Ziqi (Astra) **Zhao**

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Education

Texas A&M University — *College Station, TX*

Ph.D in Computer Science and Engineering. GPA: 4.0/4.0 — *Degree expected: Dec. 2024*

Beihang University — *Beijing, China*

B.S. in Electrical and Computer Engineering. GPA: 3.8/4.0 — *Degree obtained: June 2018*

Experience

Texas A&M University — *College Station, TX*

Graduate Research Assistant. Supervisor: Dr. Vivek Sarin — *May 2022 – Current*

- Leveraged **Krylov Subspace** methods to achieve scalable and accurate **Gaussian Process (GP)** regression
- Developed a novel GP regression model based on **iterative** and **numerical** methods using **PyTorch**
- Improved **convergence speed** by over **2x** using **linear algebra** and **stochastic approximations**
- Published a **blog** sponsored by **the Linux Foundation**: https://thenewstack.io/using-gpytorch-a-researchers-experience/

The Linux Foundation — *Fremont, CA*

Mentee. Program: Linux Kernel Bug Fixing Summer 2023 — *May 2023 – Current*

- Leveraged **VM instances** on **GCP** and **qemu-kvm** to develop **open-source** patches for **Linux kernel** bugs
- Upstreamed **6** patches in kernel subsystems including **networking**, **memory management**, **GPU driver** and **kselftest**
- Resolved **deadlocks**, **overflows** and **ref-counting** issues with tools such as **syzkaller**, **GDB** and **strace**

Publications

Interpretation of Time-Series Deep Models: A Survey — *College Station, TX*

Ziqi Zhao, Yucheng Shi (co-first author), Shushan Wu (co-first author), Fan Yang, Wenzhan Song, Ninghao Liu — *June 2022 – Curent*

- Reviewed state-of-the-art methods for the **interpretation** of **time-series** related **deep learning** models
- Studied more established **post-hoc methods** as well as novel solutions using **inherently interpretable models**

Projects

Fault-Tolerant Distributed System in Asynchronous C++ — *Fremont, CA*

Engineer — *July 2023 – Current*

- Implemented the **Raft consensus protocol** for handling **leader election**, **log replication** and **persistent state**
- Built a **MapReduce** system for **custom tasks** running on **separate machines**, using **TCP sockets** and **shared filesystems**
- Developed the codebase in **C++20** and created **50+** test cases with **gtest** to ensure **100%** correctness in concurrency
- Leveraged **gRPC** with its `CompletionQueue` API and **Boost::Asio** to achieve **non-blocking** worker communication

https://pastecat.io – A Universal Clipboard for Sharing Code Snippets — *Fremont, CA*

Engineer — *June 2023 – Current*

- Developed a **React** web application, along with a **Node.js** and **shell script** based CLI tool as the frontend interface
- Built the backend with **Google Firebase**, utilizing its **NoSQL** database and high-availability **file storage** service
- Deployed application with **Docker containers** and served under an external application **load balancer** in **GCP**
- Launched **sign-in with Google** feature for **user authentication** based on Google's **OAuth 2.0** API
- Employed **virtualized rendering** and **pagination** to improve the performance of handling **10k+** lines of text

GPU-Based Matrix Multiplication with Strassen Algorithm — *College Station, TX*

Engineer — *Feb. 2022 – May 2022*

- Developed a **CUDA C++** program to compute matrix product by **decomposing** into sums of smaller sub-matrices
- Used the **cuBLAS** library to **parallelize** matrix computations across **GPU threads** on an **Nvidia RTX 6000** graphics card
- Achieved **140x** speedup on $2^{10} \times 2^{10}$ matrices compared to a **CPU-based serial version** of the same algorithm

Skills

Programming Python, C++, C, PyTorch, Bash, React, Node.js, SQL, CUDA, OpenMP, MPI, GNU Make

Tools & Areas Operating System, Linux Kernel, Distributed System, Google Cloud (GCP), Docker, gRPC, REST API, Git