DePaul University – College of Computing and Digital Media
School of Computer Science Research Colloquium Winter 2011

organized by Jose P. Zagal

January 7

Elizabeth J. Durango-Cohen, Illinois Institute of Technology

Modeling Member Contribution Behavior in Public-Broadcasting Fundraising

Funding pressures have forced public radio, as well as other not-for-profit organizations, to reduce their reliance on mass-marketing efforts, e.g., pledge drives, and increase the volume and sophistication of their direct marketing activities. In contrast to pledge drives, direct-marketing is viewed as a less disruptive (to programming), lower cost, and potentially higher margin alternative. In this talk, we present a model-based probabilistic framework to segment the donor population of a public radio station in the Midwest of the United States. The managerial aim of this work is to understand the distribution of member contributions, identify behavioral drivers that influence contributions (eg., suggested membership levels), and capture the behavior of members (eg., how contributions evolve over time) in different segments. Collectively, we believe, these behavioral insights can allow the station to develop more successful direct marketing strategies.

We derive and implement two instances of the EM Algorithm to cluster members based on annual contributions, and based on dynamic giving-behavior over time. In the latter segmentation problem, members are assumed to belong to classes with distinct giving characteristics, each with its own Markovian behavior. The EM Algorithm is used to obtain parameter estimates of the generative model, i.e., to update the population's mixture proportion, improve the model's characterization of the cluster/behavior types (eg., transition probabilities), and cluster each member into a behavior type via a Bayesian scheme based on the posterior probabilities of cluster membership. The clustering of members based on annual contributions is formulated as a finite mixture model with unknown mixture proportions. Through an extensive empirical study, we show that framework is able to capture unobserved, but systematic differences between individuals, a key limitation of classical ``tiling'' approaches to segmentation. We also show that failure to capture heterogeneity in class behavior can lead to the improper characterization giving behavior, which, in turn, can lead to ineffective targeting of members. The two clustering approaches are also shown to be synergistic, and provide a means for the station to exploit segment-level behavior, such as loyalty, persuadability, interests, etc. in the devising its direct marketing strategy.

Bio:
Elizabeth J. Durango-Cohen is an assistant professor of Operations Management at the Stuart School of Business at the Illinois Institute of Technology. She completed her Ph.D. in 2002 in Industrial Engineering and Operations Research at the University of California, Berkeley where she worked in the area of production planning and inventory control in the

context of supply chain management. Dr. Durango-Cohen's current research efforts focus on the interface of Marketing and Operations. In addition to her work on direct-marketing optimization for non-profit broadcasting institutions, Dr. Durango-Cohen is also interested in modeling the effect of capacity on pricing decisions for supply chains with competing National and Store-Brand products.

January 14

Francisco Iacobelli, Northwestern University

Presenting Purposeful and Distinct Information. The Case of Online News

The Web makes it possible for news readers to learn more about virtually any story that interests them. Media outlets and search engines typically augment their information with links to similar stories. It is up to the user to determine what new information is added by them, if any. In this talk I will describe Tell Me More, a system that augments a seed news story by presenting paragraphs that contain new information from other news sources. The information is categorized under new names, numbers, quotes and commentary from twitter, and is presented alongside the seed news story. Tell Me More presents information that is both distinct and purposeful: distinct because each paragraph provides a unique item of information and purposeful because each item is retrieved and presented with a purpose in mind and its presentation makes this purpose visible. I will discuss design considerations and implications for the web more generally.

Bio:
Francisco is a post doctoral fellow at the Ford Institute for Global Citizenship at Northwestern's University Kellogg school of Management. He is also a lecturer at Northwestern's School of Continuing Studies' undergraduate program. His research explores information retrieval in the context of user's interaction with technology, in particular web content. More precisely, intelligent and scalable strategies of information retrieval that result in information that is both distinct and functionally clear to users. Francisco obtained his Ph.D. at the Intelligent Information Laboratory, in the Computer Science department of Northwestern University; a Masters in Computer Science at DePaul University with a concentration in AI; and his undergraduate degree in Systems Engineering and Informatics from Universidad Diego Portales in Santiago, Chile.

