Jie Liu

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Education

University of Michigan, Ann Arbor Sep. 2020 - Present
Ph.D. candidate in Computer Science and Engineering
Advisor: Barzan Mozafari

The Chinese University of Hong Kong (CUHK) Sep. 2018 - Jul. 2020
MPhil in Computer Science and Engineering
Advisors: James Cheng, Ming-Chang Yang

The Chinese University of Hong Kong (CUHK) Sep. 2013 - Jun. 2018
B.S. in Computer Science with **Honours, First Class**

Publications

*** means equally contributed co-first author**

Conference

[C1] SlabCity: Whole-Query Optimization using Program Synthesis, ***VLDB'***23 [link]
Rui Dong*, **Jie Liu***, Yuxuan Zhu, Cong Yan, Barzan Mozafari, Xinyu Wang

[C2] Understanding and Improving Proximity Graph based Maximum Inner Product Search, ***AAAI'***20 [link]
Jie Liu*, Xiao Yan*, Xinyan Dai, Zhirong Li, James Cheng, Ming-Chang Yang

[C3] Norm-Explicit Quantization: Improving Vector Quantization for Maximum Inner Product Search, ***AAAI'***20 [link]
Xinyan Dai*, Xiao Yan*, Kelvin K. W. Ng, **Jie Liu**, James Cheng

[C4] A General and Efficient Querying Method for Learning to Hash, ***SIGMOD'***18 [link]
Jinfeng Li, Xiao Yan, Jian Zhang, An Xu, James Cheng, **Jie Liu**, Kelvin K.W. Ng, Ti-chung Cheng

Thesis/Dissertation

[T1] Understanding and Improving Proximity Graph based Maximum Inner Product Search, ***MPhil*** Thesis [link]
Jie Liu

Research Experience

University of Michigan, Ann Arbor Sep. 2020 - Present
Graduate Research Assistant, Advisors: Barzan Mozafari, Xinyu Wang

Query Rewriting via LLM (Ongoing)

- Leveraged LLMs (large language models) to propose candidate queries and iteratively fix inequivalent queries by asking for counterexamples.
- Designed a knowledge transfer module, which first collects rewrite rules in natural language form and then helps design prompts tailed for queries based on query similarity.

Synthesis-aided Query Rewriting

- Proposed the first synthesis-based query rewriting technique capable of whole-query optimization without requiring predefined rewrite rules.
- Defined dataflows for SQL queries and exploit them for efficient query synthesis.

National University of Singapore Jul. 2019 - Aug. 2019
Summer Research Intern, Advisor: Xiaokui Xiao

Understanding and Simplifying Graph Attention Networks

- Reviewed existing concepts for simplifying graph neural networks and examined the learning capabilities necessary for various graph-related tasks.
- Explored the idea of light-weight attention mechanism without negatively impacting accuracy.

The Chinese University of Hong Kong (CUHK) Aug. 2018 - Apr. 2020

Research Assistant, Advisors: James Cheng, Ming-Chang Yang

Approximate Maximum Inner Product Search

- Proposed a novel proximity graph based approximate maximum inner product search (MIPS), ip-NSW+, which achieved an order of magnitude speedup over the fastest baseline.
- Offered a compelling rationale for the good performance of the inner-product navigable small-world graph: large norm nodes have big in-degrees in the ip-NSW and thus have a higher chance to be visited, matching the norm bias of the MIPS problem.

Professional Experience

ASMPT, Hong Kong Sep. 2016 - May 2017

Software Engineer Intern, Advisor: Ryan Yip

- Developed and maintained an internal tool for defect detection and classification in chip assembly and packaging.

Teaching Experience

Database Management Systems, Graduate Student Instructor, University of Michigan	2023 Winter
Foundations of Artificial Intelligence, Graduate Student Instructor, University of Michigan	2022 Fall
Introduction to Social Networks, Teaching Assistant, The Chinese University of Hong Kong	2020 Spring

Honors and Awards

Graduate Student Instructor Honorable Mention Award	2023
AWS Cloud Credits for Research	2023
CUHK Graduate with First Class Honours	2018
Best Project Award in UG Summer Internship, CUHK	2017
Dean's List, Faculty of Engineering, CUHK	2015, 2018
Niuniu Ji Scholarship	2015
S.H. Ho College Matriculation Scholarships for Academic Excellence	2014

Skills

Programming Languages: C/C++, Python, SQL.
Tools: Pytorch, Hugging Face, scikit-learn, Apache Spark, Apache Calcite, PostgreSQL, LaTeX, Git.

Last updated: 12/13/2023