Abdullah Al Raqibul Islam

CONTACT INFORMATION

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RESEARCH INTEREST

My research aims to build a high-performance graph processing engine to support trillion-edge graph processing in a single heterogeneous machine. I am particularly interested in developing data structures to efficiently store dynamic graphs without sacrificing the graph analysis's efficiency. In this regard, I want to exploit emerging storage technologies (e.g., Persistent Memory).

EDUCATION

University of North Carolina at Charlotte

Doctor of Philosophy in Computer Science 2019 - Present

College of Computing and Informatics

CGPA: 4.00 in a scale of 4.00

Expected: Spring, 2024

Specialization: Dynamic graph processing systems.

Supervisor: Dr. Dong Dai

University of Dhaka, Bangladesh

Bachelor of Science in Computer Science & Engineering 2009-2012

CGPA: 3.59 in a scale of 4.00

PUBLICATIONS

Youssef, Karim and Islam, Abdullah Al Raqibul and Iwabuchi, Keita and Feng, Wu-chun and Pearce, Roger. *"Optimizing Performance and Storage of Memory-Mapped Persistent Data Structures,"* Accepted to appear in the IEEE High Performance Extreme Computing Conference (HPEC '22). **[Outstanding Student Paper Award]**

Islam, Abdullah Al Raqibul and York, Christopher and Dai, Dong. *"A Performance Study of Optane Persistent Memory: From Storage Data Structures' Perspective,"* CCF Transactions on High Performance Computing (2022). doi:10.1007/s42514-022-00123-x.

Islam, Abdullah Al Raqibul and Dai, Dong and Cheng, Dazhao. *"VCSR: Mutable CSR Graph Format Using Vertex-Centric Packed Memory Array,"* 2022 22nd IEEE International Symposium on Cluster, Cloud and Internet Computing (CCGrid), 2022, doi: 10.1109/CCGrid54584.2022.00016.

Islam, Abdullah Al Raqibul and Dai, Dong and Narayanan, Anirudh and York, Christopher. *"A Performance Study of Optane Persistent Memory: From Indexing Data Structures' Perspective,"* MSST '20: 36th International Conference on Massive Storage Systems and Technology, 2020.

Islam, Abdullah Al Raqibul and Dai, Dong. *"POSTER: Understand the overheads of storage data structures on persistent memory,"* PPoPP '20: Proceedings of the 25th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming, 2020. doi:10.1145/3332466.3374509

RESEARCH EXPERIENCE

University of North Carolina at Charlotte

Research Assistant, Data Intelligence Research (DIR) Lab 2019-Present

- Graph Storage:

- Leading a research project on system design for large-scale dynamic graph data processing on emerging storage system technologies.
- Designing data structures to efficiently store dynamic graphs without scarifying the efficiency in running graph analysis.
- Build system from scratch in C++; Use parallel programming; Do performance optimization and analysis with *Intel VTune* and *Linux perf tool*.

- Persistent Memory:
  - *pmemids_bench*: C++ version of YCSB based benchmark suite. It includes,
    - Seven commonly used indexing data structures
    - Four persistent modes (by using PMDK's libvmem and libpmemobj libraries)
    - Four parallel settings

Google
CS Research Mentorship Program (CSRMP) - Mentee — Sep 2022 – Present

- Selected to join this 3-month research program by Google.
- Matched with my mentor at Google Dr. Marisa Ferrara Boston. Currently exploring research and professional opportunities in computer science research pathways.

Lawrence Livermore National Laboratory
Computing Graduate Student Intern - Summer — May 2022 – Aug 2022

- **Privateer 2.0:** Integrated several C++ standard template library (STL) containers (e.g., vector, list, deque, map, set, etc.) with *Privateer 2.0* to evaluate storage space optimization of these data structures in the incremental snapshot setting.
- **Snapshotable:** Designed and implemented a new *hash table* aiming to reduce the storage footprint in the de-duplication based snapshot model.

Software Engineering Experience

TigerIT Bangladesh Ltd.
Principal Software Engineer — 2019-2019
Software Engineer — 2014-2019

- Machine Learning: Led a couple of ML engineering projects including (i) hybrid recommendation engine (used in a mobile application named KinderMate), (ii) proof-of-concept development of a video analytics system, and (iii) inventory forecasting system.
- Databases: Developed a pseudo-real-time data synchronization module, syncing incremental changes in third-party databases to local databases (i.e., Oracle, Elasticsearch, etc.).
- Server Side Programming: Implemented several backend modules to support (i) payment system bookkeeping, (ii) FCM based personalized notification management, (iii) advanced text search, etc.

Therap (BD) Ltd.
Junior Software Engineer — 2013-2014

- Appointed as full stack software developer for the web-based service portal, used different java technologies (i.e. Spring, Java EE, Hibernate, etc).

Honors and Awards

SciAuth Student Fellowship, Fall 2022

Competitive Programming & Problem Solving (Selected)

Contest Participation

- Lucid Programming Competition, 2021
  Individual (Place: 5th in UNC Chapel Hill Leaderboard)
- ACM ICPC Regionals, 2011 (Asia, Dhaka Site)
  Team: DU Army Ants Reloaded, Place: 9th

Problem Setter & Judge

- SUB Inter University Programming Contest, 2017, State University of Bangladesh
- Cybernauts'16 National Programming Contest, 2016, North South University
- Bangladesh Informatics Olympiad, 2016, National Round
- IUT 6th-9th ICT Fest Programming Contest, 2014-2017, Islamic University of Technology

Professional Service

❑ Sub Reviewer, ICPP, IEEE BigData	2022
❑ Artifact Evaluation Committee, OSDI + ATC	2022
❑ Sub Reviewer, IEEE ISPA	2021
❑ Student Volunteer, SC	2021

Technical skills

Language: C/C++, Java, Python, Bash
Frameworks: Apache Spark, Apache Kafka, Spring, Java EE
Databases: Oracle, PostgreSQL, Elasticsearch
Miscellaneous: Git, LaTeX, Intel VTune, perf (Linux)

References

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