

Presents

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Social Network Signal Processing for Cyber-physical Applications

This talk presents recent advances on exploiting social networks as "sensor networks", where sources post observations on the physical world; an act we call social sensing. Social sources already volunteer to post over 500 million tweets and over 80 million Instagram photos per day, among many other social network outlets. We demonstrate that, as a sensing modality, social sensing is not unlike acoustic sensing, vibration sensing, or magnetic sensing. Appropriate signal processing algorithms inspired by physical data fusion can help exploit social media for purposes such as veracity analysis, event detection, localization, and tracking. Of particular interest are language-independent algorithms. They leverage the intuition that individuals' reactions to events and posts are a response to the subject matter of these events and posts. Therefore, the collective reaction pattern carries a lot of information on the nature of content posted, making it possible to analyze it without understanding the language, much the way it is possible to interpret non-verbal cues (or "body language") to understand conversation content. The talk describes examples of language-independent social network signal processing using Twitter and Instagram data, and presents the underlying analytical foundations and recent application results.

Bio: Tarek Abdelzaher received his B.Sc. and M.Sc. degrees in Electrical and Computer Engineering from Ain Shams University, Cairo, Egypt, in 1990 and 1994 respectively. He received his Ph.D. from the University of Michigan in 1999 on Quality of Service Adaptation in Real-Time Systems. He has been an Assistant Professor at the University of Virginia, where he founded the Software Predictability Group. He is currently a Professor and Willett Faculty Scholar at the Department of Computer Science, the University of Illinois at Urbana Champaign. He has authored/coauthored more than 200 refereed publications in real-time computing, distributed systems, sensor networks, and control. He is an Editor-in-Chief of the Journal of Real-Time Systems, and has served as Associate Editor of the IEEE Transactions on Mobile Computing, IEEE Transactions on Parallel and Distributed Systems, IEEE Embedded Systems Letters, the ACM Transaction on Sensor Networks, and the Ad Hoc Networks Journal. He chaired (as Program or General Chair) several conferences in his area including RTAS, RTSS, IPSN, Sensys, DCoSS, ICDCS, ICCCN, MASS and ICAC. Abdelzaher's research interests lie broadly in understanding and influencing performance and temporal properties of networked embedded, social and software systems in the face of increasing complexity, distribution, and degree of interaction with an external physical environment. Tarek Abdelzaher is a recipient of the IEEE Outstanding Technical Achievement and Leadership Award in Real-time Systems (2012), the Xerox Award for Faculty Research (2011), as well as several best paper awards. He is a member of IEEE and ACM.

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University at Buffalo – North Campus – Davis 113A

This talk is free and open to the public

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