Hamidreza Zare

CSE Grad Student at Penn State University
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Education

Pennsylvania State University
State College, PA

Master of Science in Computer Science and Engineering, GPA: 3.85/4.0 — *Aug. 2019 - Dec. 2021*

- **Advisors:** Professor Bhuvan Urgaonkar and Professor Viveck Cadambe — *Working on methods to operate geo-distributed consistent storage systems cost-effectively on the public cloud*
- **Relevant Graduate Courses:** Fundamentals of Computer Architecture, Algorithm Design and Analysis, Distributed algorithms, Operating System Design, Cloud Computing, Performance Evaluation

Sharif University of Technology
Tehran, Iran

Bachelor of Science in Computer Engineering, GPA: 18.73/20.00 (3.94/4.00) — *Sept. 2015 - Jun. 2019*

- **Thesis:** A new architecture for Die-Stacked DRAM considering both dynamic and static behavior of modern big-data applications; Using Die-Stacked DRAM partly as a part of memory and partly as a cache — *In HPCAN lab under the supervision of Professor Hamid Sarbazi-Azad*

NODET (National Organization for Exceptional Talents), Dastgheib 1
Shiraz, Iran

Diploma in Physics and Mathematics, GPA: 19.44/20.00 (4.00/4.00) — *Sept. 2011 - Jun. 2015*

Work Experience

Yugabyte, Inc.
Sunnyvale, CA

Intern - Software Engineer — *Aug. 2021 - Present*

My responsibility is to design and implement methods to resize the VMs in a cluster that runs YugabyteDB. Leveraging the fault tolerance of YugabyteDB, the clients' operations must be able to progress and finish successfully at the same time.

Scientific Green Co. Ltd
Tehran, Iran

Intern - System Software Developer — *Jul. 2018 - Sept. 2018*

The company was developing an infrastructure based on LoRaWAN to offer IoT services. I had the responsibility of customizing the device authentication code in loraserver.io (an open-source LoRa server stack) to use their own protocol.

NAAD
Tehran, Iran

System Software Developer — *Jun. 2017 - Sept. 2017*

My contribution to this work was in developing a logger module in C++ for the HSM that the company was creating, as well as writing Python scripts to automate the whole process of the integration tests of the HSM.

Research Experience

Penn State University
State College, PA

Research Assistant — *Aug. 2019 – Present*

- **Under the supervision of Professor Bhuvan Urgaonkar and Professor Viveck Cadambe**
- Public clouds are an ever-emerging technology solution to users' needs of computing engines and storage services. Having several big public cloud providers, each offering a broad range of VM options with different price structures, presents the users with a bewildering choice of VM types. A poor choice of VMs can have significant implications on performance and costs. Moreover, storage services that present a linearizable memory consistency model to users are an essential sub-class of storage services. There are several methods based on replication and erasure coding to implement these storage systems, bringing more options for users to pick.
  My colleagues and I developed an optimization framework to compute the near-optimal configuration among replication and erasure coding as well as among various data center placements based on the public cloud pricing structure and characteristics of the workload. Furthermore, we developed a cost-effective geo-distributed linearizable key-value store over the public cloud that uses our optimization framework to periodically compute the optimal configuration and reconfigure the key-value store to the found configuration in order to capture dynamism in workloads' characteristics while maintaining linearizability.
  We have developed the optimizer in Python3 and the key-value store in C++11. Our key-value store leverages RocksDB for its persistent storage needs. It has been tested over nine datacenters in Google Cloud Platform.

Sharif University of Technology *Tehran, Iran*

Research Assistant *Jan. 2017 – Jun. 2019*

- **Under the supervision of Professor Hamid Sarbazi-Azad**
- Die-stacked DRAM is a promising solution to the memory bandwidth bottleneck of multi-core processors. Still, it cannot accommodate the entire dataset of modern big-data applications. Prior works have tried to use it as a large cache in the memory hierarchy or as a part of the main memory. Works that use it as a cache while adapting to dynamism in applications but suffer from the tag storage/latency/bandwidth overhead. On the other hand, works that use Die-stacked DRAM as a part of main memory while eliminating the need for tags, and hence, providing efficient access to data, lack adapting to dynamism in applications. Considering both the dynamic and static behavior of modern big-data applications, we proposed a new architecture to use the Die-Stacked DRAM partly as a portion of the main memory and partly as a cache. The paper is available at arxiv.org/abs/1809.08828.

Teaching Experience

Penn State University *State College, PA*

Teaching Assistant *FALL 2020*

- **Distributed systems (CSE513)**
- Instructed by Professor Bhuvan Urgaonkar

Penn State University *State College, PA*

Teaching Assistant *SPRING 2020*

- **Introduction to Systems Programming Course (CMPSC311)**
- Instructed by Professor Patrick McDaniel

Sharif University of Technology *Tehran, Iran*

Teaching Assistant *FALL 2018*

- **Computer Language and Structure**
- Dr. Hossein Asadi

Sharif University of Technology *Tehran, Iran*

Teaching Assistant *FALL 2017*

- **Computer Language and Structure**
- Dr. Hossein Asadi

Sharif University of Technology *Tehran, Iran*

Teaching Assistant *SPRING 2017*

- **Logical Circuit**
- Dr. Siavash Bayat-Sarmadi

Sharif University of Technology *Tehran, Iran*

Teaching Assistant *FALL 2016*

- **Fundamentals of Programming**
- Dr. Omid Gheibi

Honors

Ranked 365th Among the 180000+ participants in the National Universities Entrance Exam

Admitted to NODET Passing an exam with an acceptance rate below 2%

Skills

Programming Expert in (C and C++), Python, Bash, SQL, Node.js (familiar), X86 Assembly, Verilog (HDL)

Frameworks & Tools Git, Linux, GDB, Valgrind, Ansible, gRPC, GCP, AWS, Postgres, ZSim, GAP Benchmark Suite, Modelsim, Quartus

Type Setting LaTeX, Microsoft Office

References

Bhuvan Urgaonkar

Professor of Computer Science and Engineering department at Penn State University

- **Website:** cse.psu.edu/~buu1
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Viveck Cadambe

Associate Professor in the Department of Electrical Engineering at Penn State University

- **Website:** ee.psu.edu/viveck
- **Email:** viveck@psu.edu

Siavash Bayat-Sarmadi

Associate Professor with the Department of Computer Engineering at Sharif University of Technology

- **Website:** sharif.edu/~sbayat
- **Email:** sbayat@sharif.edu

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