Konstantinos Konstantinidis

Ph.D., Iowa State University

515-357-2016 | k.m.konstantinidis@gmail.com | kkonstantinidis.github.io | github.com/kkonstantinidis

Skills

Proficient: Python • Java • AWS • MATLAB • PyTorch • MPI • MapReduce
Good: C++ • SQL • Hadoop • NumPy • Bash • Git • Jenkins

Education

Iowa State University	Ames, IA
Ph.D. & M.Eng., Electrical and Computer Engineering, GPA: 3.94/4, Advisor: Prof. Aditya Ramamoorthy.	Dec. 2022
Technical University of Crete	Chania, Greece
Diploma (5-year program), Electrical and Computer Engineering, GPA: 3.4/4, Advisor: Prof. George Karystinos.	Dec. 2016

Industry Experience

Research Scientist at Meta Platforms, Inc. (Facebook) Menlo Park, CA | 12/2023 – Present
I work on the Marketplace Recommendation & Delivery Infrastructure team building highly-scalable data pipelines to compute, store, and retrieve machine learning features & training data, primarily in C++ and Python. Also, I implement system changes, flexible APIs, and monitoring to improve the latency and reliability of offline and online feature serving.

Software Engineer, Platform at C3.ai, Inc. Redwood City, CA | 09/2022 – 11/2023
As a member of the Platform - Data team, I developed C3.ai's *feature store* system that stores and serves machine learning features. My work involved alleviating bottlenecks identified through algorithmic analysis and profiling (e.g., *YourKit*) across the data pipeline, hence improving the latency of feature serving and enabling the system to scale distributively across multiple nodes.

Software Engineer Intern at Meta Platforms, Inc. (Facebook) Menlo Park, CA | 05/2022 – 08/2022
Developed debugging tools for machine learning feature authoring used in Facebook Marketplace. The implemented framework categorizes errors during feature compilation, generates alerts, and assigns tasks to the appropriate team; I integrated it with the CI/CD. Another end product of my work was a UI tool to retrieve and transform feature values from low-latency storage.

Software Engineering Intern, Platform at C3.ai, Inc. Redwood City, CA | 06/2021 – 08/2021
Implemented a framework for cluster failure prediction which trains a model and predicts the cluster's state using streaming data.

Research Projects

ByzShield: Robust distributed learning | *Python, PyTorch, AWS, MPI, Bash.* 01/2020 – 04/2021
Developed a defense for distributed learning in which computing devices may return erroneous or malicious gradients. The method achieves a **20**% increase in top-1 accuracy on the **CIFAR-10** dataset and a **36**% reduction in the fraction of corrupted gradients.

CAMR: Aggregated MapReduce over multiple jobs | *Python, AWS, MPI, Bash.* 12/2018 – 04/2020
Proposed a method to reduce the MapReduce communication overhead for aggregate functions. It achieves state-of-the-art communication load but requires an exponentially smaller number of jobs and achieved speedup **4.3**× over the baseline approach.

Staggler mitigation in matrix multiplication | *Python, MPI, AWS.* 07/2018 – 01/2019
Proposed and implemented a technique to tolerate the presence of servers that suffer from slow computation. Our algorithm can alleviate a higher number of slow servers and requires **80**% of the time needed by prior methods on actual AWS EC2 simulations.

MapReduce communication load reduction | *C++, AWS, MPI, Hadoop, HDFS, Bash.* 05/2017 – 12/2018
Proposed an algorithm to reduce **MapReduce** communication load; it uses *Single Parity Check* codes and design theory to assign tasks to servers and splits files less finely than prior work. Tweaked the **TeraSort** algorithm (to sort data sets in **HDFS**). The method uses **MPI** for communication. It supersedes the state-of-the-art by **2.6**× and the baseline approach by **4.7**× on AWS EC2 clusters.

Selected Awards

- **Best Student Poster Award**, Midwest Machine Learning Symposium (MMLS), June 2019 (link).
- **Teaching Excellence Award**, Iowa State University, May 2019.

Selected Publications (Google Scholar)

- **K. Konstantinidis**, N. Vaswani, and A. Ramamoorthy, "Detection and Mitigation of Byzantine Attacks in Distributed Training," *IEEE/ACM Transactions on Networking (ToN)*, October 2023.
- **K. Konstantinidis** and A. Ramamoorthy, "ByzShield: An Efficient and Robust System for Distributed Training," *Machine Learning and Systems (MLSys)*, April 2021.
- **K. Konstantinidis** and A. Ramamoorthy, "Resolvable Designs for Speeding up Distributed Computing," *IEEE/ACM Transactions on Networking (ToN)*, August 2020.
- L. Tang, **K. Konstantinidis** and A. Ramamoorthy, "Erasure coding for distributed matrix multiplication for matrices with bounded entries," *IEEE Communication Letters (COMML)*, November 2018.