January 21

Mehdi Mirakhorli, DePaul University

Preserving Architectural Quality through Tracing Critical Design Decisions

Software Architecture is a core component of every software intensive systems. It can be seen as the byproduct of a series of decisions made by architects in order to maximize the degree to which quality goals and constraints are satisfied. Unfortunately, long-term activities such as the introduction of new requirements, modification of existing ones, bug fixing, performance tweaking, or even hardware replacements can adversely impact the benefits of these original decisions and erode the quality of the system. This talk includes a discussion about how we can address this problem by using a traceability solution that leverages architectural decisions to provide full-life cycle traceability between quality goals and architectural components. It describes how this approach keeps developers fully informed of potential architectural erosion as they make changes to the requirements, architectural views, and code. Finally, challenges of tracing architectural decisions are illustrated through documented examples drawn from the Avionics domain.

January 28

Tom Moher, University of Illinois Chicago

TBA

February 4

Zahra Ferdowsi, DePaul University

TBA

February 11

Ian Horswill, Northwestern University

TBA

February 18

Massimo Di Pierro, DePaul University

TBA

February 25

Alan Wagner, Georgia Institute of Technology

Creating Social Robots

Human-Robot interaction is beginning to move beyond the realm of software usability in which the robot is an controlled passive actor and the human a calls all of the shots. Roboticists are starting to explore the interactive ramifications of the robot being a volitional, responsive social actor. Situations such as these present unique opportunities and also unique challenges. For example, we can begin to explore how a robot might serve as a home healthcare assistant, observing and actively engaging elderly patients.

We present the Interdependence Framework for Social Action Selection (IFSAS) being developed at Georgia Tech. IFSAS is based on interdependence theory, a social psychological theory of interpersonal interaction. We use this framework to create social robots capable of interactive behavior. IFSAS is a top-down theory to implementation approach to Human-Robot Interaction. Be begin with definitions and first principles which reflect social psychological phenomena, translate these definitions into representations, and develop algorithms. We have recently applied this approach to the problems of social deception and trust in artificial systems with great success.

Bio:
Dr. Alan Wagner earned his BA in Psychology from Northwestern University. He began his career in science as a member of the research and development team at the MIT/Broad Institute for Genome Research developing novel robot platforms as part of the Human Genome Project. He later went on to develop software for the Speedline Corporation, an industrial robotics company and Symantec Corporation. Over that same period of time and prior to entering the doctoral program at Georgia Tech, he earned an MS degree in Computer Science from Boston University and went on to join the faculty there as an adjunct. At Georgia Tech he worked under the supervision of Dr. Ron Arkin developing a theoretical framework for human-robot interaction based on related work in social psychology and game theory. His research, first as a post-doctoral fellow and later as a research scientist at the Georgia Tech Research Institute, has since focused on developing methods that allow robots to reason about trust and deception. Recently doctor Wagner's work was listed by Time Magazine as the 13th best invention of 2010.

March 4

Jane Huang, DePaul University

TBA

Mar 11

Amy Voida, University of California Irvine

Group Console Gaming: Diversity, Dynamics & Domestication

The last several years have seen a dramatic increase in the number of American households that own game consoles, from 38% of American households in 2007 to 60% of households in 2009, only two years later. In addition, sales of "family entertainment" games have also surged, bringing together an increasingly diverse population of gamers—38% of whom are now women and 26% of whom are now over the age of fifty—to form rock bands and bowling leagues in their family rooms. What can we learn from this evolving demographic of gamers? How have they chosen to integrate gaming into their lives? What is the nature of the sociality that emerges from their group gameplay?

In this talk, I will present the results of a mixed-methods study of the collocated group console gaming practices of four generations of gamers, ranging in age from three to eighty-three. Drawing from observations of group console gaming, focus groups with gamers, and data from questionnaires and gaming environment sketches, I will explore the diversity of gaming groups and the impact of this diversity on gaming practices, unpack the dynamics of interactions within gaming groups and the relationships between these dynamics and game design decisions, and reflect on the continued domestication of game consoles.

Bio:

Amy Voida is a postdoctoral researcher in the Department of Informatics at UC Irvine. She conducts research in human-computer interaction, computer-supported cooperative work and ubiquitous computing and is particularly interested in understanding the lived experience of computational technologies. She holds a Ph.D. in Human-Centered Computing and a M.S. in Human-Computer Interaction from the Georgia Institute of Technology as well as a B.A.E. in Elementary Education from Arizona State University.