

Richard J. Burns

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Research Interests

Artificial intelligence, natural language processing, machine learning, cognitive science.

Education

- **University of Delaware**
Department of Computer and Information Sciences
Third Year Ph.D. Candidate
Passed Preliminary Examination **January 2008**
Advisor: Dr. Sandra Carberry
- **University of Delaware**
Department of Computer and Information Sciences
M.S., Computer Science **May 2008**
GPA: 3.83 [10 courses]
- **Saint Joseph's University**
Department of Mathematics and Computer Science
B.A., Computer Science **May 2006**
Minor: Mathematics
GPA: 3.68/3.81 (cumulative / major [16 courses])
Departmental Honors
Thesis: "Use of natural language processing to improve use cases"
Dean's List: Spring 2003 - Spring 2004, Spring 2005, Spring 2006

Honors and Awards

- Full graduate support provided by University of Delaware
- Saint Joseph's University: graduated Cum Laude with Departmental Honors

Publications

- **Richard Burns**, Sandra Carberry and Stephanie Elzer. Modeling Relative Task Effort for Grouped Bar Charts. Cognitive Science 2009. To appear.

- **Richard Burns**, Sandra Carberry and Stephanie Elzer. Processing Information Graphics in Multimodal Documents. Papers from the AAAI Fall Symposium: Multimedia Information Extraction, Technical Report FS-08-05, pp. 5-9, 2008.

Abstract: Information graphics, such as bar charts, grouped bar charts, and line graphs, are an important component of multimodal documents and cannot be ignored. When such graphics appear in popular media, such as magazines and newspapers, they generally have an intended message. We argue that this message represents a brief summary of the graphic's high-level content, and thus can serve as the basis for more robust information extraction from multimodal documents. The paper describes our methodology for automatically recognizing the intended message of an information graphic, with a focus on grouped bar charts.

- **Richard Burns**, Stephanie Elzer and Sandra Carberry. Estimating Effort for Trend Messages in Grouped Bar Charts. Proceedings of the International Conference on the Theory and Application of Diagrams, pp. 353-356, 2008.

Abstract: Information graphics found in popular media contain communicative signals which help the viewer infer the graphic designer's intended message. One signal is the relative effort required for different recognition tasks. This paper presents a model of the effort required to recognize a trend in a grouped bar chart. The model is developed using the ACT-R cognitive framework and validated via eye tracking experiments.

- Stephanie Elzer, **Richard Burns** and Sandra Carberry. The Role of Cognitive Modeling in an Automated System for Understanding Bar Charts. Spatial Cognition (SC '08), Proceedings of the Workshop on Cognitive Models of Human Spatial Reasoning, pp. 1-6, 2008.

Abstract: Information graphics (such as line graphs, bar charts, and pie charts) are an inherently visual medium which relies on a viewer's spatial reasoning abilities to facilitate the comprehension of complex data. Our research group has developed an automated system for understanding the intended message of simple bar charts, and we are currently working to expand this system to handle more complex types of information graphics. A key component of our system is a cognitive model for estimating the effort required to perform various tasks within a given information graphic. This novel application of cognitive modeling (including spatial reasoning) within an artificial intelligence framework represents a promising example of the potential synergy between these fields.

Presentations

- Spring 2009 Cognitive Science Graduate Student Conference, University of Delaware

Posters

- Fall 2008 Computer Science Research Day, University of Delaware
- Spring 2008 Computer Science Research Day, University of Delaware

Meetings Attended

- Spring 2009 Cognitive Science Graduate Student Conference, University of Delaware
- Fall 2008 Computer Science Research Day, University of Delaware
- 2008 AAAI Fall Symposium on Multimedia Information Extraction in Arlington, Virginia
- 2008 Diagrams (Fifth International Conference on the Theory and Application of Diagrams) in Hirsching, Germany

- 2008 ACT-R Summer School at Carnegie Mellon University in Pittsburgh, Pennsylvania
- Spring 2008 Computer Science Research Day, University of Delaware
- 2006 CSEET (19th Conference on Software Engineering Education and Training) in Oahu, Hawaii

Teaching, Academics

- **Research Assistant** **Summer 2009**
University of Delaware
Advisor: Dr. Sandra Carberry
- **Teaching Assistant** **Spring 2009**
University of Delaware
 CISC 489/689: Information Retrieval.
Instructor: Dr. Benjamin Carterette
- **Teaching Assistant** **Spring 2009**
University of Delaware
 CISC 320: Introduction to Algorithms.
Instructor: Dr. Jingyi Yu
- **Research Assistant** **Spring 2007 - Fall 2008**
University of Delaware
Advisor: Dr. Sandra Carberry
- **Teaching Assistant** **Fall 2006**
University of Delaware
 CISC 105: Introduction to Computer Science.
Instructor: Dr. Terry Harvey
- **Graduate Assistant** **Summer 2006**
Center of Visualization, Saint Joseph's University
 Authored test bank for *Learning to Program with Alice* textbook.
- **Teaching Assistant** **Spring 2006**
Saint Joseph's University
 CSC 2301: Data Structures.
- **Teaching Assistant** **Fall 2005**
Saint Joseph's University
 CSC 1401: Introduction to Java.
- **Teaching Assistant** **Spring 2005**
Saint Joseph's University
 CSC 1601: Intermediate Computer Science.
- **Teaching Assistant** **Fall 2004**
Saint Joseph's University
 CSC 1401: Introduction to Java.

Semi-Professional Experience

- Managing Editor, News Editor** **Spring 2004 - Fall 2005**
The Hawk, student newspaper, Saint Joseph's University
 Responsible for management of entire newspaper staff and execution of all stories. Managed all advertising and business aspects of paper. Generated over \$60,000 in revenue through advertising, an increase of \$45,000

from the previous year. Initiated web-publishing of newspaper at www.SJUHawkNews.com. Responsible for staff editorials, design and content of news section, and execution of news stories.

Membership in Societies

- AAAI, Association for the Advancement of Artificial Intelligence
- Member of Upsilon Pi Epsilon, Saint Joseph's University Chapter
- Member of Sigma Xi, Saint Joseph's University Chapter
- Vice President of Upsilon Pi Epsilon, Saint Joseph's University Chapter, 2005

Extramural Professional Activities

Participated in 2004, 2005 ACM programming contests

Hobbies

- Liturgical organist.
- Part-time musician: keyboard and piano.
- Little league baseball umpire, and men's adult softball aspiring athlete.
- Graduated member of SJU Pep Band, SJU Jazz Ensemble.

References

- Dr. Sandra Carberry, carberry@cis.udel.edu, Professor, Computer and Information Sciences Department, University of Delaware
- Dr. Jonathan Hodgson, jhodgson@sju.edu, Professor, Math and Computer Science Department, Saint Joseph's University
- Dr. Stephen Cooper, scooper@sju.edu, Associate Professor, Math and Computer Science Department, Saint Joseph's University