SHUBHODEEP MITRA

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EDUCATION

Master of Science in Computer Science   August 2024
Arizona State University, Tempe, AZ   **GPA**: 3.96/4
- Foundations of Algorithms, Distributed Database Systems, Privacy and Machine Learning, Cloud Computing, Statistical Machine Learning, Multimedia and Web Databases, and Blockchain Engineering.

Bachelor of Engineering in Computer Science and Engineering   May 2018
The National Institute of Engineering, Mysuru, India   **GPA**: 8.74/10

TECHNICAL SKILLS

Programming Languages: Java, C/C++, Bash, Python (NumPy, pandas), Android, Kotlin, Go, Rust.
Skills: SpringBoot, ReactJS, Redux, MapReduce, Kafka, Docker, REST, Ansible, AWS, GraphQL, PyTorch, Kubernetes, SQL, PostgreSQL, Redis, MongoDB, Firebase, Git, GitHub, MATLAB, A/B testing, Linux/Unix Programming, gdb, ElasticSearch.

EXPERIENCE

Graduate Research Assistant (Distributed Systems) - EMITLab ASU, Tempe, USA   December 2022 – Present
- Led development of scalable solutions for vertical scaling of large models, efficient data management, and concurrent workflows on AWS infrastructure, boosting sampling pool and simulation diversity by **4x**.
- Optimized deployment, configuration, and orchestration of a cluster of AWS EC2 using Ansible, driving a **27% reduction** in per-simulation experiment time through improved parallelism.
- Revamped in-memory graph data structure and integrated local caching mechanisms to generate provenance graph and multi-variate timelines, reducing MongoDB calls by over **50k**.

Software Engineer 2 - Hewlett Packard Enterprise (HPE), Bangalore, India   July 2018 – July 2022
- Led development effors in C/C++ for critical modifications in internal-VLAN, L3 counters, Netdev, and Ofproto, pivotal for IP-Subinterface, facilitating seamless traffic flow across **17 protocols**.
- Redesigned IGMP and MLD multicast protocols to integrate real-time packet flow monitoring, enhancing reliability.
- Developed CLI infrastructure for L2 protocols, including VLAN, VLAN Translation, and Multi-Zone User-Based Tunneling, integrating SDN features to support advanced network management and configuration capabilities.
- Engineered a comprehensive test automation suite for all development work, achieving **98%** code coverage and empowering DevOps team to conduct periodic system health checks.
- Secured first place in a hackathon by addressing parking space challenges at HPE Bangalore campus.

RELEVANT PROJECTS

ColumnarDB   March 2024
- Designed a Columnar Database system in Java with features including BitMap and BTree indexing, compressed BitMap, Columnar Joins, Columnar Sort, Scan, and Delete optimizing data operations efficiency for **50k entries**.

Live Video Streaming Application   December 2023
- Architected and implemented a high-performance live video streaming application in **Go** and **WebRTC**, optimizing for low latency and scalability, employing advanced techniques to enhance video delivery quality.

Image Retrieval and Recommendation   October 2023
- Designed and built an end-to-end image retrieval and recommendation system with **82% accuracy,** applying neural network feature extraction, dimensionality reduction techniques, graph algorithms, and LSH.

Elastic Face Recognition Service   March 2023
- Developed face recognition services from videos leveraging **AWS IaaS** with 98% accuracy. Dynamically scaled in and out on-demand, efficiently handling concurrent user requests. Utilized AWS EC2, S3, DynamoDB, and SQS.

Scalable Aesthetic-Preserving Face De-Identification   November 2022
- Created a Kotlin Android app employing an **ML-kit** and openCV foundation to detect individuals in photograph backgrounds through face recognition, applying an aesthetic-preserving filter to safeguard bystanders' privacy.

Taxi Trajectory Visualization   October 2022
- Implemented an application enabling spatial-temporal, and KNN queries on NYC taxi data stored in Spark SQL table.

Real-Time Parking Spot Notification, Hewlett Packard Enterprise   January 2020
- Engineered a scalable system to monitor over 500 vehicles entering and exiting campus. Leveraged surveillance footage and employed OpenCV and TensorFlow, providing Android users with live parking availability updates.

INVOLVEMENT

Teaching Assistant, CSE510 - Database Management System Implementation   January 2024 – May 2024
Global Leadership Academy program, Arizona State University, Tempe, USA   August 2022 – December 2022
Novel TLS Signature Extraction for Malware Detection, IEEE CONECCT   July 2020
- Researched a solution at Hewlett Packard Enterprise to identify presence of malware in a network flow from an initial unencrypted Client Hello packet of TLS with 92.4 percent accuracy.