Mayank **Sharma**

Final Year Undergraduate · Computer Science and Engineering

INDIAN INSTITUTE OF TECHNOLOGY, KANPUR

(+91) 9461240034 | mayank8019@gmail.com | msharma.in | mayanksha | mayanksha | mayanksha

Educational Qualifications

Year	Degree	Institution(Board)
July'16 – Present	B.Tech, CSE	Indian Institute of Technology, Kanpur
2016	AISSCE – XII	Children Sr. Sec. School, Dadabari, Kota
2014	CBSE – X	Central Academy Sr. Sec. School, Chittorgarh

Academic Achievements

2016 **All India Rank 630**, JEE Advanced 2016 among 200 thousand selected candidates.

2016 **All India Rank 2237**, JEE Mains 2016 among 1.2 million candidates.

2015 **All India Rank 854**, KVPY Fellowship Award awarded by Department of Science and Technology, India.

2016 **Certificate of Merit**, for being in **State Top 1-Percent** in National Standard Examination in Physics (NSEP).

2014 **All India Rank 1707**, National Science Talent Search Examination among 3.2+ Lakh applicants.

Work Experience

Google Summer of Code, GNOME Organization

India

Improve Google Drive support in GNOME Virtual File System (GVfs), Mentor: Ondřej Holý

Summer 2019

- Ported libgdata from (*autotools* + *make*) to (*meson* + *ninja*) build system, writing build files to compile and link a shared library consisting of 100+ object files, thereby **improving build times by ∼40%**.
- Developed a new API (`GDataDocumentsProperty`) for libgdata (C library for Google Drive API) from scratch to support Properties Resource on File objects.
- Augmented copy, move, delete and make_directory operations in GVfs (earlier disabled) with `GDataDocumentsProperty` API, by creating a volatile path to the new entry, thereby handling differences between a **POSIX-based fs** *vs* a **database-backed fs** (Google Drive).
- Developed a **regression test-suite** from scratch for the Google backend in GVfs. The test-suite is planned to be a part of **Gitlab based CI system** and uses GIO operations on a dummy google account to test the backend.
- All the code is open-sourced on GNOME's Gitlab and is planned to make way into **GNOME's 3.36 stable release**.

Software Engineer Intern, WalmartLabs

Bengaluru, India

Microservice Orchestration Layer (*Mozart*), Mentor: Kshirodra Meher

Summer 2019

- Worked on the Service Orchestration Layer (REST based) for Walmart International, to create a **one-stop solution for 162 Microservices**.
- Helped migration from a monolithic Oracle ATG (Java based) system to a **Bulk-Head Design Pattern based architecture** in node.js.
- Developed **"mozart-utils"**, an npm package published to Walmart's in-grown npm repository providing standardized utility functions to over 8 sub-modules in a mono-repo.
- Collaborated with team to develop **20 endpoints**, with all 20 being used in production systems for Walmart Mexico.
- Contributed to seen improvements in performance **from less than 15,000 to ∼ 90,000 concurrent users/hr** on a single instance.
- Received a direct Pre-Placement-Offer (PPO) on showing outstanding performance amongst 120 interns.

Software Developer Intern, EarlySalary

Pune, India

Pickup System Case Allocation Automation, Mentor: Vivek Jain

Summer 2018

- Worked on the backend of a scalable web app, and helped migration from an existing PHP based system to the one based on node.js.
- Implemented centralized Authentication and Authorization, using JumpCloud's Directory-as-a-Service **(LDAP)**.
- Helped **design APIs and Algorithms**, to retrieve and automatically assign a new case to a Pickup Agency based upon its priority in a cluster.
- Developed **Microservices for Lambda based REST APIs**, and Prevented XSS into the existing MySQL Databases.
- Techonologies Used: Express.Js with Node.Js, Typescript, MySQL, LDAP, AWS Lambda Services

Projects

Microarchitectural Side and Covert-Channel Attacks

Course Project, under Prof. Biswabandan Panda — *Ongoing*

- Working on mounting a covert channel attack on a victim running some benign process on a different core, using the FLUSH + RELOAD attack on cache.
- Developing a side-channel attack on GnuPG cryptographic library, to observe cache accesses to critical functions like Square, Reduce, Multiply to get the RSA Private Key.

