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RESEARCH STATEMENT

My research interests are in designing new approaches to enable effective end-user interactive machine learning. While developers skilled in statistical machine learning have been successful in building intelligent systems to enhance human productivity and capabilities with large unstructured data sets, a fundamental limitation of relying on developers to provide these capabilities is that developers cannot possibly foresee the countless variety of distinctions end-users might want to make within large datasets in pursuit of their every day goals. A promising solution, therefore, is to enable people to interactively train machine learning systems themselves. Recent work has shown that we can create end-user interactive machine learning systems for specific applications. However, a better understanding is needed of ***how to design effective interaction with interactive machine learning systems***. I am examining this question in a variety of interactive machine learning systems, aiming to broaden interaction with large unstructured data and to accelerate the integration of intelligent computing into our everyday lives.

EDUCATION

Ph.D. Computer Science, expected July 2012 **-** GPA 3.7
University of Washington (UW)
January, 2007 – Present
Advisor: Prof. James Fogarty

M.Sc. Computer Science
University of British Columbia (UBC) – GPA 3.8
September, 2004 – December, 2006
Thesis: *Combining Unsupervised and Supervised Machine Learning to Build User Models for Intelligent Learning Environments*
Advisor: Prof. Cristina Conati

B.Sc. Computer Science
B.Sc. Mathematics
University of British Columbia (UBC) – GPA 3.7
September, 1999 – May, 2004

REFEREED ARTICLES

[P.13] **Amershi, S.**, Fogarty, J., Kapoor, A. and Tan, D. (2010) Examining Multiple Potential Models in End-User Interactive Concept Learning. Submitted To *The ACM Conference on Human Factors in Computing Systems* (CHI 2010).

[P.12] **Amershi, S.** and Conati. C. (2010) Combining Unsupervised and Supervised Machine Learning to Model Students in Exploratory Learning Environments. Submitted To *The Handbook of Educational Data Mining.* Data Mining and Knowledge Discovery Series (eds. R. Cohen and V. Kumar), Chapman & Hall/CRC Press.

[P.11] **Amershi, S.**, Morris, M. R., Moraveji, N., Balakrishnan, R., and Toyama, K. (2010) Multiple Mouse Text Entry for Single-Display Groupware. To Appear In *Proceeding of the ACM Conference on Computer Supported Cooperative Work* (CSCW 2010). (Acceptance rate: 20%; To be presented orally).
Best Paper Nominee.

[P.10] **Amershi, S.**, Fogarty, J., Kapoor, A. and Tan, D. (2009) Overview-Based Examples Selection in Mixed-Initiative Interactive Concept Learning. To Appear In *Proceeding of the ACM Symposium on User Interface Software and Technology* (UIST 2009). (Acceptance rate: 17%; Presented orally).

[P.9] **Amershi, S.** and Conati, C. (2009) Combining Unsupervised and Supervised Machine Learning to Build User Models for Exploratory Learning Environments. To Appear In *The Journal of Educational Data Mining* (JEDM 2009).

[P.8] Hoffmann, R., **Amershi, S.**, Patel, K., Wu, F., Fogarty, J., and Weld, D.S. (2009) Amplifying Community Content Creation with Mixed-Initiative Information Extraction. To Appear In *Proceedings of the ACM Conference on Human Factors in Computing Systems* (CHI 2009). (Acceptance rate: 24%) ***Best Paper Nominee***.

[P.7] Weld, D.S., Wu, F., Adar, E., **Amershi, S.**, Fogarty, J., Hoffmann, R., Patel, K., and Skinner, M. (2008) Intelligence in Wikipedia. *Proceedings of the AAAI Conference on Artificial Intelligence* (AAAI 08), Senior Papers Track, pp. 1609-1614. (Acceptance rate: 40%)

[P.6] **Amershi, S.** and Morris, M.R. (2008) CoSearch: A System for Co-located Collaborative Web Search. *Proceedings of the ACM Conference on Human Factors in Computing Systems* (CHI 2008), pp. 1647-1656. (Acceptance rate: 22%; Presented orally).

