Walter D. Bennette

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Education

Iowa State University — Ames, IA
August 2011-Expected May 2014

PH.D in Industrial Engineering with a minor in Statistics (Current GPA: 3.86)
Awards and Activities: SMART scholarship, Engineering Fee Task Force, College of Engineering Dean's Budget and Planning Advisory Council, Preparing Future Faculty Program

Iowa State University — Ames, IA
August 2009-May 2011

Master of Science in Industrial Engineering (GPA: 3.93)
Awards and Activities: Cowell Fellowship, Engineering Graduate Student Dean's Advisory Board, Engineering Fee Task Force, College of Engineering Dean's Budget and Planning Advisory Council

Lake Superior State University — Sault Ste. Marie, MI
August 2005-May 2009

Bachelor of Science in Mathematics (Graduated Cum Laude, GPA: 3.687)
Minor in Mechanical Engineering
Awards: Board of Trustees Distinguished Scholarship, Rotary Scholarship, Wal-Mart Scholarship, and Franklin F. Otis Memorial Scholarship.

Research Experience

Integer Programming for Instance Selection in Supervised Learning
September 2012-Present

Aspects of a classification algorithm's training dataset may negatively affect the ability of the classifier to make accurate class predictions. For example, class values may overlap, classes may have outliers, or minority classes may be ignored. This project introduces instance selection techniques that utilize integer programming to select a subset of the data in such a way that all or some classification learning algorithms will perform better when applied to the new and reduced training dataset. This project will join optimization theory and data mining to form a theoretically robust and solvable formulation of instance selection.

Instance Selection for Improved Classifier Performance
May 2011-August 2012

Developing a unique approach for improving simple classification algorithms through the application of instance selection. Past techniques complicate classifier models or have prohibitively large search spaces to find sufficiently improved classifiers. This technique simplifies models and reduces the required search space. Extensively use data mining software, R, and some Java to perform experiments as well as analyze results. This project is under review for journal publication.

Research Experience (continued)

Instance Selection for Interpretable Decision Tree
January 2010-May 2011

Decision trees are used to predict the dependent variable of a data point (an instance) based on the values of the data point's independent variables. Decision trees are an attractive data mining algorithm because they are intuitive to human users. However, decision trees may become too large and then are not interpretable. This can defeat their primary purpose. Through the unique application of optimization techniques to the dataset from which the decision tree is built, decision tree size can be significantly reduced and predictive accuracy increased. This project introduced a new technique to data mining for improving the interpretability of decision trees and improving overall decision tree predictive accuracy.

Work Experience

SMART Scholarship: Recruitment Participant — Rome, NY
01 August 2011-Present

Science, Mathematics and Research for Transformation (SMART) scholar. Perform summer internships and have service commitment at an Air Force Research Lab (AFRL) in return for full school tuition and annual stipend. Have current internship at AFRL/RI with the National Operational Environment Model (NOEM) research group. Perform independent verification of NOEM's critical infrastructure modules; ensure that the model reflects programmer's vision. Major tasks include finding and reporting errors in code, creating a verification document for NOEM's customers, and developing testing procedures.

ITT Exelis: Computer Programming Intern — Rome, NY
10 August 2012-15 February 2013

Continue SMART scholarship summer internship duties for the National Operational Environment Model (NOEM) research group. Work remotely and perform independent verification of NOEM's critical infrastructure modules; ensure that the model reflects programmer's vision. Major tasks include finding and reporting errors in code, creating a verification document for NOEM's customers, and developing testing procedures.

SUNY IT: AFRL/RI Intern — Rome, NY
May 2011-August 2011

Summer intern for the National Operational Environment Model (NOEM) research group at AFRL/RI. Helped perform a sensitivity analysis pilot study and delivered several sensitivity analysis options, including a novel approach of visualizing results via decision tree. Worked with several group members to accomplish this pilot study. Results were later incorporated into the NOEM, and the decision tree technique is being organized as part of a book chapter.

Iowa State University: Teacher and Research Assistant — Ames, IA
August 2009-May 2011

Teacher's assistant for IE 413 Introduction to Stochastic Modeling. Hold office hours for students where they receive clarification on classroom material, aid in learning software, and help with modeling assignments. Grade weekly reports for 60 students and provide feedback to guide towards better report writing. Research Assistant for Dr. Sigurdur Olafsson. Investigate data mining, optimization, and scheduling techniques. Collaborate with research team to identify new research areas, construct and execute research plans.

Work Experience (continued)

Space and Naval Warfare Systems Command: NREIP Intern San Diego, CA
June 2010-August 2010

Summer intern for the communication and information sciences department at SSC Pacific. Research goal was to search for a relationship between ocean acoustics and seismic events from coastal earthquakes. Took advantage of signal processing and seismic theory to devise a classification scheme of recorded ocean acoustics. Presented a technical brief to department researchers and visiting faculty. Designed and presented an informational poster upon conclusion of internship at a base wide event.

Publications

J. Salerno, J. Smith, W. Geiler, P. McCabe, A. Panasyuk, W. Bennette, A. Kwiat, "The NOEM: A Tool for Understanding/Exploring the Complexities of Today's Operational Environment" Handbook of Computational Approaches to Counterterrorism, Springer 2013, pp. 363-400.

W. Bennette and S. Olafsson, "Instance selection for improved classifier performance", 2012 (submitted for review).

Skills

Through the courses and projects undertaken in my graduate studies I have gained a proficiency in simulation and simulation output analysis, mathematical modeling and solution techniques, network analysis (graph theory), scheduling theory, statistical methods and theory, and data mining.

To complement the above skills I am proficient in R (statistical computing language), Weka (data mining software), CPLEX Optimization Studio, MATLAB and Arena Simulation Software. I also utilize Java in research.