Raghavendra D. Prabhu

Education

2004-2008 **B.Tech. Computer Engineering**, *National Institute of Technology Karnataka (NITK), Surathkal*

Undergraduate thesis

title *Link-Based Object Classification and Ranking with Unsupervised Learning*

supervisors Dr. Santhi Thilagam

description Dealt with classification and ranking of web pages based on Link Mining and Kohonen Self-Organizing Maps.

Experience

2021 - Present **Staff Software Engineer**, Facebook/Meta
Driving AI and datacenter scalability, fault tolerance, load shedding and infrastructure resilience at hyperscale.

2015 - 2021 **Tech Lead/Staff Software Engineer**, Yelp
Responsible for design, development and technical leadership of several projects in the distributed systems team involving Cassandra, Kubernetes and ZooKeeper.

2011 - 2015 **Product Lead/Senior Software Engineer**, Percona
As the Product Lead of Percona XtraDB Cluster (PXC), involved in its development, design, and releases, including the first and subsequent GA releases of PXC 5.6.

2008 - 2011 **Systems Engineer**, *Cloud Computing*, Yahoo!
Worked on MySQL, memory-mapped databases, and distributed hash tables (DHT), implemented a key readahead mechanism for fixing MySQL replication lag.

Publications

- *SOMGPU: Self Organizing Maps on a Graphical Processing Unit for Pattern Classification*: Published at IEEE Congress on Evolutionary Computation (CEC) which was part of IEEE World Congress on Computational Intelligence (WCCI) 2008. *Cited by more than 10 publications.* dx.doi.org/10.1109/CEC.2008.4630920
- *GNeuron: Parallel Neural Networks with GPU*: Presented at 14^{th} International IEEE Conference on High Performance Computing (HiPC) 2007. hipc.org/hipc2007/posters/GNeuron.pdf

Skills

Languages Python, Golang, Rust, SQL, C++.

Technologies Distributed Systems and Datastores (MySQL and Galera, Cassandra, ZooKeeper etc.), Orchestrators (Kubernetes and Operators) and Linux Containers (Docker), Terraform, Performance Profilers, AWS Workflows and Services, CI/CD, Agile Development, Puppet, Linux Kernel and GNU/Linux internals, Virtualization platforms like KVM.

Projects

Meta/Facebook :

- *Autonomous Bootstrap and Recovery* Designing and validating autonomous bootstrap and recovery of IaaS control plane services, storage, and database systems from diverse failure scenarios.
- *Fault Injection at Hyperscale* Implementing large-scale fault injection frameworks to proactively test and

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enhance the reliability of hyperscale compute and storage deployments.
  - *Demand Curtailment & Energy Risks* Developing sacrificial ROI-aware load-shedding strategies to mitigate risks associated with grid supply and demand curtailment across heterogeneous systems, including AI/GenAI training and idle capacity.
  - *Resilience Against Climate Change* Strengthening the resilience of Meta's datacenter infrastructure against current and emerging climate-related risks.
  - *Scaling AI and Datacenter Capacity* Ensuring the fault tolerance of business-critical software systems during the rapid expansion of datacenter and AI capacity.

Finde-rs Dynamically scaling race-free filesystem crawling and indexing tool written in Rust.

Yelp Several distributed systems projects at Yelp, salient ones being:
  - *Cassandra Operator for K8s*: Golang-based K8s operator to effectively orchestrate EBS-backed Cassandra clusters on AWS with Kubernetes and Yelp's PaaSTA. Increases deployment efficiency and resource utilization significantly.
  - *Linux Page Cache Fencing*: eBPF-based tool for per-process I/O accounting and reduction of the write amplification from page cache thrashing.
  - *Taskerman*: ZooKeeper-based Distributed Cluster Manager for Cassandra, Kafka, and Elasticsearch. Reduces engineering toil and time to roll out new features considerably.
  - *Kafka ZooKeeper Migration*: Controller for zero-downtime migration of Kafka brokers between ZooKeeper clusters under high load.

ZooKeeper Operator Golang K8s operator to launch and manage ZooKeeper clusters on Kubernetes with horizontal scaling, persistence and lifecycle management.

Percona XtraDB Cluster (PXC) Have been responsible for several feature-rich stable releases of the product, and its adoption by OpenStack and large-scale infrastructure setups for high availability. Also involved in the reliability engineering of PXC with Docker and Kubernetes.

Linux Kernel Involved in different areas of Linux kernel such as filesystems and ENOSPC (XFS, Btrfs), virtual memory (readahead), kbuild, security, I/O, as well as debugging the kernel with KVM. [Merged Contributions] [Others]

MySQL Worked on areas such as fallocate and hole punching for InnoDB tablespace extension, increment for InnoDB single tablespace; also made several other contributions to Percona Server, Xtrabackup and Percona Toolkit.

Dotler Massively concurrent, Graphviz dot generating lockless web crawler written in Go.

PyVolume Flask-based Python Docker Volume driver supporting plugins for ZooKeeper FUSE and SSHFS.

Pocket Bot AWS Lambda and API Gateway based serverless Facebook messenger chatbot for Pocket, written in Python with persistence in S3.

GNeuron Neural network library making use of GPU for parallel computation (GPGPU) with nearly 5x speedup over its sequential counterpart.

GPUSOM Pattern Classification with Kohonen's Self Organizing Maps (SOMs) on GPUs using Accelerator, first of its kind in GPGPU ecosystem.

Achievements

- Annual company-wide recognition for representing the 'Be Tenacious' core value of Yelp. Several quarters of Greatly Exceeds Expectations (GEE) at Meta.
- Invited speaker at several conferences and panel discussions such as at Datastax Accelerate, Percona Live, FOSDEM, Linux.conf.au, RICON, Highload++, SCALE 13x, Fossetcon, and universities such as Imperial College London and Cambridge. Slides: https://www.slideshare.net/slidunder
- Won 2^{nd} place in the event Mushaca, a three-dimensional mouse design event. It is the first driver-less implementation of Mushaca.
- Received the IEEE CIS (Computational Intelligence Society) Conference International Travel Grant in 2008.
- Mention of my work SOMGPU in the newsletter of ACM Special Interest Group (SIG) on Genetic and Evolutionary Computation - SIGEVOlution.
- Secured 9^{th} rank in a hyper-competitive Common Entrance Test (CET) for Engineering in 2004.

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