

Mayank Sharma

FINAL YEAR UNDERGRADUATE · COMPUTER SCIENCE AND ENGINEERING

INDIAN INSTITUTE OF TECHNOLOGY, KANPUR

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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.
- 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 320,000+ 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

- **Improved build times by ~40%**, by porting libgdata from (*autotools + make*) to (*meson + ninja*) build system, by writing build files for compiling and linking a shared library consisting of 100+ object files.
- Developed a new API (*GDataDocumentsProperty*) for libgdata (C library for Google Drive API), to support Properties Resource on File objects.
- Drastically improved the copy, move, delete and make_directory operations in GVfs (earlier disabled).
- All the code is merged to be **shipped to millions of GNOME users** in its 3.36 stable release.

Software Engineer Intern, WalmartLabs

Bengaluru, India

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

Summer 2019

- Helped improve number of concurrent users/hr by developing REST-based APIs for the Service Orchestration Layer for Walmart International.
- 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 the team to develop 20 endpoints for Sams Mexico, which were used during a high-traffic sale event, with 99.9+% requests being served successfully.
- Received a Pre-Placement-Offer (PPO) on demonstrating outstanding performance amongst 120 interns.

Software Developer Intern, EarlySalary

Pune, India

Pickup System Case Allocation Automation, Mentor: Vivek Jain

Summer 2018

- Worked directly under the CTO to design APIs and Algorithms, to retrieve and automatically assign a new case to a Pickup Agency based upon its priority in a cluster.
- Implemented centralized Authentication and Authorization, using JumpCloud's DaaS (**LDAP**).
- Technologies Used: Express.js with Node.js, Typescript, MySQL, LDAP, AWS Lambda Services

Key Projects

Microarchitectural Side and Covert-Channel Attacks

Course Project, under Prof. Biswabandan Panda

 [GitHub](#)

- Successfully mounted a covert channel attack on a victim running some benign process on a different core, using the FLUSH + RELOAD attack on cache, **achieving 65+% accuracy**.
- Developed a side-channel attack on the 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

- 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 efficiently share/append file, with strong guarantees on time complexities of various operations (AppendFile, ShareFile, RevokeFile).

Securing Zoobar Server

 [GitHub](#)

Course Project, under Prof. Pramod Subramanyam

- Exploited vulnerabilities using control hijacking techniques like buffer overflow & return-to-libc attacks.
- Fixed security bugs and implemented privilege separation in the login service of Zoobar web server.

GemOS - Operating Systems

 [GitHub](#)

Course Project, under Prof. Debadatta Mishra

- Implemented Multi-level paging, signals like SIGINT, SIGSEGV and SIGFPE and exception handlers like page-faults and divide-by-zero, on gem5 architectural simulator.
- 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.

Databases Project - Traffic Management System

 [GitHub](#)

Course Project, under Prof. Arnab Bhattacharya

- 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.

A Blockchain based Voting System with Biometric Verification

 [GitHub](#)

Course Project, under Prof. Sandeep Shukla

- 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.

Linux from Scratch

 [GitHub](#)

Association of Computing Activities (ACA, IITK CSE)

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

Relevant Courses

Compiler Design (<i>i</i>)	Malware Analysis and Intrusion Detection Systems (<i>i</i>)	Computer Networks (<i>i</i>)
Secure Memory Systems	Cyber-Security of Critical Infrastructure	Parallel Computing
Systems & Cyber Security	Operating Systems	Algorithms 2
Blockchain Technology & Applications	Intro. to Machine Learning	Database Systems
Data Structures & Algorithms	Discrete Mathematics	Software Engineering
<i>i</i> : In progress		

Positions of Responsibility

Head, Web Development

India

Entrepreneurship Cell, IIT Kanpur

Summer 2019

- Spearheaded a team of 10+ Senior Web Developer Executives effectively distributing development work and collaborating in a GitHub Organization [↗](#).
- Developed various sites for E-Cell, including the homepage and sites for various events, round-the-year.

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
- Distributed Systems and Concurrency
- Systems Security
- Open Source Software