[P.5] **Amershi, S.**, Carenini, G., Conati, C., Mackworth, A., and Poole, D. (2008) Pedagogy and Usability in Interactive Algorithm Visualizations - Designing and Evaluating CIspace. *Interacting with Computers - The Interdisciplinary Journal of Human-Computer Interaction 20* (1): pp. 64-96.

[P.4] Conati, C., Merten, C., **Amershi, S.**, and Muldner, K. (2007) Using Eye-tracking Data for High-Level User Modeling in Adaptive Interfaces. *Proceedings of the AAAI Conference on Artificial Intelligence* (AAAI 07), Nectar Track pp. 1614-1617. (Acceptance rate: 17%).

[P.3] **Amershi, S.** and Conati, C. (2007) Unsupervised and Supervised Machine Learning in User Modeling for Intelligent Learning Environments. *Proceedings of the ACM/SIGCHI Conference on Intelligent User Interfaces* (IUI 2007), pp. 72-81. (Acceptance rate: 22%; Presented orally).

[P.2] **Amershi, S.** and Conati, C. (2006) Automatic Recognition of Learner Groups in Exploratory Learning Environments. *Proceedings of Intelligent Tutoring Systems* (ITS 2006), pp. 463-472. (Acceptance rate: 32%; Presented orally).

[P.1] **Amershi, S.**, Arksey, N., Carenini, G., Conati, C., Mackworth, A., Maclaren, H., and Poole, D. (2005) Designing CIspace: Pedagogy and Usability in a Learning Environment for AI. *Proceedings of the ACM/SIGCSE Conference on Innovation and Technology in Computer Science Education* (ITiCSE 2005), pp. 178-182. (Acceptance rate: 33%; Presented orally).

REFEREED WORKSHOP PAPERS

[W.3] **Amershi, S.** and Morris, M.R. (2008) CoSearch: Leveraging Multiple Devices to Enhance Collaboration in Resource-Constrained Environments. *The ACM Conference on Human Factors in Computing Systems Workshop on HCI for Community and International Development* (CHI 2008). (Presented orally).

[W.2] Morris, M.R. and **Amershi, S.** (2008) Shared Sensemaking: Enhancing the Value of Collaborative Web Search Tools. *The ACM Conference on Human Factors in Computing Systems Workshop on Sensemaking* (CHI 2008).

[W.1] **Amershi, S.**, Conati, C. and Maclaren, H. (2006) Using Feature Selection and Unsupervised Clustering to Identify Affective Expressions in Educational Games. In Proceedings of *The Intelligent Tutoring Systems Workshop on Motivational and Affective Issues in ITS* (ITS 2006), pp. 21-28. (Presented orally).

REFEREED DEMOS AND POSTERS

[D.3] **Amershi, S.** and Morris, M.R. (2009) Co-located Collaborative Web Search: Understanding Status Quo Practices. *The ACM Conference on Human Factors in Computing Systems – Extended Abstracts* (CHI 2009).

[D.2] Hoffmann, R., **Amershi, S.**, Patel, K., Wu, F., Fogarty, J., and Weld, D.S. (2008) Amplifying Community Content Creation with Mixed-Initiative Information Extraction. *The ACM Symposium on User Interface Software and Technology* (UIST 2008).

[D.1] **Amershi, S.**, Morris, M.R. (2009) CoSearch: A System for Co-located Collaborative Web Search. *Microsoft Research's TechFest* (TechFest 2008).

PATENTS

[T.3] Morris, M.R., **Amershi, S.**, Moraveji, N. and Balakrishnan, R. (2009) Multiple Mouse Character Entry. Pending

[T.2] **Amershi, S.** and Morris, M.R. (2008) System and Interface for Co-located Collaborative Web Search. Pending.

[T.1] Morris, M.R., Teevan, J., **Amershi, S.**, and Mickens, J. (2008) Using Related Users' Data to Enhance Web Search. Pending.

