Network-based computing has become an important aspect of social and other networks as well as many applications. With various complex data being collected from human beings and available for public use, the growing need for integrative analysis of understanding person to person relationships and behaviors in social and other networks are required. In this talk, based on our newest findings, I will present computational approaches to complex network modeling and embedding. I will also discuss how network fusion can be performed for integrative analysis. These methods will be helpful for the analysis of social and other networks and also for understanding of user behaviors. I will demonstrate several case studies to show the effectiveness in real-world applications.

Short Bio

Dr. Aidong Zhang is a SUNY Distinguished Professor of Computer Science and Engineering at the State University of New York (SUNY) at Buffalo where she served as the Department Chair from 2009 to 2015, and has also held adjunct professor positions in both Biomedical Engineering and Biomedical Informatics Departments. She is currently on leave and serving as a Program Director in the Information & Intelligent Systems Division of the Directorate for Computer & Information Science & Engineering, at the National Science Foundation. Her research interests include data mining/data science, machine learning, bioinformatics, and health informatics. She has authored over 300 research publications in these areas. Dr. Zhang currently serves as the Editor-in-Chief of the IEEE Transactions on Computational Biology and Bioinformatics (TCBB). She served as the founding Chair of ACM Special Interest Group on Bioinformatics, Computational Biology and Biomedical Informatics during 2011-2015 and is currently the Chair of its advisory board. She is also the founding and steering chair of ACM international conference on Bioinformatics, Computational Biology and Health Informatics. She has served as editors for several other journal editorial boards, and has also chaired or served on numerous program committees of international conferences and workshops. Dr. Zhang is an ACM Fellow and an IEEE Fellow.
The micro-macro link in social networks

Christoph Stadtfeld

ETH Zürich, Switzerland

Abstract

Social networks are large, complex, dynamic systems. However, social networks emerge on a much smaller scale from the actions of individual nodes that do not necessarily overlook its structures. Yet, emerging network outcomes such as segregation, cluster formation, or the distribution of knowledge have a direct impact on them and can restrict their choices and opportunities to act. In the study of social network dynamics it is thus important to simultaneously consider the link between the two levels levels: the macro-level of large-scale network structures and the micro-level of individuals’ opportunities, preferences, and actions. This talk illustrates how state-of-the-art statistical network methods and computational simulation techniques can be combined to investigate the micro-macro link in social networks. Recent empirical work in the context of the Swiss StudentLife study will illustrate the value of this approach.

Short Bio

Christoph Stadtfeld is an assistant professor of Social Networks at ETH Zürich, Switzerland. He develops methods for the statistical analysis of dynamic social network data, and publishes theoretical-empirical work on network dynamics in different sub fields of sociology. Both research lines have been featured in leading sociological and methodological journals (e.g. Sociological Methodology, Sociological Methods & Research, Social Networks, Social Forces). To make the methodological work accessible to the applied social networks community, Christoph Stadtfeld develops and contributes to scientific software packages, like the Goldfish package in R.
Understanding Social Behavior During Crisis Events using Digital Traces

Emma Spiro
University of Washington, USA

Abstract

Social media have become an established feature of the dynamic information space that emerges during crisis events. Both emergency responders and the public use these platforms to search for, disseminate, challenge, and make sense of information during crises. In this talk, I will review the social processes that unfold in communities during disaster events and how these processes can be studied at scale with behavioral trace data. I illustrate this approach in studies of rumoring behavior and mass convergence of attention. Understanding these processes has important practical implications for effectively leveraging social media for emergency management.

Short Bio

Emma S. Spiro is an Assistant Professor at the University of Washington Information School. She is also an Adjunct Assistant Professor in the Department of Sociology, and an affiliate of the UW Center for Statistics and the Social Sciences and the eScience Institute. At the iSchool Emma is a co-director of the Social Media Lab and the Data Science and Analytics Lab. Prior to joining UW, Emma was a Graduate Fellow of the University of California Irvine Center for Networks and Relational Analysis. Emma studies online communication and information-related behaviors in the context of emergencies and disaster events. Her work also explores the structure and dynamics of interpersonal and organizational networks in both online and offline environments. Her research has been published in journals such as PNAS, Social Networks and Information, Communication & Society. Emma earned her Ph.D. in Sociology from the University of California, Irvine. She also holds a B.A. in Applied Mathematics and a B.A. in Science, Technology, and Society from Pomona College, as well as an M.A. from the Institute for Mathematical Behavioral Sciences at University of California, Irvine.
Learning Analytics — Improving Higher Education

George Karypis

University of Minnesota, USA

Abstract

An enduring issue in higher education is student retention to successful graduation. Studies in the U.S. report that average six-year graduation rates across higher-education institutions is 59% and have remained relatively stable over the last 15 years. For those that do complete a college degree, less than half complete within four-years. Requiring additional terms or leaving college without receiving a bachelor’s degree has high human and monetary costs and deprives students from the economic benefits of a college credential (over $1 million in a lifetime and even higher in STEM fields). Moreover, when students do not succeed in graduating, local and national communities struggle to create an educated workforce. Estimates indicate that by 2020 over 64% of the jobs in the U.S. will require at least some post-secondary education. These challenges have been recognized by the U.S. National Research Council, which identified that there is a critical need to develop innovative approaches to enable higher-education institutions retain students, ensure their timely graduation, and are well-trained and workforce ready in their field of study. Failure to do so represents a significant problem as it deprives the U.S. of the highly skilled workforce that it needs to successfully compete in the modern world.

This talk describes various efforts under way to develop “Big Data” methods to analyze in a comprehensive manner, the large and diverse types of education and learning-related data in order to improve undergraduate education. These methods are motivated by and are designed to address various interrelated issues that have a significant impact on college student success and include: (i) academic pathways towards successful and timely graduation from the student perspective; (ii) effective pedagogy by instructors; and (iii) retention and persistence of students from the institutional and advisor perspective. In addition, the talk will discuss areas in which research methods and approaches that have been developed by the data mining, machine learning, and social network analysis communities can be applied to this domain.

Short Bio

George Karypis is a Distinguished McKnight University Professor and an ADC Chair of Digital Technology at the Department of Computer Science & Engineering at the University of Minnesota, Twin Cities. His research interests span the areas of data mining, high performance computing, information retrieval, collaborative filtering, bioinformatics, cheminformatics, and scientific computing. His research has resulted in the development of software libraries for serial and parallel graph partitioning (METIS and ParMETIS), hypergraph partitioning (hMETIS), for parallel Cholesky factorization (PSPASES), for collaborative filtering-based recommendation algorithms (SUGGEST), clustering high dimensional datasets (CLUTO), finding frequent patterns in diverse datasets (PAFI), and for protein secondary structure prediction (YASSPP). He has coauthored over 280 papers on these topics and two books (“Introduction to Protein Structure Prediction: Methods and Algorithms”
(Wiley, 2010) and “Introduction to Parallel Computing” (Publ. Addison Wesley, 2003, 2nd edition)). In addition, he is serving on the program committees of many conferences and workshops on these topics, and on the editorial boards of the IEEE Transactions on Knowledge and Data Engineering, ACM Transactions on Knowledge Discovery from Data, Data Mining and Knowledge Discovery, Social Network Analysis and Data Mining Journal, International Journal of Data Mining and Bioinformatics, the journal on Current Proteomics, Advances in Bioinformatics, and Biomedicine and Biotechnology. He is a Fellow of the IEEE.