19th Workshop on Information Technologies and Systems

Phoenix, AZ, USA
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Sponsors
Foreword

Welcome to the Nineteenth Workshop on Information Technologies and Systems (WITS 2009) being held in Phoenix, Arizona, USA. The purpose of the workshop is to provide a forum for discussion and interaction among scholars with research interests in cutting-edge issues of information technologies and systems.

The theme of the conference is "Interdisciplinary Frontiers in Information Technology Innovation." Information technology is transforming every industry, be it healthcare, finance, tourism, retail, entertainment, or education. While each industry is diverse and unique, innovation in IT has transformed not only consumer expectations and the nature of products and services offered but also the structure of the industry itself. The information systems innovations across these interdisciplinary frontiers—both in research and practice—need to address several issues while being industry or application “aware.” For example, challenges such as lack of interoperability, privacy and confidentiality, and human-computer interface issues that are addressed by our research need to be specific to each industry, e.g., health care. The workshop invited papers that address the challenges and opportunities in IT across industries from a wide variety of disciplinary and inter-disciplinary perspectives: computing, communication, economics, management science, and social and cognitive sciences.

Out of the 114 research papers that were submitted, 36 were accepted, resulting in an acceptance rate of 32%. The papers published in the proceedings represent high-quality research across a wide range of topics, including collaborative filtering, information diffusion and personalized recommendation, conceptual modeling, healthcare, data mining, product distribution and supply networks, emerging e-business models, data and knowledge management, text mining and web mining, social computing, process management, and quality management.

The eight prototypes selected for the workshop demonstrate novel ideas and solutions based on technologies such as data visualization, community source development, data provenance, social and organizational networks, and agent-based negotiation. The innovation in teaching session includes six teaching modules in areas such as business intelligence, IT governance, business process integration, and web services and service-oriented architecture. We are pleased to introduce industry best-of-breed from companies such as EY, rSmart, and SAP.

We are pleased to feature our keynote speaker, Alisa Wright, CEO, BioConvergence. She will discuss how the life sciences industry needs to create solutions that link diagnostic, pharmaceutical, and medical device companies.

We would like to take this opportunity to thank all those who were instrumental in making WITS 2009 a success. We want to first thank the members of the Program Committee, who reviewed the papers and helped us in making the acceptance decisions. We would also like to thank the members of the following committees:

- Alok Gupta, Ramayya Krishnan, Salvatore March, Vijay Mookerjee, Jeffrey Parsons (chair), and Carson Woo for being part of the committee that selected the best overall paper and best student paper from among the ones that were nominated.
- Ram Gopal (chair), Hemant Jain, Kumar Mehta, and Veda Storey, who chose the best teaching innovation submission out of finalist submissions.
- Prabuddha De (chair), Keng Siau, and Ramesh Venkataraman, who chose the best research prototype submission out of the finalist submissions.

We are greatly appreciative of Alan Hevner and Sudha Ram for organizing the discussion panels. We are grateful to Faiz Currim, the prototype, innovation in teaching, and industry best-of-breed coordinator, who not only solicited and selected the submissions but also made appropriate arrangements for their demonstration, and Valentin Dinu, the local arrangements chair, and the volunteers, Kyle Blocher and Binny Samuel, who took care of every little detail associated with local arrangements. We are appreciative of the international liaisons—Matti Rossi, Amitava Bagchi, Guoqing Chen, Lihua Huang, Kar Yan Tam, Paulo Goes, and Andrew Burton-Jones—for promoting WITS in Europe, Asia, Latin America, and Australia. We would like to thank Ram Gopal, Kumar Mehta, Sudha Ram, Ram Ramesh, Sanjukta Das-Smith, Ramesh Venkataraman, and Atish Sinha, who shared their own experiences and provided us with very helpful advice throughout the year. Finally, a special word of thanks goes to Paulo Goes and Vijay Vaishnavi, who invested a lot of time in advising us with various aspects of organizing this workshop.

The smooth and efficient functioning of the workshop would not have been possible without the support of our organizational sponsors. We are grateful to the following sponsors for their generous support:

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- Sheldon B. Lubar School of Business, University of Wisconsin-Milwaukee

We hope that all of you will enjoy WITS 2009 and we look forward to your participation in future WITS workshops.

Vijay Khatri (Indiana University) and Huimin Zhao (University of Wisconsin-Milwaukee), Co-Chairs, WITS 2009
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Zan Huang. Bipartite Graph Sampling Methods for Sampling Recommendation Data

Abstract: Sampling is the common practice involved in academic and industry efforts on recommendation algorithm evaluation and selection. Experimental analysis often uses a subset of the entire user item interaction data available in the operational recommender system, often derived by including all transactions associated with a subset of uniformly randomly selected users. Our paper formally studies the sampling problem for recommendation to understand to what extent population-based algorithm evaluation results correspond with sample-based results using different sampling methods. We use a bipartite graph to represent the key input data of user-item interaction for recommendation algorithms and build on the literature on unipartite graph sampling to develop sampling methods for our context of bipartite graph sampling. We also developed several metrics for assessing the quality of a given sample, including performance recovery and ranking recovery measures for assessing both single-sample and multiple-sample recovery performances. Based on the empirical results from two real-world datasets we provide some general recommendations for sampling for recommendation algorithm evaluation.

Pelin Atahan, Monica Johar, and Sumit Sarkar. Optimizing Offer Sets Based on User Profiles

Abstract: Personalization and recommendation systems are being increasingly utilized by ecommerce firms to provide personalized product offerings to visitors at the firms' web sites. These systems often recommend, at each interaction, multiple items (referred to as an offer set) that might be of interest to a visitor. When making recommendations firms typically attempt to maximize their expected payoffs from the offer set. This paper examines how a firm can maximize its expected payoffs by leveraging the knowledge of the profiles of visitors to their site. We provide a methodology that accounts for the interactions among items in an offer set in order to determine the expected payoff. Identifying the optimal offer set is a difficult problem when the number of candidate items to recommend is large. We develop an efficient heuristic for this problem, and show that it performs well for both small and large problem instances.

