Ujjwal Shekhar

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Education

IIIT Hyderabad **CGPA : 9.39 / 10.00 overall**

B.Tech. in Computer Science, M.S. by Research in Computational Natural Sciences (Dual Degree) *May 2021 – Present*

- **Academic Awards:** Dean's List (6 semesters), Merit List (1 semester)
- **Skills:** C, C++, Python3, Golang, gRPC, Racket (Scheme), SQL, PyTorch, MPIC++, Matplotlib, Pandas, Bash, Git
- **Coursework (with grades out of 10):** Distributed Systems *(10, Course Topper)*, Advanced Computer Architecture *(10)*, Principles of Programming Languages *(10)*, Automata Theory *(10)*, Operating Systems and Networks *(9)*, Algorithm Analysis and Design *(10)*, Responsible and Safe AI systems *(10)*, Statistical Methods in AI *(10)*, Computer Systems Organization *(9)*, Design and Analysis of Software Systems *(9)*, Data Structures and Algorithms *(9)*

Experience

Jump Trading Group Mumbai, Maharashtra, India

Software Engineering Intern *May 2025 – Aug 2025*

- Pushed multiple high impact **C++** projects into production, Subject to NDA.

Google Summer of Code Remote, UCSC - OSPO

Open Source Developer *May 2024 – Sept 2024*

- Mentored by Prof. Jose Renau of the **Micro Architecture lab** at UC-Santa Cruz
- Upto 2x compile time speedup for hardware code ≈**10M** lines for specific cases [Project Link]
- Built a **templated** AST in **C++** for hardware **compilers**. Used **Google Bench** for benchmarking

IIIT Hyderabad Hyderabad, Telangana, India

Undergraduate Researcher, Centre for Computational Natural Sciences and Bioinformatics lab *May 2022 – Present*

- Working on extensions of Rock-Paper-Scissor games on lattice systems
- Worked on topological phase transitions in lattice models and epidemic synchronization on networks
- Exploring **mechanistic interpretability** techniques to study NLD problems and Epidemic Spreading

Programming Club Administrator *May 2022 – Sept 2024*

- Led Lockout 2023, 2024 Python Bot setup (**60+** participants)
- Overseeing server administration for hosting and maintaining bots/websites
- CodeCraft 2023, 2024 problem writing and preparation (**25000+** registrations worldwide)
- Taken educational meets (**100+** offline participants) on topics like Graph Theory [Slides]

Teaching Assistant, Computer Programming *Aug 2023 – Dec 2023*

- Taught C Programming Language tutorials/labs for **340+** first-year students, managed course logistics

ikiMinds (co-mentored by ClearCals) Remote

Software Intern *Jan 2023 – Apr 2023*

- AI Discord bot for blog Q&A using NextcordPy, ChatGPT API, and LangChain, to help reduce sign-on attrition

Projects

- **Network File System** | *C, Socket API, Concurrency, Networks* : Developed from scratch using the ***Socket API***, with server failure detection. Transparent interface for distributed Storage Servers and API calls to Naming Servers for multiple Clients.
- **Custom POSIX C-shell** | *C, Linux, Operating Systems* : Shell with functionality to create background processes, pipe, and redirect commands. Signal handling using terminal raw mode and ***Network API*** calls to fetch man pages. Has zero dependencies.
- **Graph Feature Learning Algorithms** | *PyTorch, Cluster Computers, ProcessPoolExecutors* : Identified and addressed ***Node2Vec*** and ***DeepWalk*** shortcomings. **Rejection Sampling** for optimizing second-order biased random walks. ***Process Pool Executors*** to optimize parallel runtime of the ML algorithm on a cluster compute by approximately 25×.
- **Paddy Field Detection API pipeline** | *Python, Google Earth Engine API* : Used ***Google EE*** API and ***Random Forests*** to get paddy cultivation area and paddy quality from satellite images. Won ***first prize by State Government*** in Megathon.
- **Content Adressable Network** | *Golang, gRPC, OpenSSL, Protobuf* : Distributed decentralized key value storage drop-in module with replication, crash tolerance, multi-hashes, caching and load balancing.
- **Stripe-like Distributed Service** | *Golang, gRPC, OpenSSL, Protobuf, bcrypt, SQLite3* : Implemented multiple bank servers, clients, and a central payment gateway. Enabled secure authentication via mTLS and Protobuf-baked role-based auth using interceptors. Ensured idempotent transactions and offline payment queuing with auto-retry. Used 2PC with timeout for atomic, distributed payments.

Achievements

- Codeforces (shakr) Peak Rating 1671 (**Expert**)
- Codechef (shakr) Peak Rating 2039 (**5 Stars**)
- ICPC Indian Online Round Ranks: 132 (Prelims-2 24), 152 (Prelims-1 24), 316 (Amritapuri 22), 383 (Kanpur-Mathura 22)
- All India Rank 1 in NPTEL's Advanced Graph Theory course
- Joint Entrance Exam - MAINS : **99.76 %ile**
- Winner, Megathon (2023) across 400+ participants citywide.
- Indian Olympiad Qualifier for Math : Certificate of Merit for Top 40 in West Bengal State

Publications

- Roy A., **Shekhar U.**, Bose A., Ghosh S., Nannuru S., Dana S. K.,& Hens C. (2024). *Impact of Diffusion on synchronization pattern of epidemics in nonidentical metapopulation networks.* [Accepted at Chaos '24]
- Bai R., Chatterjee S., **Shekhar U.**, Islam S., Deshpande A., Bhattacharyya S., & Hens C. *Heterogeneous mass distribution in anti-symmetric Lotka-Volterra doublet chain.* [Accepted as Letter at Phys. Rev. E '25]