Crowdsourcing Computing Tasks to People: from ESP Game to Social Media

ABSTRACT

Crowdsourcing complex computing tasks to people has become a promising way to leverage human perception power to solve difficult computer intelligence problems, from labeling images, optical character recognition, to improving web searching results and even folding 3D protein structure. Accordingly, many human-centric computing algorithms and platforms have been designed to accommodate different crowdsourcing tasks, such as ESP game, Amazon Mechanical Turk (AMT), and social media like Flickr and Twitter. In these systems, people are contributing their brain powers to crowdsourcing for different reasons, for entertainment (e.g., ESP game), monetary incentives (e.g., AMT), or even spontaneously (e.g., in social media). In this talk, I will compare these crowdsourcing models, and reveal several key design factors--the reliability and dependence between people when they participate in computing tasks, and the varying difficulty levels between tasks--, and show how they impact the success of a crowdsourcing system. I will develop statistical models to comprehensively study these factors, which can distill high quality data from collective contributions by participants even if they are not always reliable or independent in completing their tasks. Efficient variational approach is derived to infer the most likely true labels and reveal interdependence structure between participants in a probabilistic framework given the massive crowdsourced quality-deficient data. I will demonstrate that the proposed algorithm achieves competitive performance on building robust visual recognition system with the help of crowd contributed data in real-world systems. In addition, as an example of using crowdsourced data, I will present a cross-media model to link data streams in different modalities on semantic level. It has been applied to extract and rank high-quality twitter posts to ensure timely response of decision-makers to social and natural events based on social media platforms.

BIOGRAPHY

Guojun Qi is a Ph.D. candidate in the Beckman Institute and the Department of Electrical and Computer Engineering in the University of Illinois at Urbana-Champaign. He has been awarded Microsoft Fellowship and IBM Fellowship. His work has appeared in several venues, including IEEE TPAMI, IEEE TKDE, IEEE T Multimdia, ICML, WWW, CVPR, ICDE, WSDM and SDM. His current research interests concentrate on integrating information and knowledge from multi-agent systems based on integrating collective intelligence and building highly reliable human-centric systems (e.g., crowdsourcing, collaborative filtering and social media) in order to solve complex computing tasks in real world. He is a recipient of the best paper award at ACM Multimedia 2007, and his social media paper in ICDE 2013 has been selected as one of the best papers to be highlighted in a special issue of IEEE Transactions on Knowledge and Data Engineering.

All are welcome!

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