Abhijeet Ghoshal, Syam Menon, and Sumit Sarkar. Recommendations Using Information from Multiple Association Rules

Abstract: Personalized recommendations enable firms to effectively target customers with products and services. Such systems are often based on association rules. While there has been considerable work done on mining rules more efficiently, there is very little prior research that examines how to use rules effectively when making recommendations. Traditional association rule-based recommendation systems have relied on identifying one rule from the several eligible ones to make the recommendation. This ignores information from other eligible rules that can potentially improve the recommendation. We propose a method to combine multiple rules when making recommendations. In doing so, we also present an approach to select the best combination of rules from the many that might be available.

Abstract: Establishing traceable links between the analysis and design of socio-technical work systems and that of computerized tools required to support these work systems is necessary part of implementing systems in organizations. This paper explains aspects of a conceptual model related to work systems, processes, activities, actors, and technologies that establishes a link between work system analysis by business professionals and analysis and design work by technical experts. An approach for identifying scope of sociotechnical systems, especially the extent of automation for the activities identified using the work systems method, is described.

Sase Singh, Fei Sun, and Carson Woo. *Designing UML Diagrams Using Goal-based Concepts*

Abstract: Researchers in the requirements engineering discipline have been proposing goal modeling techniques to capture business context as part of the information systems (IS) requirements. Unfortunately, it is still unclear how to utilize the goals captured by goal modeling techniques in IS design. To overcome this gap, we propose a systematic and structured set of guidelines to translate goal-based requirements, which are represented in goal schemas, to UML diagrams. The translation guidelines are grounded on Bunge’s ontology; good aggregation and decomposition principles; and a goal structured approach developed by Rolland et al. The usefulness of these guidelines was tested in an empirical study. The results illustrate that subjects using the guidelines were able to generate more complete and precise UML diagrams.


Abstract: Data Modelers document their understanding of the users’ work domain via conceptual models. Once a model has been developed, they ought to check that it has no defects. The literature has little guidance about strategies and tactics to improve the effectiveness of model validation. In this light, we propose a theory arguing that two factors have a major impact on the effectiveness of validation—namely, the (a) ontological clarity of the models prepared, and the (b) extent to which a validation method engages users more with the semantics of the domain represented by a model. We experimentally tested the theory in which we systematically varied the levels of these two factors. Forty-eight expert data-modelers participated in our experiment. Their task was to find defects in the model they were given. Our results showed that those who received the model that had greater ontological clarity on average detected more defects. We obtained no effect for the validation method that we predicted would engage participants more with the semantics of the domain represented by the model they had been given.
Ahmed Abbasi, Siddharth Kaza, and Fatemeh “Mariam” Zahedi. Evaluating Link-Based Techniques for Detecting Fake Pharmacy Websites

Abstract: Fake online pharmacies have become increasingly pervasive, constituting over 90% of online pharmacy websites. There is a need for fake website detection techniques capable of identifying fake online pharmacy websites with a high degree of accuracy. In this study, we compared several well-known link-based detection techniques on a large-scale test bed with the hyperlink graph encompassing over 80 million links between 15.5 million web pages, including 1.2 million known legitimate and fake pharmacy pages. We found that the QoC and QoL class propagation algorithms achieved an accuracy of over 90% on our dataset. The results revealed that algorithms that incorporate dual class propagation as well as inlink and outlink information, on page-level or site-level graphs, are better suited for detecting fake pharmacy websites. In addition, site-level analysis yielded significantly better results than page-level analysis for most algorithms evaluated.

Wen Yao, Chao-Hsien Chu, Akhil Kumar, and Zang Li. Using Ontology to Support Context Awareness in Healthcare

Abstract: The advances in ubiquitous computing enabled by Radio Frequency Identification (RFID) technologies and heterogeneous embedded sensors have a great impact on the delivery of healthcare services in hospitals. RFID facilitates the capture of context information. In this paper, we propose a Context-embedded Intelligent Hospital Ontology (CIHO) to support semantic interoperability and context-aware applications using OWL-DL, a Web Ontology Language. The CIHO model provides a formal description of the healthcare domain and supports logic-based context reasoning. For illustration and validation, we conduct sample ontology reasoning and evaluate the quality of the CIHO model with a semiotic metrics suite. By managing the heterogeneous nature of software applications and providing context-aware services, hospitals can benefit a lot from improved patient safety and facilitated hospital personnel collaboration.

Erik Giesen, Wolfgang Ketter, and Rob Zuidwijk. An Agent-Based Analysis Approach to Resource Allocation in the Dutch Youth Health Care System

Abstract: The Dutch youth care sector is struggling with long waiting lists and long waiting times, while allocating clients to care providers. The problem is considered an urgent societal problem and has received a lot of media attention. Repeated government provided funding has not resulted in a permanent solution. In our previous work (Giesen, Ketter & Zuidwijk 2009) we diagnosed that the real problem is not solely the waiting list length or waiting time as such and we showed that the current allocation system as a whole needs to be reconsidered. We considered solution directions that not only focused on the handling of contemporary waiting lists, but that may require structural changes in the system. We elaborated on such structural changes by presenting an overview of multiple allocation strategies, based on a combination of push/pull strategies and centralized/decentralized queuing strategies.
Ping Yan and Daniel D. Zeng. In-store Shopping Activity Modeling based on Dynamic Bayesian Networks

Abstract: RFID technology has been recently adopted in retail environments to track consumer in-store movements, bringing about new exciting opportunities for spatial data mining-enabled marketing. In this paper, we propose a Dynamic Bayesian Networks (DBN)-based model of customer in-store shopping trips and activities. This model infers a customer’s product purchase interest given the observations of customer in-store movement data collected through a RFID-based wireless network. We also report a preliminary evaluation of our approach using a real-world dataset. Our proposed approach can be potentially used to help create an intelligent shopping environment, in which store operators can target their marketing efforts at providing effective location-aware real-time product recommendation for individual customers.

