Meta Paths and Meta Structures: Analysing Large Heterogeneous Information Networks

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Abstract
A heterogeneous information network (HIN) is a graph model in which objects and edges are annotated with types. Large and complex databases, such as YAGO and DBLP, can be modeled as HINs. A fundamental problem in HINs is the computation of closeness, or relevance, between two HIN objects. Relevance measures, such as PCRW, PathSim, and HeteSim, can be used in various applications, including information retrieval, entity resolution, and product recommendation. These metrics are based on the use of meta paths, essentially a sequence of node classes and edge types between two nodes in a HIN. In this talk, we will give a detailed review of meta paths, as well as how they are used to define relevance. In a large and complex HIN, retrieving meta paths manually can be complex, expensive, and error-prone. Hence, we will explore systematic methods for finding meta paths. In particular, we will study a solution based on the Query-by-Example (QBE) paradigm, which allows us to discover meta paths in an effective and efficient manner. We further generalise the notion of a meta path to "meta structure", which is a directed acyclic graph of object types with edge types. We develop three relevance measures based on meta structure. Due to the computational complexity of these measures, we also study an algorithm with data structures proposed to support their evaluation for performing query recommendation.

About the Speaker
Dr Reynold Cheng is an Associate Professor of the Department of Computer Science in the University of Hong Kong. He was an Assistant Professor in HKU in 2008-11. He received his BEng (Computer Engineering) in 1998, and MPhil (Computer Science and Information Systems) in 2000, from the Department of Computer Science in the University of Hong Kong. He then obtained his MSc and PhD from Department of Computer Science of Purdue University in 2003 and 2005 respectively. Dr Cheng was an Assistant Professor in the Department of Computing of the Hong Kong Polytechnic University during 2005-08. He was a visiting scientist in the Institute of Parallel and Distributed Systems in the University of Stuttgart during the summer of 2006. Dr Cheng was granted an Outstanding Young Researcher Award 2011-12 by HKU. He was the recipient of the 2010 Research Output Prize in the Department of Computer Science of HKU. He is the Chair of the Department Research Postgraduate Committee, and was the Vice Chairperson of the ACM (Hong Kong Chapter) in 2013. He is a member of the IEEE, the ACM, the Special Interest Group on Management of Data (ACM SIGMOD). He is an editorial board member of TKDE, DAPD and IS, and was a guest editor for TKDE, DAPD, and GeoInformatica. He is the lead PC chair of WISE 2019, an area chair of ICDE 2017, a senior PC member for DASFAA 2015, PC co-chair of APWeb 2015. He has served as PC members and reviewer for top conferences (e.g., SIGMOD, VLDB, ICDE, EDBT, KDD, ICDM, and CIKM) and journals (e.g., TODS, TKDE, VLDBJ, IS, and TMC).

All are welcome!

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