Cryptographically Secure Key-Value Store

GitHub

Course Project, under Prof. Pramod Subramanyam — *6th Semester*

- Designed and implemented a secure key-value store (in Golang) with sharing semantics (between different users), under the assumption that datastore is malicious.
- Used a multi-level block structure (with encrypted metadata) to effeciently share/append file, with strong guarantees on time complexities of various operations (AppendFile, ShareFile, RevokeFile).

A Blockchain based Voting System with Biometric Verification

GitHub

Course Project, under Prof. Sandeep Shukla — *6th Semester*

- Designed an Ethereum based Voting System, with Biometric (Fingerprint) voter Verification, and experimented with Fuzzy-hashing on fingerprint minutiae data (obtained using a Fingerprint Reader).
- Developed a back-end for the system (with a fallback to LDAP credentials) and deployed it over the Ethereum Ropsten Test Network.

Databases Project - Traffic Management System

GitHub

Course Project, under Prof. Arnab Bhattacharya — *6th Semester*

- Designed collection schemas of various entities to store/fetch information in an efficient manner from a MongoDB database (with Mongoose as the ODM).
- Developed a MEAN web-app to permit Role-Based-Access-Control (RBAC) for different stakeholders in the Traffic Mgmt. System.

GemOS - Operating Systems

GitHub

Course Project, under Prof. Debadatta Mishra — *5th Semester*

- Implemented Multi-level paging, signals like SIGINT, SIGSEGV and SIGFPE and exception handlers like page-faults and divide-by-zero.
- Implemented system calls like expand, shrink, write, sleep, clone, etc. and added process scheduling (init/cloned processes) with round-robin scheduling policy in GemOS.
- Designed and implemented a scalable ext-2 like FUSE-based filesystem for GemOS.

Zero-shot Sketch Based Image Retrieval (SBIR)

GitHub

Machine Learning Course Project, under Prof. Piyush Rai — *5th Semester*

- Implemented Principal Component Analysis & tried extending it to zero-shot setting, to test how it generalizes to other unseen classes.
- Used TU Berlin Sketch Dataset and learned how to extract features to be later compared to hand-drawn sketches.
- Used canny edge detection to convert images to basic sketches in OpenCV.
- Modeled these images using tensorflow by taking hints and code snippets from various research papers.

Linux from Scratch

GitHub

Association of Computing Activities (ACA, IITK CSE) — *2nd Semester*

- Developed a Student Search in bash which scraped data from Office Automation Portal of IITK.
- Used the ZeromQ library in python to implement client server model to play Collatz Conjecture Game.
- Created a bootable (SysVInit based) bare-bones linux distribution, compiling packages from tarballs, building upon the host system kernel and finally compiling the kernel for new distro.

Skills

Programming	C and Golang (*Fluent*), Typescript (*Proficient*), C++, python, bash
Web	Express.js with Node.js *(Fluent)*, Angular 7, MongoDB, AWS Lambda & EC2
Tools	gdb, Valgrind, memcheck, meson *(build system)*, MPICH, MySQL, LDAP, Git, LaTeX, Vim
Operating Systems	Linux (Arch, Ubuntu & LFS), Windows

Relevant Courses

Secure Memory Systems (i)
Systems & Cyber Security
Blockchain Technology & Applications
Data Structures & Algorithms
Cyber-Security of Critical Infrastructure (i)
Operating Systems
Intro. to Machine Learning
Discrete Mathematics
Parallel Computing (i)
Algorithms 2 (i)
Database Systems
Software Engineering

i: In progress

Positions of Responsibility

Head, Web Development

India

Entrepreneurship Cell, IIT Kanpur

Summer 2019

- Spearheading a team of 10+ Senior Web Developer Executives effectively distributing development work and collaborating in a Git Organization.
- Developed various websites for E-Cell, including the homepage, and sites for various events, round-the-year.
- Worked on Campus Ambassador and Events Registration Portals, and administered EC2 instances for the same.

Hall Webmaster

India

Hall of Residence 5

Summer 2019

- Redesigned and Revamped the then webpage of Hall 5 IIT Kanpur.

Interests

- Low-level Systems — File Systems and Network
- Systems Security and Secure Memory Hierarchies
- Open Source Software (Currently, a student developer for GNOME Organization)