SELECTED PRESS

[S.3] Searching as a Team. *MIT Technology Review*, March 2008. http://www.technologyreview.com/Infotech/20405/?nlid=936&a=f

[S.2] Microsoft Research Shows New Search Projects. *Seattle Post-Intelligencer*, March 2008. http://blog.seattlepi.nwsource.com/microsoft/archives/133413.asp

[S.1] Microsoft Shows Off Collaborative Search Tools. *InfoWorld*, March 2008. http://www.infoworld.com/article/08/03/04/Microsoft-shows-off-collaborative-search-tools_1.html

RESEARCH EXPERIENCE

Research Assistant, University of Washington, WA
September, 2008 – Present, Advisor: James Fogarty
Investigating the design of effective strategies for end-user interaction with machine learning systems. Designed and evaluated methods for guiding the selection of effective training examples [P.10] and for comparing multiple potential models during the end-user interactive machine learning process [P.13].

Research Internship, Microsoft Research India, Bangalore, India
July, 2008 – September, 2008, Supervisor: Kentaro Toyama
Explored the design space of mouse-based text entry techniques for single-display groupware systems used in underserved classrooms in rural India. Developed 13 techniques with novel characteristics suited to the multiple-mouse scenario and evaluated these in a three-phase study over 14 days with 40 students in two developing region educational institutions. [P.11], [T.3].

Research Assistant, University of Washington, WA
September, 2007 – June, 2008, Advisor: James Fogarty
Collaborated on a project exploring the synergistic pairing of community content creation and information extraction systems. Demonstrated this synergy in the context of Wikipedia infoboxes and an information extraction system. Conducted interviews with Wikipedia experts to understand behaviours of Wikipedia contributors, designed interfaces for enabling and encouraging contributions as a non-primary task, and evaluated these designs in both a laboratory setting and real world setting. [P.8], [P.7].

Research Internship, Microsoft Research, Redmond, WA
June, 2007 – August, 2007, Supervisor: Merrie Morris
Developed CoSearch, a tool for co-located collaborative web search in resource constrained environments. Conducted formative investigations and interviews on current co-located search practices, developed CoSearch which uses multiple mice and mobile phones in addition to a shared PC to facilitate search collaboration, and formally evaluated CoSearch compared to status-quo co-located search practices. [P.6], [W.3], [W.2], [D.2], [D.1], [T.2], [S.3], [S.2], [S.1].

Research Assistant, Laboratory for Computational Intelligence, UBC
September, 2005 – December, 2006, Advisor: Prof. Cristina Conati
Developed a machine learning framework for building user models for adaptive technologies that reduces the development costs traditionally associated with user modeling. Empirically evaluated the user models built, via the framework, for two pedagogical systems [P.12], [P.9], [P.4], [P.3], [P.2]. Researched the use of machine learning for identifying patterns of biometric expressions of students learning with an educational game [W.1].

Research Assistant, Laboratory for Computational Intelligence, UBC
May, 2003 – August, 2005, Advisors: Prof. Alan Mackworth and Prof. David Poole
Managed an ongoing and collaborative research and development project, called AIspace (www.aispace.org), centered around Java applets for visualizing and learning about Artificial Intelligence (AI) algorithms. Carried out a complete renovation of AIspace including redesigning user interfaces, increasing functionality, and supplementing help with video tutorials. Conducted several formal pedagogical and usability evaluations. AIspace continues to complement course material in AI courses offered at UBC and several universities worldwide. The design principles, development process and evaluation results can be found in [P.5], [P.1].

TEACHING EXPERIENCE

Teaching Assistant, Dept. of Computer Science and Engineering, UW
Course: Advanced Topics in Human-Computer Interaction (CSE 510)
March, 2007 – June, 2007, Instructor: Prof. James Fogarty
Helped advise group projects in human-computer interaction, created assignments, graded and managed records.

Teaching Assistant, Dept. of Computer Science and Engineering, UW
Course: Software Engineering Course (CSE 403)
January, 2007 – March, 2007, Instructor: Marty Stepp
Prepared and conducted tutorial sessions on software engineering principles and design, helped supervise large group projects, graded and managed records.