Yu Fu, Zhiyuan Chen, A. Gunes Koru, and Aryya Gangopadhyay. A Privacy Protection Technique for Publishing Data Mining Models and Supporting Data

Abstract: Data mining techniques have been widely used to extract useful knowledge (as mining models) from data. The model and the supporting data often need to be published together to allow others to verify the model or to use the data in their own research. However, the privacy of the published data needs to be protected. Existing privacy protection methods can protect privacy, but they do not guarantee that the same model can be built from sanitized data. Thus models cannot be verified. This paper proposes a technique that not only protects privacy, but also guarantees that the same model, in the format of decision trees, can be built from the sanitized data. Users can also apply other mining techniques to the sanitized data to achieve good results. This technique can be used to reduce research fraud and the cost of collecting research data.

Anindya Ghose, Panagiotis G. Ipeirotis, and Beibei Li. Towards Designing Ranking Systems for Hotels on Travel Search Engines: Combining Text Mining and Image Classification with Econometrics

Abstract: In this paper, we empirically estimate the economic value of different hotel characteristics, especially the location-based and service-based characteristics given the associated local infrastructure. We build a random coefficients-based structural model taking into consideration the multiple-levels of consumer heterogeneity introduced by different travel contexts and different hotel characteristics. We estimate this econometric model with a unique dataset of hotel reservations located in the US over 3 months and user-generated content data that was processed based on techniques from text mining, image classification, and on-demand annotations. This enables us to infer the economic significance of various hotel characteristics. We then propose to design a new hotel ranking system based on the empirical estimates that take into account the multi-dimensional preferences of customers and imputes consumer surplus from transactions for a given hotel. By doing so, we are able to provide customers with the “best value for money” hotels. Based on blind tests of users from Amazon Mechanical Turk, we test our ranking system with some benchmark hotel ranking systems. We find that our system performs significantly better than existing ones. This suggests that our inter-disciplinary approach has the potential to improve the quality of hotel search.
Jing Peng and Daniel Zeng. *Exploring information hidden in tags: A subject-based item recommendation approach*

**Abstract:** Collaborative tagging sites allow users to bookmark and annotate their favorite Web contents with tags. These tags provide a novel source of information for collaborative filtering (CF). Research on how to improve item recommendation quality leveraging tags is emerging yet information hidden in tags is far from being fully exploited. In this paper, we aim at finding informative usage patterns from tags by consistent clustering on tags using nonnegative matrix factorization. The clustered subjects, represented by weighed tag vectors, can then be used to build a subject centered user information seeking model for item recommendation. Experiments on two real world datasets show that our subject-based algorithms substantially outperform the traditional CF methods as well as tag-enhanced recommendation approaches reported in the literature.

Gediminas Adomavicius and YoungOk Kwon. *Toward More Diverse Recommendations: Item Re-Ranking Methods for Recommender Systems*

**Abstract:** Recommender systems are becoming increasingly important to individual users and businesses for providing personalized recommendations. However, while the majority of algorithms proposed in recommender systems literature have focused on improving recommendation accuracy (as exemplified by the recent Netflix Prize competition), other important aspects of recommendation quality, such as the diversity of recommendations, have often been overlooked. In this paper, we introduce a number of item re-ranking methods that can generate substantially more diverse recommendations across all users while maintaining comparable levels of recommendation accuracy. Empirical results consistently show the diversity gains of the proposed re-ranking methods for several real-world rating datasets and different rating prediction techniques.

Dan Zhu. *A Game Theoretical Approach for Defending Against Shilling Attack*

**Abstract:** Shilling attacks have become a major threat to on-line recommender systems employing collaborative filtering (CF) techniques. The attack can efficiently influence the prediction results and mislead customers by introducing biased ratings. In this paper, we propose a Bayesian game theoretic framework to analyze the interactions between malicious attackers who conduct shilling attacks and defenders/monitors who attempt to mitigate attack effects. Furthermore, we investigate the decision making process for the detection strategy selection based on the concept of mixed strategy Bayesian Nash equilibrium.
Muhammad Adeel Zaffar, Ram L. Kumar, and Kexin Zhao. *Diffusion of Open Source Software (OSS): An Economics of Social Networks Perspective*

**Abstract:** There is growing emphasis on global collaboration in the business world and greater interdependence between organizations while making technology adoption decisions. Hence, it is critical to better understand the effect of network structure on the social behavior of organizations and economic outcomes. In this paper, while considering open source software (OSS) as an exemplar, we propose and illustrate an investigation of diffusion of OSS based on the literature on social networks. The objective is to understand what determines the strategic importance of a firm within a network and how does it influence the diffusion of OSS across the network. Results from an agent-based simulation suggest that a) strategically situated nodes in a network can significantly affect the diffusion of OSS; b) the measure of strategic importance of a firm in the context of software diffusion is dependent on other factors such as network topology and network density.

