



Dr. Miao Qiao

Senior Lecturer
School of Computer Science
University of Auckland

 **Date: 27 April 2023 (Thursday)**

 **Time: 11:00am – 12:00pm**

 **Venue: Mr. and Mrs. Lee Siu Lun Lecture Theatre
WLB205, Shaw Campus**

 **Registration: <https://bit.ly/cs-ereg>**

Register Now



Big Graph Management and Analysis: on Eccentricity Computation and Local Subgraph Algorithms

ABSTRACT

This talk will introduce two works in the direction of fusing theory and practice in graph data management and analytics. The first work investigates the efficient computation of the eccentricity distribution of a big graph. Given a graph, eccentricity measures the distance from each node to its farthest node. Eccentricity indicates the centrality of each node and collectively encodes fundamental graph properties: the radius and the diameter — the minimum and maximum eccentricity, respectively, over all the nodes in the graph. Computing the eccentricities for all the graph nodes, however, is challenging in theory: any approach shall either complete in quadratic time or introduce a $\geq 1/3$ relative error under certain hypotheses. In practice, the state-of-the-art approach PLLECC in computing exact eccentricities relies heavily on a precomputed all-pair-shortest-distance index whose expensive construction refrains PLLECC from scaling up. This work provides insights to enable scalable exact eccentricity computation that does not rely on any index. The proposed algorithm IFECC handles billion-scale graphs that no existing approach can process and achieves up to two orders of magnitude speedup over PLLECC. The second work introduces a new problem of Anchored Densest Subgraph (ADS) and its efficient local computation. The computation is local since the complexity is only related to the query nodes as opposed to the entire graph. Extensive experiments show that our local algorithm for ADS outperforms the global algorithm by up to three orders of magnitude in time and space consumption; moreover, our local algorithm outperforms existing local community detection solutions in the locality, result density, and query processing time and space.

BIOGRAPHY

Miao Qiao joined the School of Computer Science, University of Auckland, in 2018. Her research focuses on the theory and practice of databases with the past and current research topics of graph data management and query optimization, social network analysis, sampling, join optimization and brain network analytics for medical diagnosis. The research outcome has been published in top conferences including SIGMOD, PODS, PVLDB, ICDE and WWW, and top database journals such as VLDBJ and TKDE. She has served as a review board member of conferences such as PODS and PVLDB and as programme chair of ADC and ISWC. Her research has been supported by the Royal Society of New Zealand and the Ministry of Business, Innovation and Employment, New Zealand.

ENQUIRY

Tel: 3411-2385 Email: comp@comp.hkbu.edu.hk Website: <https://www.comp.hkbu.edu.hk/v1/?page=events>