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Computer Science Seminar

Chandan Reddy

Mining Critical Events in Longitudinal Data: Challenges and Opportunities

Date: Tuesday, February 16, 2016
Time: 1:00 pm - 2:00 pm
Location: NVC Room 214

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Abstract:

Due to the advancements in recent data acquisition and storage technologies, various disciplines have attained the ability to not only accumulate a wide variety of data but also to monitor observations over longer time periods. In many real-world applications, the primary objective of monitoring these observations is to be able to better understand and estimate the time point at which a particular event of interest will occur in the future. One of the major difficulties in handling such longitudinal data is that the data is usually censored, i.e., it is often incomplete since some of the instances will either become unobservable or no event occurs during the monitoring duration. Due to this censored nature, standard statistical and machine learning based predictive algorithms cannot readily be applied to analyze the data. In addition to the presence of censoring, such longitudinal event data poses unique challenges to the field of predictive analytics and thus creates opportunities to develop new algorithms. For example, in many practical scenarios, the censored data challenges are compounded by several other closely related complexities such as the presence of correlations within the data, high dimensionality of the data, temporal dependencies across multiple time points, lack of available information from a single source, and difficulty in acquiring sufficient event data in a reasonable amount of time. In this talk, I will describe new computational algorithms that can address these challenges and effectively capture the underlying predictive patterns in longitudinal data by directly estimating the probability of event occurrence. The performance of these new models for mining critical events will be demonstrated on important problems such as forecasting patient risk in healthcare, project success prediction in crowdfunding, and cancer survival estimation in bioinformatics. Finally, some of the ongoing research works in our lab related to the student retention problem and crime data analysis will also be discussed.

Bio:

Chandan Reddy is an Associate Professor in the Department of Computer Science at Wayne State University. He received his Ph.D. from Cornell University and M.S. from Michigan State University. He is the Director of the Data Mining and Knowledge Discovery (DMKD) Laboratory and a scientific member of Karmanos Cancer Institute. His primary research interests are Data Mining and Machine Learning with applications to Healthcare Analytics, Social Network Analysis and Bioinformatics. His research is funded by the National Science Foundation, the National Institutes of Health, the Department of Transportation, and the Susan G. Komen for the Cure Foundation. He has published over 60 peer-reviewed articles in leading conferences and journals including SIGKDD, WSDM, ICDM, SDM, CIKM, TKDE, DMKD, TVCG, and PAMI. He received the Best Application Paper Award in ACM SIGKDD conference in 2010, and was a finalist of the INFORMS Franz Edelman Award Competition in 2011. He is a senior member of the IEEE and life member of the ACM.