Kang Zhao, Akhil Kumar, and John Yen. *Effect of Topology on the Robustness of a Supply Network – Metrics and Results*

**Abstract:** We develop new robustness metrics for supply networks. We also propose the new ReWiSe supply network topology based on the re-wiring of the scale-free network and show that it outperforms a pure scale-free topology in some aspects when both random and targeted disruptions are likely to occur. The unique feature of our approach is that by tuning the rewiring parameter of ReWiSe it is possible to design networks with good performance on new robustness metrics in the presence of both types of disruptions. Our model is described and the experimental results and insights about choosing the right topology for achieving robustness are discussed in detail. At 20% failure rate, the ReWiSe model has higher availability and connectivity than the scale-free network by 7 to 8% and lower proximity by the same percentage. These tradeoffs are explored further.

Karl R. Lang, Richard D. Shang, and Roumen Vragov. *Strategies for Providing Digital Culture Goods in the Presence of Consumer Sharing and Content Co-Creation*

**Abstract:** New forms of implicit consumer collaborations in online communities and social networks influence demand preferences as consumers (1) increasingly exchange information about products and providers (thus reducing information asymmetry) and (2) increasingly participate in the creation of cultural goods themselves by contributing user-generated content (thus complementing and competing with firm offerings). While research findings on these issues vary there is strong evidence from theoretical and empirical research that, overall, piracy hurts producers and that the increased information endowment challenges the profitability of conventional producer strategies that are based on pushing product designs to large segments of consumers while ignoring to service the subtle nuances in consumer demand patterns. We contribute an experimental economics study that finds that consumer-based co-creation increases economic efficiency and that social welfare benefits are robust in the presence of moderate consumer piracy. We also discuss some business implications of our results for content producers.
Linjing Li and Daniel D. Zeng. *Equilibrium Bidding Strategy for GSP Keyword Auctions*

Abstract: The generalized second-price (GSP) mechanism is the most widely-used auction format in sponsored search markets. However, figuring out how to bid on GSP auctions presents major theoretical and computational challenges due to the complex nature of the auction format and the infinite number of equilibria. Our study characterizes various equilibrium bidding behaviors in GSP auctions. We develop an algorithm to identify all pure-strategy Nash equilibria and discuss their distribution in the pure-strategy space. This equilibrium distribution can help advertisers formulate bidding strategies, and help search engines calculate their expected revenues.

Jing Hao, Syam Menon, Srinivasan Raghunathan, and Sumit Sarkar. *The Impact of Ranking Mechanism on Quality Score and Revenue in Keyword Auctions*

Abstract: We examine two of the most widely used ranking mechanisms in sponsored search. The first, where bidders are ranked based on their bids (rank-by-bid, or RBB) was used by Yahoo! until recently. The other mechanism ranks bidders based on the product of their bids and quality scores of their advertisements (rank-by-revenue, or RBR), and was initiated by Google. Existing literature has implicitly assumed the quality score to be exogenous. Advertisers can usually improve the quality scores of their advertisement at some cost, and the quality score should ideally be endogenous to the decision being made. We identify conditions under which one ranking mechanism is more profitable to the search engine than the other when an advertiser optimizes the quality score of his advertisement and when it does not.

Harpreet Singh, Ram Gopal, and Xinxin Li. *Risk and Return of Investments in Online Peer-to-Peer Lending*

Abstract: Online peer to peer (P2P) lending has received great coverage in media but little attention from academic researchers. In this study, we focus on risk and return of investments on prosper (P2P lending website). We find that on average, loans through prosper provide negative return. We then use decision tree analysis to segment loans in term of different return and risk profiles. We further determine the efficient frontier for investments on prosper and calculate the efficiency of loans in various segments. We found that (1) within each credit grade, there exist subgroups which give positive return and for these subgroups risk is aligned with return and (2) group of loans with lower credit grade are more efficient in terms of risk and return than higher credit grade. Our study provides investment guidelines for lenders and design implications for online peer to peer lending websites.
Sandeep Purao, Arvind Karunakaran, and Brian Cameron. ReKon: Recombinable Knowledge Units for Systems Integration Projects

Abstract: We describe the ReKon platform. It contains granular knowledge units that can be combined, as needed, to support efforts to build systems integration solutions. They are created from more than 1,200 templates contributed by four IT consulting organizations. The granularity of knowledge units represents a direct response to the emergent nature of systems integration projects that defies a one-size-fits-all approach. The paper develops the underlying conceptual model and operations for ReKon, describes a prototype implementation, and reports results from a two-phase evaluation that point to its potential.

Anna Ye Du, Sanjukta Das, Ram Gopal, and Ram Ramesh. Data and Revenue Management Using Tiered Storage

Abstract: Information lifecycle management is of critical importance to organizations with burgeoning data. As different groups of data assume different priorities within a firm, tiered storage emerges as a necessary and viable mechanism for data management. We consider the case of online video downloads and model data as a network where relationships between data nodes capture the impact on content usage and browsing habits. We devise a bi-level programming approach to solve the buyer’s and the seller’s problems by taking into consideration both direct and indirect hits to the specific data nodes. We model the seller as a revenue maximizer while the buyer is interested in maximizing the overall hits, especially to revenue generating data content. We provide a detailed analysis of the choices made by these two entities and provide a roadmap for the empirical analysis to be accomplished in future.

