

Mishal Shah

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EDUCATION

National Institute of Technology Karnataka, Surathkal

India

Bachelor of Technology in Computer Science & Engineering; GPA: 8.08/10.0

July. 2016 – June. 2020

EXPERIENCE

Software Engineer (Web Solutions Engineer) at Google

October 2021 - Present

- Working on an internal learning management system called Connect Trainings. Designed and developed over 15+ technical features.
- Implemented local and remote caching to cache latency-heavy RPC calls. Reduced the latency by 90% (200-300ms to 10-30ms). Extended the solution by implementing real-time cache freshness. The solution was presented at an internal Google-wide conference.
- Devised and implemented a solution for the migration of tables to sub-resource format. This reduced fanout on update of a field in the table. The refactor was handled without any downtime of the product.
- Designed a solution based on [ReAct paper](#) for using LLMs to answer user queries. Developed a working model to orchestrate queries requiring user-data from an API and using LLM to converse with the user.
- Made a scalable similarity model based on Bag of Words, TF-IDF and Cosine similarity and indexing for faster search to detect similar articles in the Google help center and reduce content debt.

Software Engineer at Cisco

August 2020 - October 2021

- Worked on the asynchronous C++ IoT-DSA-based protocol SDK of Edge Intelligence project in the IoT Group. Developed south-bound file transfer from various IoT devices to the cloud using the Boost & Beast library.
- Set up a lab for hardware testing of the project and configured Cisco routers (IR809 & IR1101) to deploy the application.
- Reduced the runtime of Continuous Integration by 20% by parallelizing the unit & system tests.
- Contributed Cloud to Device data-transfer feature for bi-directional communication between the IoT clouds and various Edge devices.

Google Summer of Code Student at ns-3 The Network Simulator

May 2019 - August 2019

- Leveraged the Bake build system of ns-3 to add command-line options like getconf, install, and search for the apps on the AppStore to have a smaller core in the ns-3 mainline. The project reduced the build-time of the ns-3 project.
- Migrated the AppStore codebase to the latest versions of Python (3.6) and Django (2.2) to ensure compatibility and maintainability. Enforced a PEP8-compliant coding structure for improved readability and consistency.
- Implemented REST APIs to fetch the configuration file and data of the apps using the Django Rest Framework. Added OAuth with GitLab and GitHub. Built a feature to show download statistics for each app.
- [Google Summer of Code '20 Mentor](#) & [Google Code-in '19 Mentor](#) for the ns-3 organization.

Software Engineering Intern at IIIT, Hyderabad

May 2018 - July 2018

- Defined the Abstract Syntax Tree for various content types to enable their rendering as a learning experiment.
- Built a parser, linker, and renderer to render the content written with the defined grammar.
- Server-side infrastructure was built using Node.js and realisations were stored in a MongoDB database. The infrastructure was used to build eight experiments on data structure and algorithms.

COURSES UNDERTAKEN

Computer Science: Data Structures and Algorithms, Software Engineering, Computer Networks, Advanced Computer Networks, Wireless Networks, Operating Systems, Compiler Design, Cloud Computing, Database Management Systems

Mathematics: Engineering Mathematics, Linear Algebra and Matrices, Discrete Mathematical Structures

PROGRAMMING SKILLS

Languages: Java, C++, C, JavaScript, Python, SQL, Erlang

Technologies: Git, Boost.Asio, Beast, Docker, MEAN, Django, RubyOnRails, DPDK, OpenNetVM, pktgen-dpdk

PUBLICATIONS AND PROJECTS

- **PowerDPDK: Software-Based Real-Time Power Measurement for DPDK Applications:** Bachelor's thesis, funded by Intel, focused on adding RAPL-based APIs to DPDK for real-time power consumption monitoring in Network Functions (NFs). Written in C for minimal software footprint, the project also explored software-based domain estimation and performance evaluation using pktgen-dpdk to simulate complex network flows. [IEEE NFV-SDN '20](#)
- **TCP NewVegas:** Implemented a variant of TCP Congestion Avoidance Algorithm named TCP New Vegas in ns-3.
- **IRIS NITK:** An online student-led Management Information System (MIS) portal for NITK used by over 3000 students and over 15 departments. Developed NoDues module to streamline clearance procedures for graduating students across various departments and college sections. Led a team of 15 members and mentored sophomore-year students during a summer internship with IRIS NITK.
- **Virtual Clinic:** Developed a comprehensive hospital management system using Django to automate healthcare consultations, encompassing appointment scheduling, consultations, and lab reporting. The system caters to five user groups with over 20 features. A waterfall development lifecycle was followed, achieving 51% code coverage.
- **Opentelemetry C++:** Developed an ETW (Event Tracing for Windows) tracer exporter for OpenTelemetry, enabling applications, services, and Docker-on-Windows containers to send logs directly to ETW as per the OpenTelemetry specification.
- **Mini C-Compiler:** Developed the lexical analysis, syntax analysis, semantic analysis, and code generation phases of a C compiler using lex and yacc.
- **OS Simulator:** Led a team of 10 developers over 3 months to create an interactive simulation of major operating system concepts. Developed the Ubuntu-themed UI and implemented simulations for Inter-Process Communication and Process Synchronization algorithms. Additionally, designed the application's server architecture.
- **Empact:** Developed a web application using the MEAN stack to integrate emotion analysis with Jitsi Meet video conferencing, powered by Microsoft Cognitive Services. The application provides users with constructive feedback and insights based on their emotions during meetings.
- **Spell-Corrector:** Developed an Erlang implementation of Peter Norvig's spell-checker (originally written in Python). Leveraging concurrent programming to achieve improved time efficiency for corrections involving up to two-letter errors.

RECORDED TALKS/BLOGS

- **Introduction to WebSockets:** [slides](#), [video](#)
- **Introduction to Express.js & Build a basic chat app:** [slides](#), [video](#)
- **Introduction to Node.js:** [slides](#), [video](#)
- **Running DPDK Forwarding Applications with Pktgen-DPDK:** [link](#)
- **Building a basic web-server from scratch:** [link](#)
- **Browser behaviour in HTTP/1.1 vs HTTP/2:** [link](#)

EXTRA CURRICULAR ACTIVITIES

- **Convenor (Head)** at **The Institution of Engineers, NITK Chapter** - Managed a team of over 145 members, over 20 events (keynote talks, coding contests, workshops), implemented initiatives: weekly blog posts, internships records of members for better alumni outreach. Constructed a budget plan for various events and technical projects.
- **Lead Organizer** for **HackVerse** - India's largest student-run Hackathon with over 2400+ applicants. Raised 98% of sponsorships, led a cross-functional team of over 40 members to improve the operational efficiency and enhance the hacker experience.
- **Development SIG Head** at **Web Enthusiasts' Club NITK**, Led a team of over 30 developers. Involved in conducting sessions/talks for freshmen, developed website for the Club, mentored more than 35 freshman to get started with Web Development and Parallel Programming, conducted review sessions for GSoC proposals.
- Open source contributions to **OWASP** - **SecureTea Project** - added **Slack Bot** and **Telegram Bot** Notification
- **Internship Coordinator** for the year 2018-19 at the Department of Computer Science and Engineering, NITK.
- Website Manager for **TEDxNITKSurathkal** - 2019 Edition