Kirstin Early

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RESEARCH INTERESTS

Machine learning applied to social challenges; adaptive survey design; cost-effective data collection

EDUCATION

Carnegie Mellon University, Pittsburgh, PA

Ph.D., Machine Learning, August 2017
- Dynamic Question Ordering: Obtaining Useful Information while Reducing Burden
- Research advisors: Jennifer Mankoff, Stephen Fienberg

M.S., Machine Learning, December 2015
- Cost-Effective Feature Selection and Ordering for Personalized Energy Estimates

Vanderbilt University, Nashville, TN

Bachelor of Science, *summa cum laude*, 2012
- Majors: Computer Science (with honors), Classics, Mathematics
- Research advisor: Douglas Fisher

RESEARCH EXPERIENCE

Carnegie Mellon University

Dynamic Question Ordering   2014 – present
Studying how ordering questions in data collection can improve prediction and survey outcomes while minimizing respondent burden.
Supervisors: Jennifer Mankoff and Stephen Fienberg

Gender and Authorship in Computer Science   2015 – present
Examining differences in gender as related to productivity, influence, and collaboration in CS publications over time.
Supervisors: Jennifer Mankoff and Jessica Hammer

Energy Disaggregation   2012 – 2014
Researched data-driven techniques to extract and classify device power signatures from building-level power signals in an unsupervised manner.
Supervisor: J. Zico Kolter

Vanderbilt University

Environmental Sustainability in Virtual Worlds   2011 – 2012
Explored machine learning with textual data in the context of designing a virtual world to represent student-submitted items on environmental sustainability.
Supervisors: Douglas Fisher (Vanderbilt University) and Mary Lou Maher (University of Maryland)

École Polytechnique Fédérale de Lausanne

Collection Protocols in Wireless Sensor Networks   Summer 2011
Designed and implemented collection protocols for wireless sensor networks with the Laboratory of Algorithmic Research on Networked Information.
Supervisor: Christina Fragouli

WORK EXPERIENCE

Verdigris Technologies

Machine Learning Intern   Summer 2013
Developed machine learning algorithms to classify categories of electrical devices observed by Verdigris's circuit panel-monitoring hardware.
Supervisors: Mark Chung, Jonathan Chu, Zico Kolter

Publications

1. K. Early, S. Fienberg, J. Mankoff. "Test-time feature ordering with FOCUS: Interactive predictions with minimal user burden." In *Proceedings of 2016 ACM Conference on Pervasive and Ubiquitous Computing* (2016).
   Honorable mention: Top 5% of submissions.

2. K. Early, J. Mankoff, S. Fienberg. "Dynamic question ordering in online surveys." *Journal of Official Statistics* (2017).

3. K. Early, S. Fienberg, J. Mankoff. "Dynamic question ordering in survey scoring: Measuring respondents' attitudes with low burden." *In submission* (2017).

4. K. Early, A. Wong, J. Hammer, J. Mankoff. "Understanding gender equity in author order assignment" *In submission* (2017).

5. D. Onafuwa, K. Early, V. Kamath, V. Ramkrishnan, N. Vyas, O. Kohanteb, S. Fienberg, J. Mankoff. "The socio-technical needs of prospective tenants." *In submission* (2017).

6. K. Early, S. Fienberg, J. Mankoff. "Cost-effective feature selection and ordering for personalized energy estimates." In *Workshops at the Thirtieth AAAI Conference on Artificial Intelligence* (2016).

7. K. Early, J. Z. Kolter. "An additive autoregressive hidden Markov model for energy disaggregation." In *Workshops at the Twenty-Ninth AAAI Conference on Artificial Intelligence* (2015).

8. J. Chemali, K. Early, W. Neiswanger. "Exploring penalized estimation for structured binary data." In *Women in Machine Learning Workshop at Neural Information Processing Systems (NIPS)* (2014).

Invited Talks

American Statistical Association   2016
International Conference on Questionnaire Design, Development, Evaluation, and Testing: "Dynamic Question Ordering in Online Surveys"

Honors and Awards

Census Dissertation Fellowship	2017
Machine Learning Department TA Award	2017
Dean's Award for Outstanding Scholarship	2012
Computer Science Award	2012
Wilson L. and Nellie Pyle Miser Award	2012

Selected by the faculty of the School of Engineering as the senior student "to have excelled in all aspects of mathematics during the student's undergraduate career."

Dean's List	2009 – 2012
Phi Beta Kappa	2012
Tau Beta Pi	2011
Cornelius Vanderbilt Scholarship	2008 – 2012
Valedictorian	2008
National AP Scholar	2008

Professional Service

Reviewer
    Proceedings of the ACM on Interactive, Multimedia, Wearable and Ubiquitous Technologies (IMWUT)   2017
    UbiComp   2015
Student Volunteer
    International Conference on Machine Learning (ICML)   2016
    AAAI Conference on Artificial Intelligence   2016

Technical Program Committee
Second International Workshop on Non-Intrusive Load Monitoring 2014

DEPARTMENT SERVICE	Admissions Committee Member 2017

Worked with faculty and other students to consider applicants to the MLD masters program.
Speaking Skills Committee Member 2015 – 2017
Evaluate Ph.D. students on their speaking skills requirement.
MLD Student Research Symposium Committee Member 2014
Organized a department symposium that included student and faculty research spotlight talks, a poster session, and a faculty panel.

OUTREACH AND LEADERSHIP

Women@SCS Volunteer 2012 – 2017
Plan and execute TechNights, a weekly program at CMU to introduce middle-school girls to the excitement of computer science.
Women@SCS Sisters Mentoring Program 2012 – 2017
Mentor undergraduate and junior graduate women in the School of Computer Science.
OurCS Organizing Committee Member 2015
Organized and executed a three-day workshop for undergraduate women to learn about research in computer science.
Vanderbilt Students Volunteer for Science 2009 – 2012
Prepared and presented science lessons and experiments for elementary, middle, and high school students in inner-city Nashville schools.

GRADUATE COURSEWORK

Introduction to Machine Learning, Intermediate Statistics, Computational Methods in Sustainable Energy, Statistical Machine Learning, Algorithms in the Real World, Multimedia Databases and Data Mining, Convex Optimization, Probabilistic Graphical Models, Statistics Journal Club, Machine Learning Journal Club

TEACHING

Teaching Assistant for 10-401: Introduction to Machine Learning, undergraduate-level
Instructors: Aarti Singh and Barnabás Póczos Spring 2016
Teaching Assistant for 10-601: Introduction to Machine Learning, masters-level
Instructors: Tom Mitchell and Nina Balcan Spring 2015
As a TA, I prepared homeworks and exams, mentored student projects, led recitations, held office hours, and graded.

PROGRAMMING

MATLAB, C/C++, Python, R, SQL, Java, LaTeX