Thomas Setzer. Data Center Workload Consolidation based on Truncated Singular Value Decomposition of Workload Profiles

Abstract: In today’s data centers, typically thousands of enterprise applications with varying workload behaviors are hosted. As energy usage is one of the key cost drivers in data centers, workload consolidation is increasingly used to host multiple applications on a single server, sharing and multiplexing a server’s capacity over time. To minimize the number of required, energy consuming servers, IT managers need to decide which applications should be combined on which server. For that purpose, typically application workload levels are predicted for a planning period such as a month in a defined granularity (e.g., over 5-minute intervals). Then integer programs are used to minimize the amount of required servers, while for each interval constraints ensure that the aggregated workloads of applications assigned to a server must not exceed a server’s capacity. As such problems are NP-hard and computationally intractable for data centers with hundreds of servers and fine-grained workload data, approximations are applied to find at least a good solution, often abandoning the chance to find the optimum. In this paper we propose a novel approach based on applying Singular Value Decomposition to the workload data to reduce the dimensionality of the problem by capturing workload features in order to make the problem computationally tractable. We interpret the coordinates of the time-series projections along the first right singular vectors as indicators for workload levels and complementarities and propose a model to solve the consolidation problem with these few indicators only. We evaluate the model using industry data.
Session 5 A: Personalized Recommendation
Sonoran H/ 10:30-12:00p, December 15, 2009

Sandeep Purao, Vijayan Sugumaran, and Veda C. Storey. From User-Contributed Tags to Domain-level Constructs: A Heuristic Approach

Abstract: The World Wide Web is rapidly becoming the tagged web as citizens tag resources to facilitate retrieval. We argue that these tags capture individual, often incomplete, knowledge about a domain. Aggregated across a large number of contributors, they contain the potential to identify, in a bottom-up manner, key constructs in a domain. This research develops a set of heuristics that aggregates and analyzes web tags to extract domain-level constructs. In addition to inferring their existence, the heuristics distinguish entities, attributes and relationships. This paper presents the heuristics and demonstrates their usefulness with tags from Del.icio.us.

Thomas H. Park, Jieyun Li, Haozhen Zhao, and Michael Chau. Analyzing Writing Styles of Bloggers with Different Opinions

Abstract: Understanding customers is crucial to companies’ decision-making. With the advent of Web 2.0, more and more people choose to express their feelings and articulate their attitudes through online social communities such as blogs and web forums. These new sources of information offer the potential to obtain large quantities of customer feedback using automated analysis techniques. In this paper, we study how people with different opinions toward a commercial product write differently in their blogs. We define and extract four types of stylometric features – namely lexical, syntactic, structural, and sentimental features – to represent a blogger’s writing style. Based on multivariate analyses on a data set of iPod-related blogs, we found various writing style patterns of bloggers. Our analysis shows that a blogger’s writing style is marginally related to his or her opinion toward a product.

Yilu Zhou. Dealing with Name Translation Variations and Same Name Problem

Abstract: Name translation often comes with high level of variability where there is more than one correct translation. Even professional translators find it difficult to identify all variations during translation. At the same time, the same translation can represent multiple person entities which increase the ambiguities. Our research addresses these two problems by developing an intelligent system that incorporates two components: an enhanced Hidden Markov Model to perform transliteration and identifies multiple translation candidates, and a Gaussian Mixture Model to cluster documents retrieved by all translation candidates. We tested our model under the situation when English names are translated into Chinese and performed clustering on Chinese documents. Our preliminary experiment results showed that in identifying person entities
Ofer Arazy, Arie Croitoru, and Soobaek Jang. The Life Cycle of Corporate Wikis: An Analysis of Activity Patterns

Abstract: Following the success of wikis on the internet (e.g. Wikipedia), corporations have begun adopting wikis. Preliminary evidence suggests that wiki is a sustainable collaboration tool and that wikis deployment is experiencing massive success. The objective of this paper is to provide a large scale evaluation of corporate wikis life cycles. We analyze and categorize the temporal activity patterns of more than thirteen thousand wikis in one multinational organization over a 29 months period. This clustering problem poses some unique challenges, and required the development of novel extensions to existing algorithms. We identified four clusters and their prototypical activity patterns. Our findings show that, contrary to what has been suggested in previous studies, most corporate wikis become inactive after a relatively short period, and less than 20% of wikis show continuous activity. Implications for research and practice are discussed.


Abstract: We hypothesize that articles on Wikipedia have “parents” who contribute a significant portion of their edits. We establish a notion of inequality based on the Gini Co-efficient for articles on Wikipedia and find support for the existence of this phenomenon of parenting. We base our study on data collected from the Tagalog and Croatian Wikipedias. Ultimately we claim that our research has significant implications for policy for both Corporate Wikis as also for Wikipedia. We state these implications and also suggest directions for future research.

Jun Liu and Sudha Ram. Who Does What: Collaboration Patterns in the Wikipedia and Their Impact on Data Quality

Abstract: Data quality in the Wikipedia is debatable. On the one hand, existing research indicates that not only are people willing to contribute articles but the quality of those articles is close to that found in conventional encyclopedias. On the other hand, the public has never stopped criticizing the quality of Wikipedia articles, and critics never have trouble finding low quality Wikipedia articles. Why do Wikipedia articles vary widely in quality? We investigate the relationship between collaboration and data quality. We show that the quality of Wikipedia articles is not only dependent on the different types of contributors but also on how they collaborate. Based on an empirical study, we classify contributors based on their roles in editing individual Wikipedia articles. We identify various patterns of collaboration based on the provenance or, more specifically, who does what to Wikipedia articles. Our research helps identify collaboration patterns that are preferable or detrimental for data quality, thus providing insights for improving data quality in Wikipedia.
Harry Jiannan Wang and Harris Wu. Supporting Business Process Design through a Web 2.0 Process Repository

Abstract: Various process reference models have been developed by system vendors, consulting firms, and academic researchers to facilitate business process design. Although these reference models complement each other in terms of scope and contents, research on leveraging multiple reference models to support process design has been scant. In addition, it is difficult to efficiently search, discover, and share process knowledge in those reference models, which greatly hinders their usability. This research gap is largely due to a lack of innovative tools for managing process knowledge. In this paper, we bridge this gap by designing and developing a Web 2.0 Process Repository (WPR) to integrate and manage process knowledge from multiple sources. Several innovative features of WPR, such as a collaborative multi-facet process classification framework and case-based process design support, are discussed. A prototype system is developed to demonstrate WPR.

