

PIUSH PAUL

🌐 piushpaul.dev | 🐙 [piush-terminalwitchcraft](https://github.com/piush-terminalwitchcraft) | 📁 [piush-paul](https://piush-paul.github.io) | ✉ piushpaul.16@gmail.com | 📞 +1 (213) 268-1235 | Los Angeles, CA

EDUCATION

University of Southern California

Master of Science in Computer Science

Aug 2026 – Present

Los Angeles, CA, USA

- **Coursework:** Analysis of Algorithms, Database Management

Thadomal Shahani Engineering College, University of Mumbai

Bachelor of Engineering in Computer Engineering (CGPA: 9.45 / 10.0)

Dec 2020 - May 2024

Mumbai, India

- **Coursework:** Operating System, Computer Networks, Database Management, Quantitative Analysis, Distributed Computing, Artificial Intelligence, Big Data Analysis
- **Academic Excellence:** Achieved University Topper recognition in Semester 8, and organized the TSEC Mashup programming contest.

EXPERIENCE

Deutsche Bank

Software Engineer (Analyst)

Jul 2024 – Aug 2026

Pune, India

- Engineered and maintained **low-latency C++ infrastructure** for market connectivity, focusing on core trading components including SDS (Static Data Service) and QES (Quantum Execution Service).
- Spearheaded integration pipelines with global exchanges such as **Eurex** and **NSE**, optimizing proprietary protocols and market data flow to ensure minimal latency.
- Designed and implemented comprehensive unit and integration test suites for core execution systems utilizing **Boost.Test** and **GTest** frameworks.
- Contributed to **MiFID II post-trade transparency** reporting pipelines by validating high-volume trade and order messages, ensuring strict regulatory compliance.
- Built a Python automation script for QA to streamline internal library version upgrades, reducing manual processing time from **5 hours to under 3 minutes**.
- Orchestrated **CI/CD deployment pipelines** across 12+ repositories utilizing Ansible and ArgoCD to ensure deterministic builds and data consistency during trade pricing and product booking.

PROJECTS

ZenithEngine | C++, CMake, DPDK, Linux Networking

Jul 2026 - Present

- Architecting a **low-latency cryptocurrency HFT engine** featuring a **zero-allocation** market data feed handler, L2 order book, and highly optimized execution engine.
- Optimized critical path latency and inter-thread communication by implementing bounded **lock-free MPSC ring buffers**, **core pinning** (thread affinity), **cacheline alignment**, and branch prediction.
- Architected a high-performance **WebSocket** protocol stack leveraging **DPDK** for full **kernel-bypassing**, achieving sub-microsecond latency by moving packet processing entirely to userspace.
- Implemented a custom, zero-allocation **TCP/IP state machine** and direct NIC polling mechanism to eliminate OS context switches and interrupt handling overhead.
- Engineered zero-copy payload extraction for market data feeds, demonstrating significant reductions in tail latency under high-frequency burst conditions compared to standard POSIX sockets.

Thread-Safe Low-Latency Memory Pool | Modern C++20, Lock-Free Atomics, AVX2, Huge Pages

- Architected a two-tier thread-cached memory pool (thread-local L1 cache + central slab), scaling throughput to **1.08 Billion ops/sec** across 12 concurrent threads (**808× speedup** over global spinlocks) with a **14 ns p50** allocation latency.
- Engineered an ABA-free lock-free allocator utilizing a 64-bit packed **TaggedIndex** atomic CAS (`lock cmpxchgq`) and a dense atomic index array, completely eliminating lock contention with zero data races verified under **TSan** and **ASan**.
- Optimized memory subsystem with strict **64-byte cacheline alignment** (`alignas(64)`), pre-faulted **2 MB Huge Pages** (`MAP_HUGETLB`), and software prefetching, eliminating false sharing, runtime TLB thrashing, and OS kernel page faults.

Forecasting Blossoming Patterns in Forest Ecosystems | Google Earth Engine, Python, TensorFlow

- Integrated and preprocessed a **4-year, multi-source dataset** of satellite imagery and climate data, applying temporal interpolation to correct for cloud cover and dimensionality reduction for performance.
- Trained a **CNN-LSTM spatiotemporal model** to forecast vegetation changes and developed a custom algorithm to classify blooming stages with high predictive accuracy (**MSE: 0.0069**).

PUBLICATIONS

Advanced Deep Learning Techniques for Early Detection of Oral Cancer: A Multimodal Approach

2025

- Piush Paul, Umang Singh, Sarah Khan, Atharva Jog, Ujjwala Bharambe — Second International Symposium on Artificial Intelligence (ISAI), 2025.
- Developed and optimized deep learning models using advanced data processing techniques, evaluating CNN, Vision Transformer, and **EfficientNetB2** architectures.
- **EfficientNetB2** achieved state-of-the-art classification performance with **96.12% precision** and **94.38% accuracy**, demonstrating strong potential for AI-assisted quantitative diagnosis.

ACHIEVEMENTS

- **ICPC Regionalist:** Qualified by securing **1st rank** within the university in the national online preliminary round, and achieved **82nd rank** in the ICPC regional round Mathura-Kanpur.
- **Competitive Programming:** Solved more than **350 problems** and achieved **Specialist** rating (max 1423) on Codeforces.
- **1st Runner up at Google Agentic AI Hackathon 2025:** A national level hackathon organized by **Google**, holding the Guinness World Record for most participants.
- **Winner of Smart India Hackathon 2022:** A national level hackathon organized by the **Government of India**.
- **Won the Codessiance Hackathon 2022-23**, with a footfall of 200+ participants.
- **1st Place** in coding competition in **TSEC Codecell Weekly challenges**.
- **TSEC Hall of fame:** Inducted in recognition of all-round excellence and leadership throughout the four-year undergraduate program.

TECHNICAL SKILLS

Programming Languages: C++ , C, Python, Bash, Rust, Java

Frameworks & Libraries: DPDK, CMake, Boost, GTest, Pytest, PyTorch, Pandas, NumPy

Tools and Platforms: Linux, Git, Docker, Ansible, ArgoCD, Teamcity, GCP

Core Concepts: Low-Latency Systems, Multithreading, Lock-Free Programming, Kernel Bypassing, CI/CD

LEADERSHIP & EXTRACURRICULARS

Organizer, TSEC Mashup

June 2023

- Organized weekly competitive programming contests to help students enhance their algorithmic problem-solving skills.

Volunteer, NSS TSEC

June 2021 – June 2022

- Helped organize community events including a blood donation drive and CPR workshops.