

Michael C. Hughes

CONTACT INFORMATION

Ph.D. student
Department of Computer Science
Brown University
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RESEARCH INTERESTS

Machine learning and computer vision

Bayesian nonparametric models, Markov chain Monte Carlo, online variational inference
action recognition, scene recognition, unsupervised learning, time series models

EDUCATION

Brown University, Providence, RI

Candidate for Ph.D., May 2012 – May 2015 (expected)

M.S., Computer Science, May 2012

- Adviser: [Professor Erik B. Sudderth](#)
- Coursework (4.0 GPA): *Machine Learning, Probabilistic Methods, Computational Linguistics, Nonparametric Bayesian Analysis, Computational Biology, Data-Driven Vision, Design & Analysis of Algorithms, Topics in Security*

Franklin W. Olin College of Engineering, Needham, MA

B.S., Electrical and Computer Engineering, May 2010

- Coursework (3.93 GPA): *Signals and Systems, Software Systems, Linear Algebra, Nonlinear Dynamics and Chaos, Artificial Intelligence, Human Interface Design*

AWARDS

National Science Foundation

- [Graduate Research Fellowship](#), 2011
- Graduate Research Fellowship, Honorable Mention, 2010

American Society for Engineering Education

- [National Defence Science and Engineering \(NDSEG\) Graduate Fellowship](#), 2011
Declined to accept NSF fellowship award.

CONFERENCE PUBLICATIONS

- [1] **Hughes**, M.C., E.B. Fox and E.B. Sudderth. “Effective Split-Merge Monte Carlo Methods for Nonparametric Models of Sequential Data.” To Appear in *Advances in Neural Information Processing Systems (NIPS)* 25, 2012.
- [2] Kim, D., **Hughes**, M.C., and E.B. Sudderth. “[The Nonparametric Metadata-Dependent Relational Model](#).” In *The 29th International Conference on Machine Learning (ICML)*, 2012.

WORKSHOP PUBLICATIONS

- [3] **Hughes**, M.C., and E.B. Sudderth. “[Nonparametric Discovery of Activity Patterns from Video Collections](#).” In *The Eight IEEE Computer Society Workshop on Perceptual Organization in Computer Vision (POCV)*, 2012. Co-located with CVPR.

RESEARCH EXPERIENCE

Unsupervised Activity Discovery in Video Collections, 2011 - 2012

Ph.D. candidacy project, Brown University

- Developed model to segment video into coherent activities without human labels
- Allows relevant activities to be *learned from data*, not specified in advance
- Invented MCMC inference algorithm that effectively proposes large global changes, allowing study of high-dimensional data impossible with conventional methods

Topology Estimation for Multi-Camera Tracking, Summer 2009

MIT Lincoln Laboratory, Lexington, MA.
Homeland Protection and Tactical Systems Division.

- Prototyped multi-camera tracking for facility-wide surveillance in 9-week project
- Developed methods to estimate camera topology without prior knowledge
- Recovered most topological links in 4 camera network from only 8 min. of footage
- Presented results in hour-long, seminar-style talk to full-time research staff

Study on Network Formation Games, Summer 2008

Research In Industrial Projects for Students (RIPS).
Institute for Pure and Applied Mathematics, UCLA.
Sponsored by Microsoft Research Asia, Beijing.

- 2-month theoretical investigation of ad-hoc network formation by selfish agents
- Developed proofs and conjectures about connectivity at Nash equilibria
- Found polynomial time approximation for NP-Hard best response calculation
- Presented poster at NetSci 2010 and prepared unpublished manuscript

Trustworthy Architecture for Distributed Systems, 2009-2010

Senior Capstone Program in Engineering, Olin College.
Sponsored by IBM Research, New York.

- Led 5 students in designing trustworthy systems architecture for smart grid
- Proposed hardware and software requirements and protocols for security
- Mentors: Dr. Mark Sheldon (Olin), Mr. Alex Morrow (IBM Fellow)

Novice Programmer Behavior Research, 2007-2008

Undergraduate Research, Olin College.

- Conducted independent research on programming behavior of novice CS students
- Authored paper accepted in Journal of Computer Science Education
- Mentor: Dr. Matthew Jadud

SKILLS

Programming Languages

Proficient: Matlab, Python
Capable: C++, C, Java, R

Numerical Libraries

Python: Scipy, Numpy
C++: Eigen, OpenCV

CITIZENSHIP

U.S.A.

PROFESSIONAL SERVICE

Journal Reviewer

Transactions on Pattern Analysis and Machine Intelligence (PAMI)
Special Edition: Bayesian Nonparametrics

Conference Reviewer

International Conference on Robotics and Automation (ICRA) 2013