Jiaqi Yan, Sherry Sun, Huaiqing Wang, and Zhongsheng Hua. A Belief-Desire-Intention Modeling Approach for Inspection-Oriented Quality Management

Abstract: The recent quality scandal in Chinese dairy industry has revealed a serious problem: the quality inspection processes are lack of effective methods to avoid inspection errors when suppliers deceive in order to maximize their profit. The solution to this problem relies on incorporating domain knowledge into the inspection policies that guide an inspection process. However, domain knowledge cannot be captured in the traditional mathematical or statistical models used in quality management. To fill this void, we propose a belief-desire-intention modeling approach to factor the domain knowledge of the inspection environment, the inspection capability of various measurements, and the associated risks for inspection errors. The proposed model can be used as a foundation to design intelligent systems to monitor and detect quality problems timely and effectively.


Abstract: Process control mechanisms may not always succeed in producing desired outcomes. We propose an iterative approach that (a) applies data mining classification techniques in order to discover the conditions under which a controlled process produces undesired or sub-optimal outcomes and (b) uses this information to improve the control mechanism. While this approach shows promise for application in a variety of process control problem domains, in this paper we illustrate its use by applying it to a chronic disease care problem in a healthcare management organization, specifically the treatment of patients with type 2 diabetes mellitus. In particular, the proposed iterative approach is used to improve a canonical treatment strategy (based on clinical guidelines) by predicting and eliminating treatment failures, which delay or prevent patients from reaching evidence-based goals.
Aaron R. Sun, Jessie Cheng, and Daniel D. Zeng. *A Novel Recommendation Framework for Micro-blogging based on Information Diffusion*

Abstract: Micro-blogging is increasingly extending its role from a daily chatting tool into a critical platform for individuals and organizations to seek and share real-time news updates during emergencies. However, extracting useful information from micro-blogging sites poses significant challenges due to the volume of the traffic and the presence of extensive irrelevant personal messages and spams. In this paper, we propose a novel recommendation framework to overcome this problem. By analyzing information diffusion patterns among a large set of micro-blogs who play the role of news providers, our approach selects a small subset as recommended emergency news feeds for regular users. We have evaluated our diffusion-based recommendation framework on Twitter during the early outbreak of H1N1 Flu. The preliminary results show that our method leads to more balanced and comprehensive recommendations compared to benchmark approaches.

Young Jin Lee, Yong Tan, and Kartik Hosanagar. *Do I Follow My Friends or the Crowd? Informational Cascades in Online Movie Rating*

Abstract: Online product review as a form of online Word of Mouth (WOM) and User-Generated Content (UGC) has attracted much attention recently. This study analyzes how online movie user ratings are generated through a complex interrelationship between product information, marketing effort, and social influences. In particular, we examine the effect of comparable WOM from the crowd or friends on user ratings. Our multilevel analysis indicates that, on average, higher predecessors’ ratings increase the likelihood of a subsequent user providing a high rating, or, in other words, herding occurs. On the other hand, prior reviews by friends act to reduce this herding behavior. We show that the degree of herding behavior induced by the crowd’s ratings can be significantly different across movies due to movie level heterogeneity.

Akhmed Umyarov and Alexander Tuzhilin. *Making Aggregate-Level Predictions in Recommender Systems Using Multi-Level Ratings*

Abstract: Aggregate-level ratings have been studied in recommender systems and have been shown to improve predictions of ratings of individual items for individual users. Similarly, individual-level ratings have also been used for the estimation of aggregate-level ratings for groups of items and users. In this paper, we combine these approaches and present a novel method for estimating unknown aggregate-level ratings from the known individual- and the aggregate-level ratings corresponding to different levels of the rating aggregation hierarchy. We show both theoretically and empirically that this combined approach outperforms the alternative methods that do not include the ratings from different levels of the rating aggregation hierarchy.
Keynote Speech
Sonoran G/ 12:30-1:30p, December 14, 2009

Title: Creating Solutions for the Life Sciences Industry: The IT Challenge
Keynote Speaker: Alisa Wright, CEO, BioConvergence

Abstract: Twenty years ago, the life sciences industry was comprised of very segregated diagnostic, pharmaceutical and medical device companies focusing on acute disease in developed nations. As we gained knowledge and technology to understand the fundamentals of disease around the world and particularly chronic disease, we had to break down our silos as no one company or sector could go it alone. Doing so has created linked solutions designed to more effectively diagnose and treat diseases. Our current exploration will not only build on this new foundation but require new solutions to expand the continuum to distributors, healthcare providers and patients. All of these improvements have something in common – using new information technology and communication systems to achieve our healthcare goals.

Discussion Panel 1
Sonoran JK/ 3:30-5:00p, December 14, 2009

Title: Application Aware IS Research: Impacts and Contributions.
Panel Chair: Al Hevner; Panelists: Ram Gopal, Matthias Jarke, Sandra Slaughter, and Iris Vessey

Abstract: Relevant research in Information Systems must address opportunities and problems in real application domains. An application domain consists of the people, organizational systems, and technical systems that interact to work toward the goals of a well-defined field of endeavor. The dilemma arises when the researcher attempts to generalize the results of the research beyond the application domain into broader theory. Does research rigor demand that ‘good’ research always result in general theory contributions beyond the application domain of the research project? What are the right research trade-offs between specific impacts to the application domain and general contributions to the IS field?

