MD HASANUR RAHMAN

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CURRENT POSITION(S)

University of Iowa *2021-present*
Department of Computer Science
PhD Student

Argonne National Laboratory *2021-present*
Mathematics and Computer Science Division
Visiting Student

RESEARCH INTERESTS

System Dependability, Data Reduction, Machine Learning Applications

EDUCATION

University of Iowa *2021-present*
PhD in Computer Science
Advisor: Guanpeng Li

Bangladesh University of Engineering and Technology *2015-2019*
BSc in Computer Science and Engineering

PUBLICATIONS

DRUTO: Upper-Bounding Silent Data Corruption Vulnerability in GPU Applications
Md Hasanur Rahman, Sheng Di, Shengjian Guo, Xiaoyi Lu, Guanpeng Li, Franck Cappello
38th IEEE International Parallel & Distributed Processing Symposium (IPDPS'24)

A Feature-Driven Fixed-Ratio Lossy Compression Framework for Real-World Scientific Datasets
Md Hasanur Rahman, Sheng Di, Kai Zhao, Robert Underwood, Guanpeng Li, Franck Cappello
IEEE International Conference on Data Engineering (ICDE'23) Acceptance rate: 19.1%

Peppa-X: Finding Program Test Inputs to Bound Silent Data Corruption Vulnerability in HPC Applications
Md Hasanur Rahman, Aabid Shamji, Shengjian Guo, Guanpeng Li
ACM International Conference for High-Performance Computing, Networking, Storage and Analysis (SC'21) Acceptance rate: 23.6%

Investigating The Impact of Transient Hardware Faults on Deep Learning Neural Network Inference
Md Hasanur Rahman, Sabuj Laskar, Guanpeng Li
Software Testing, Verification and Reliability (STVR'24)

LibPressio-Predict: Flexible and Fast Infrastructure For Inferring Compression Performance
Robert R. Underwood, Sheng Di, Sian Jin, Md Hasanur Rahman, Arham Khan, Franck Cappello
International Workshop on Data Reduction for Big Scientific Data (DRBSD-9) in Conjunction with SC'23

Characterizing Deep Learning Neural Network Failures between Algorithmic Inaccuracy and Transient Hardware Faults
Sabuj Laskar, Md Hasanur Rahman, Bohan Zhang, Guanpeng Li
IEEE Pacific Rim International Symposium on Dependable Computing (PRDC'22)

TensorFI+: A Scalable Fault Injection Framework for Modern Deep Learning Neural Networks
Sabuj Laskar, Md Hasanur Rahman, Guanpeng Li
IEEE International Workshop on Resiliency, Security, Defences and Attacks (ISSRE-W'22)

RESEARCH EXPERIENCE

Characterizing Error Propagation across Multiple Inputs in HPC Applications

- Developed an automated program analysis framework that depicts the upper bound of program SDC (silent data corruption) probability based on error propagation characteristics over multiple inputs.
- Proposed a LLVM-based dynamic input fuzzing technique that identify the SDC-bound inputs for benchmarking HPC resilience.

Developing a scalable data reduction framework to dynamically generate best-qualified data reduction solution

- Analyzed various complicated data characteristics such as smoothness, distribution, textures to effectively project the data compressibility with real-world scientific datasets.
- Performed comprehensive analysis of how to maintain high data fidelity while projecting data compressibility.

WORK EXPERIENCES

University of Iowa — *2021-present*
Research Assistant — *IA, USA*

Argonne National Laboratory — *2021-present*
Remote Research Intern — *IL, USA*

Samsung Research — *2019-2021*
Software Engineer — *Bangladesh*

PROFESSIONAL SERVICE

Subreviewer	ISSRE'23, HPDC'23, DSN'23, ISSRE'22, MiddleWare'22, HPDC'22, DSN'22,SELSE'22, PRDC'21
Student Mentoring	Abdullah Naveed (2023), Sabuj Laskar (2022), Zhengyang He (2022)