Research Fellow October 2011–present

- Advisor : Prof. Zeeshan Syed
- Refining Clinical Models though Transfer Learning
  - Refining Clinical Models for Percutaneous Coronary Intervention through Transfer Learning
  - Adapting Surgical Models to Individual Hospitals using Transfer Learning
- One-plus-class Support Vector Machine for highly imbalanced data
- Improving Surgical Models through One/Two Class Learning

GE Global Research Center, Niskayuna, NY
Research Intern June 2011–August 2011

- Software Sciences and Analytics Lab
- Advisor: Ph.D. Sahika Genc
- Predictive alarm for ICU (Intensive Care Unit) patients

University of Michigan, Ann Arbor, MI
Graduate Student Research Assistant July 2006–September 2011

- Advisor : Prof. Clayton Scott
- Machine Learning for Flow Cytometry Data Analysis
  - Transfer Learning for Automatic Gating of Flow Cytometry Data
  - Multivariate Gaussian Mixture Model with Truncated and Censored Data
  - Statistical File Matching of Flow Cytometry Data
- Multiple Set Estimation
  - Nested Support Vector Machines
  - The Solution Path for the Cost-Sensitive Support Vector Machines
  - The One Class Support Vector Machine Solution Path
- Semi-supervised Novelty Detection

Infobank Corp., Seoul, Korea
Engineer January 2001–February 2005

- Developed LG Electronics CDMA mobile handset software for TELUS, Canada
- Developed stock trading systems for PDAs and mobile virtual machine platforms
  - custom UI components, script-based UI builder, and remote update installer
  - Adopted by major Korean security companies: LG Investment & Securities Co., Dong Bu Securities Co., and Mirae Asset Securities Co.
- Developed sales management systems for SK Telecom
- Developed mobile banking systems for Industrial Bank of Korea

Samsung Electronics, Suwon, Korea
Digital ASIC Design Program July 1999

- Designed and built a hardware system of a ping-pong video game including a NTSC signal generator on FPGAs (Altera Max PM7160), and developed a software in VHDL

- Ranked 1st among 15 teams in the project competition

Teaching Experience

University of Michigan, Ann Arbor, MI

Graduate Student Instructor Winter 2009

- EECS 545: Machine Learning
  - Graduate level course on machine learning
  - Responsible for holding office hours, grading exams and project reports, and advising students for class projects
  - Class projects included developing algorithms for separating background and identifying moving objects in video sequences

Academic Projects

- Finding the Number of Clusters using Dirichlet Process Mixture Models Fall 2009
  - Explored the Bayesian nonparametric framework to determine the number of components in parametric mixture models
- Random Linear Feature Extraction and Its Application Fall 2008
  - Investigated non-adaptive dimensionality reduction approach via random linear projection for classification problems
- Phase Retrieval based on Iterative Fourier Transform algorithm Winter 2006
  - Estimated Fourier phase from Fourier modulus using iterative Fourier transform algorithms: ER (Error Reduction), HIO (Hybrid Input-Output), and mixed ER/HIO algorithms

Invited Talks

- IEEE Conference on Healthcare Informatics, Imaging, and Systems Biology 2012
- Kyung Hee University (Korea) CSE 2012
- University of California, LA EE 2012
- US-Korea Conference 2012 2012
- Seoul National University (Korea) ECE 2011
- UNIST (Korea) ECE 2011
- Seoul National University (Korea) BME 2011
- Dankook University (Korea) CS 2011
- Korean-American Scientists and Engineers Association (KSEA) Michigan Chapter Technical Workshop 2011
- Boston University ECE 2011
- ICML 2011 Workshop on Unsupervised and Transfer Learning 2011

Awards and Honors

Best Paper Award, IEEE HISB 2012 2012
Pascal2 Best Student Paper Award, ICML 2011 workshop 2011
Rackham Travel Grant, University of Michigan 2011, 2008, 2007
The Edwin R. Riethmiller Fellowship, University of Michigan 2010
Special Award, Herman Hesse Homepage Contest, Korea 2001
The first prize, Digital ASIC Design Program, Samsung Electronics 1999
Honor Student Scholarship, Seoul National University 1997–2000

Service

Vice President, Korean Student Association–Graduate, University of Michigan 2010
President, Korean EECS Student Association, University of Michigan 2009
Vice President, EE Student Council, Seoul National University 1998–1999

Computer Skills

Programming Languages: **C/C++**, **Java**, VHDL, Assembly (Intel 8051, Motorola 68k)

Software Packages: **MATALB**, R, Microsoft Embedded Visual C++, ARM Developer Suite, Synopsys VHDL System Simulator, Lauterbach Trade32 In-Circuit Debugger

References

Available upon request.