Discussion Panel 2
Sonoran JK/ 1:30-3:00p, December 15, 2009

Title: Emerging IT Challenges in Life Sciences, Biotech and Pharmaceutical Companies
Panel Chair: Sudha Ram; Panelists: Brian Ellerman, Tucson SIS Site Head – Sanofi-Aventis, David J. Kempson, CIO – Maricopa Integrated Health System, and Edward Suh, CIO – TGen

Abstract: Life Sciences, biotechnology, and pharmaceutical industries are recognized globally as key drivers of modern economic progress, offering enormous potential for linking basic research innovations with new market opportunities. The impact of the progress in the biosciences is being felt particularly across the United States, as demonstrated by bioscience job growth, up 5.7 percent between 2001 and 2006, and the number of bioscience establishments, up 15.7 percent nationwide during the same time period. A key to development of this industry is information technology. This panel will explore the emerging IT challenges faced by healthcare, biotechnology and pharmaceutical organizations.
Innovation in Teaching
- Steven Alter. *Using “Cash for Clunkers” and Other Current Cases to Teach Database Concepts*
- David Douglas and Paul Cronan. *Tyson Foods, Business Intelligence via SAP’s BEx Analyzer*
- Justin Greis and V. Ramesh. *An Innovative Approach To Teaching IT Governance, Risk And Controls*  
  (**Nomination for best innovation in teaching award**)
- Sonja Hecht, Jörg Schmidl, Holger Wittges, and Helmut Krcmar. *Extending Business Intelligence Curricula With Dashboard Design*  
  (**Nomination for best innovation in teaching award**)
- Bipin Prabhakar. *Business Process Integration Project Using SAP*  
  (**Nomination for best innovation in teaching award**)
- Harry Jiannan Wang. *Teaching Case On SOA And Web Services In A System Analysis And Design Course*  
  (**Nomination for best innovation in teaching award**)

Prototype
- Ruba Aljafari, Surenrdra Sarnikar, and Swetha Vemula. *Risk Assessment Tool For Knowledge Sharing In Interorganizational Networks*
- J. Leon Zhao, Shaokun Fan, and Daning Hu. *A Knowledge Flow Management System For Community Software Development*
- Hong Guo, Subhajyoti Bandyopadhyay, and Hsing K. Cheng. *A Different Angle On Net Neutrality – Should We Charge Broadband Users Rather Than Content Providers?*
- Sudha Ram, Jun Liu, and Arjhun Thiagarajan. *PROVISIA: Visualization Of Data Provenance*
- Daniel Rudmark, Anders Hjalmarsson, and Linus Andrén. *E-Me – Towards A Next Generation Student IS Architecture*  
  (**Nomination for best prototype award**)
- David Rueckel, Bernhard Pflug, Tobias Noiges, and Katharina Steininger. *Buddy Fusion*  
  (**Nomination for best prototype award**)
- Wael Jabr, Radha Mookerjee, Yong Tan, and Vijay Mookerjee. *An Integrated Model For Customer Service Support: A Queuing Analysis*
- Yinping Yang, Sharad Singhal, Rully Santosa, Shixing Yan, and Yong Siang Foo. *Negotiation As A Service: An Agent-Based Negotiation Engine For Online Business*  
  (**Nomination for best prototype award**)

Industry Best-of-Breed
- Chris Coppola and Anthony Potts, rSmart. *New Development And Distribution Model For Enterprise Software In Education*
- Craig Crawford, Bob Leto, and Todd Smyth, Ernst & Young. *A Data-driven Approach to IT Cost Optimization*
- Heather Czech Matthews, SAP. *Communities of Influence at Work: Universities and SAP*
### Monday December 14, 2009

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<td>8a-9:30a</td>
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<td>- Zan Huang. <em>Bipartite Graph Sampling Methods for Sampling Recommendation Data</em></td>
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<td>- Pelin Atahan, Monica Johar, and Sumit Sarkar. <em>Optimizing Offer Sets Based on User Profiles</em></td>
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<td>- Abhijeeet Ghoshal, Syam Menon, and Sumit Sarkar. <em>Recommendations Using Information from Multiple Association Rules</em></td>
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<td><strong>Coffee Break (Sonoran G)</strong></td>
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<td>10:30a-12p</td>
<td><strong>Session 2 A: Health Care</strong>&lt;br&gt;<strong>Sonoran H</strong> (Session Chair: Roger Chiang)</td>
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<td>- Wen Yao, Chao-Hsien Chu, Akhil Kumar, and Zang Li. <em>Using Ontology to Support Context Awareness in Healthcare</em></td>
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<td>- Erik Giesen, Wolfgang Ketter, and Rob Zuidwijk. <em>An Agent-Based Analysis Approach to Resource Allocation in the Dutch Youth Health Care System</em></td>
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<td>- Ping Yan and Daniel D. Zeng. <em>In-store Shopping Activity Modeling based on Dynamic Bayesian Networks</em></td>
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<td>- Yu Fu, Zhiyuan Chen, A. Gunes Koru, and Aryya Gangopadhyay. <em>A Privacy Protection Technique for Publishing Data Mining Models and Supporting Data</em></td>
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<td>12p-1:30p</td>
<td><strong>Welcome remarks and Lunch</strong> (Sonoran G)** Key note speech:** Alisa Wright, CEO, BioConvergence</td>
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<td><strong>Session 3</strong></td>
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<td>1:30p-3:00p</td>
<td><strong>Session 3 A: Collaborative Filtering</strong>&lt;br&gt;<strong>Sonoran H</strong> (Session Chair: Thomas Lee)</td>
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<td></td>
<td>- Jing Peng and Daniel Zeng. <em>Exploring information hidden in tags: A subject-based item recommendation approach</em></td>
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<td>- Dan Zhu. <em>A Game Theoretical Approach for Defending Against Shilling Attack</em></td>
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<td>3:00p-3:30p</td>
<td><strong>Coffee Break (Sonoran G)</strong></td>
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<td>3:30p-5:00p</td>
<td><strong>Panel:</strong> Application Aware IS Research: Impacts and Contributions. (Sonoran JK)** Panel Chair:** Al Hevner; <strong>Panelists:</strong> Ram Gopal, Matthias Jarke, Sandra Slaughter, and Iris Vessey</td>
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<td>5:15p-6:15p</td>
<td><strong>WITS Board Meeting (Sonoran H)</strong></td>
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<td>6:30p-9:30p</td>
<td><strong>WITS Dinner</strong>&lt;br&gt;<strong>Venue:</strong> Sam’s Café, <strong>Address:</strong> Biltmore Fashion Park, 2566 E. Camelback Road, Suite 201, Phoenix, AZ 85016 <strong>Phone:</strong> (602) 954-7100</td>
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<td><strong>Session 3 B: Product Distribution and Diffusion and Supply Networks</strong>&lt;br&gt;<strong>Sonoran I</strong> (Session Chair: Zhangxi Lin)</td>
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<td>- Muhammad Adeel Zaffar, Ram L. Kumar, and Kexin Zhao. <em>Diffusion of Open Source Software (OSS): An Economics of Social Networks Perspective</em></td>
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<td>- Kang Zhao, Akhil Kumar, and John Yen. <em>Effect of Topology on the Robustness of a Supply Network – Metrics and Results</em></td>
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### Tuesday December 15, 2009

