Sultan Mahmud Sajal

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Professional Experience

May, 2024 - Present	**Performance and Capacity Engineer** at Meta Platforms, Inc.
May, 2022 - August, 2022	**Research Intern** at Cloud Operations Research (CORE), Microsoft Research.
May, 2021 - August, 2021	**Research Intern** at Gray Systems Lab (GSL), Microsoft.
August, 2018 - May, 2024	**Graduate Research Assistant** and **Graduate Teaching Assistant** at The Pennsylvania State University.
October, 2017 - July, 2018	**Junior Software Engineer** at Reve Systems.

Education

2018 - 2024 **Ph.D. in Computer Science and Engineering**
The Pennsylvania State University
Thesis topic: Improving the Fidelity of Trace-Driven Experiments in Cloud Computing Systems
Advisors: *Timothy Zhu* and *Bhuvan Urgaonkar*

2013 - 2017 **B.Sc. in Computer Science and Engineering**
Bangladesh University of Engineering and Technology
Thesis topic: An Empirical Study on the Growth of New Languages and Their Users in Stack Overflow
Advisor: *Rifat Shahriyar*

Skills

Programming Languages	Java, Python, C++, Scala, C, R
Databases	MySQL, PostgreSQL
Technologies	AWS Services and SDK, Azure Services and CLI, Apache Spark, Kubernetes(K8s), Docker, Git, Nginx, Varnish Http Cache, Memcached
Scripting	Bash, HTML, CSS, LaTeX
Specialized Skills	Distributed Systems, Microservice, Analysis and Testing of Systems, Performance Evaluation

Recent Projects

- **Facilitate Isolated Experimentation for Reproducible Results in Cloud Systems** [2023 - Ongoing]
  - Motivate the need for isolated experimentation for realistic and reproducible experiments through realistic experiments
  - Using synthetic and real-world applications with *Kubernetes* as orchestration service
- **Efficient and Scalable Cloud Admission Control in Azure** [2022]
  - Developed novel admissions control techniques to guarantee SLAs for both allocated and reserved resources while maximizing resource efficiency.
  - Extended existing simulator (written in *C++*) and generated synthetic capacity reservation requests using *Python3* to complement real-world trace, stored in *PostgreSQL*

Recent Projects (continued)

- **Upscale Workloads to Evaluate Cloud Systems at High Load** [2020 - 2023]
  - Developed novel upscaling techniques for real workloads to enable faithful systems experimentation under varying loads.
  - Deployed a stateful replicated *DeathStarBench Social Network benchmark*, using *Varnish Http Cache* as front-end reverse proxy cache and *Nginx* as load balancer, and deployed in *Azure*
  - Deployed a stateless 16-node distributed Mediawiki application using *MySQL*, *Memcached*, and *Nginx* load balancer, and deployed in *Azure*
- **Development of Flight Simulator for Spark Jobs** [2021]
  - Analyzed anonymized *Azure HDInsight* telemetry data to generate synthetic database and queries to facilitate realistic performance experiments using synthetic data
  - Developed in *Apache Spark* using *Scala*
- **Downscale Workloads from Cloud System for Realistic Experimentation and Prototyping** [2018 - 2020]
  - Developed novel techniques to downscale cloud workloads while preserving important characteristics such as arrival process and performance to facilitate realistic systems research and industry prototyping.
  - Deployed two different application systems: (1) distributed *Elgg* and (2) *MediaWiki* with autoscaling
  - Both uses *MySQL* database and *Nginx* load balancer and are deployed as *Docker* containers in *AWS*

Publications

1. **Sajal, Sultan Mahmud**, T. Zhu, B. Urgaonkar, and S. Sen, *"TraceUpscaler: Upscaling Traces to Evaluate Systems at High Load,"* in Nineteenth European Conference on Computer Systems, ***(Eurosys 2024)***, Runner Up Paper Award, 2024.
2. **Sajal, Sultan Mahmud**, L. Marshall, B. Li, *et al.*, *"Kerveros: Efficient and Scalable Cloud Admission Control,"* in 17th USENIX Symposium on Operating Systems Design and Implementation, ***(OSDI 2023)***, 2023.
3. **Sajal, Sultan Mahmud*** and Hasan*, Rubaba, T. Zhu, B. Urgaonkar, and S. Sen, *"TraceSplitter: A New Paradigm for Downscaling Traces,"* in Proceedings of the Sixteenth European Conference on Computer Systems, ***(EuroSys 2021)***, **Equal Contribution*, 2021.