Tutor (Math, Physics, Chemistry, and English), Alma Mater Society (AMS) Tutoring Services, UBC
October, 2001 – April, 2003, Supervisor: Jessica Young
Assisted undergraduate students in theoretical comprehension and problem solving. Helped students improve writing style and composition for creative essays and technical papers.

Undergraduate Teaching Assistant, Dept. of Computer Science, UBC
Course: Software Development (CS 219)
May, 2002 – August, 2002, Instructor: Andrew Warfield
Instructed students in software development and programming during laboratory sessions, and assisted students with assignments and projects.

PROFESSIONAL SERVICE

Assistant to CHI 2011 General Chair, CHI 2011
July 2009-Present

AAAI 2010 Spring Symposium on Artificial Intelligence for Development (AI-D) Organizing Committee Member, AAAI 2010
March 2010

Paper Reviewer
CHI 2010
IEEE Pervasive Computing – Special Issue on Smarter Phones 2009
Pervasive 2009
CHI 2009
UIST 2008
CHI 2008

UIST 2009 Student Volunteer Co-Chair, UIST 2009
October 2009

IJCAI 2009 Workshop on Intelligence and Interaction Student Volunteer, IJCAI 2009-10-09
July 2009

DUB Student Coordinator, UW
January 2008-July 2009
Organized and managed the DUB group and seminar on HCI and Design. DUB is an interdisciplinary seminar on that includes 100+ faculty, graduate students and industry researchers from Computer Science, Technical Communications, the Information School, DXARTS, and other departments on campus and local industrial research labs (e.g., Intel Research, Microsoft Research). My responsibilities included encouraging collaboration across departments and research institutions, creating awareness about the DUB group on campus, at related research and academic institutions, and at relevant conferences, and scheduling and inviting speakers internal and external to UW.

UIST 2008 Student Volunteer, UIST 2008
October 2008

Survey Coordinator, UW CSE
June 2008-June 2009
Created, distributed and analysed department wide survey on graduate student life in the Computer Science & Engineering department at UW.

Prospective Student Committee Member, UW CSE
January 2008 – March 2008
Helped coordinate the UW CSE prospective student visit days, including organizing the HCI research group meeting where HCI faculty and students presented ongoing research, coordinating a poster session for visiting students to learn about research within the department, and scheduling meetings for visiting students.

OUTREACH SERVICE

Women in Computer Science and Technology Speaker, Vancouver, BC
2006, 2004
Spoke to an audience of female high school students about my experiences as a woman in the male dominated field of Computer Science, with the goal of encouraging females to pursue education in Computer Science and Technology.

Student Science Teacher, The Learning Centre, Burnaby, BC
2001-2002
Taught remedial weekend classes in math and science to elementary and high school students in the local area.

Science Fair Judge, Inman Elementary and Burnaby South Secondary School, Burnaby, BC
1999-2002

Math Workshop Coordinator, Marlboro Elementary School, Burnaby, BC.
1999
Organized and ran math workshops for elementary school students in advanced math classes.

HONORS AND AWARDS

2009	Google Anita Borg Scholarship Recipient ($10,000 US), National Research Award
2009	Google Workshop for Women Engineers Invitee
2009	Microsoft Research/Live Labs PhD Fellowship Finalist, Institutional Fellowship
2007-2008	Microsoft Endowed Fellowship ($18,000 US), Institutional Academic Fellowship
2005-2006	University Graduate Fellowship ($16,000 CAD), Institutional Academic Fellowship
2004	NSERC Undergraduate Research Award ($10,000 CAD), National Research Award
2003	NSERC Undergraduate Research Award ($10,000 CAD), National Research Award
1999-2003	Dean's Honor List
2001-2002	Undergraduate Scholars Program ($2,500 CAD), Institutional Academic Scholarship
2001	Golden Key International Honor Society, Lifetime Member
2000-2001	Undergraduate Scholars Program ($2,500 CAD), Institutional Academic Scholarship
1999-2000	BC Government Scholarship ($1,000), Provincial Academic Scholarship