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<td>7:15a-8:00a</td>
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| **Session 4** | **Session 4 A: Emerging e-Business Models**  
Sonoran H (Session Chair: Radha Mookerjee)  
- Linjing Li and Daniel D. Zeng. *Equilibrium Bidding Strategy for GSP Keyword Auctions*  
  (**Nomination for best paper award**)
- Jing Hao, Syam Menon, Srinivasan Raghunathan and Sumit Sarkar. *The Impact of Ranking Mechanism on Quality Score and Revenue in Keyword Auctions*  
- Harpreet Singh, Ram Gopal, and Xinxin Li. *Risk and Return of Investments in Online Peer-to-Peer Lending*  
  (**Nomination for best paper award**)                                                                 |
| **Session 4** | **Session 4 B: Data and Knowledge Management**  
Sonoran I (Session Chair: Jinsoo Park)  
- Sandeep Purao, Arvind Karunakaran, and Brian Cameron. *ReKon: Recombinable Knowledge Units for Systems Integration Projects*  
- Anna Ye Du, Sanjukta Das, Ram Gopal, and Ram Ramesh. *Data and Revenue Management Using Tiered Storage*  
- Thomas Setzer. *Data Center Workload Consolidation based on Truncated Singular Value Decomposition of Workload Profiles* |
| 9:30a-10:30a  | • Coffee Break (Sonoran G)  
• Research Prototype, Innovation in Teaching and Industry Best-of-Breed Posters and Demo (Sonoran JK) |
| **Session 5** | **Session 5 A Text Mining and Web Mining**  
Sonoran H (Session Chair: Atish Sinha)  
- Sandeep Purao, Vijayan Sugumaran, and Veda C. Storey. *From User-Contributed Tags to Domain-level Constructs: A Heuristic Approach*  
- Thomas H. Park, Jiejun Li, Haozhen Zhao, and Michael Chau. *Analyzing Writing Styles of Bloggers with Different Opinions*  
- Yili Zhou. *Dealing with Name Translation Variations and Same Name Problem* |
| 10:30a-12p   | **Session 5 B: Social Computing**  
Sonoran I (Session Chair: Gautam Pant)  
  (**Nomination for best paper award**) |
| 12p-1:30p    | Lunch and Best Paper Awards (Sonoran G)                                                                                                                                                     |
| 1:30p-3:00p  | **Panel**: *Emerging IT Challenges in the Life Sciences, Biotech, and Pharmaceutical Industries* (Sonoran JK)  
**Panel Chair**: Sudha Ram; **Panelists**: Brian Ellerman, Tucson SIS Site Head-Sanofi-Aventis, David J Kempson, CIO-Maricopa Integrated Health System, Dan Stanzione Co-Director – iPlant Collaborative, Edward Suh, CIO-TGen |
| 3:00p-3:30p  | Coffee Break (Sonoran G)                                                                                                                                                                     |
| **Session 6** | **Session 6 A: Process Management and Quality management**  
Sonoran H (Session Chair: Ahmed Abbasi)  
- Harry Jiannan Wang, and Harris Wu. *Supporting Business Process Design through a Web 2.0 Process Repository*  
- Jiaqi Yan, Sherry Sun, Huaiqing Wang, and Zhongsheng Hua. *A Belief-Desire-Intention Modeling Approach for Inspection-Oriented Quality Management*  
| **Session 6** | **Session 6 B: Collaboration, Information Diffusion, and Recommender Systems**  
Sonoran I (Session Chair: Bin Zhu)  
- Aaron R. Sun, Jessie Cheng, and Daniel D. Zeng. *A Novel Recommendation Framework for Microblogging based on Information Diffusion*  
  (**Nomination for best paper award**)  
- Young Jin Lee, Yong Tan, and Kartik Hosanagar. *Do I Follow My Friends or the Crowd? Informational Cascades in Online Movie Rating*  
- Akhmed Umayarov and Alexander Tuzhilin. *Making Aggregate-Level Predictions in Recommender Systems Using Multi-Level Ratings* |
| 5:15p-6:15p  | WITS feedback meeting (Sonoran H)                                                                                                                                                            |