Nishant Tatar

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SUMMARY

Engineering graduate with demonstrated experience in Python development and Data Management. Strong background in building data-driven systems and deploying scalable infrastructure. Proven leadership in driving technical initiatives and contribution to student governance.

EDUCATION

Indian Institute of Technology Gandhinagar [Nov 2021 - Jun 2025]

- BTech in Materials Science (Minors in Computer Science) CGPA: 7.43/10.0

SKILL SUMMARY

Characterization Techniques: TIFR, TEM, XRD, SEM, DSC, TGA, AFM

Languages: Python, SQL, Bash

Tools and Frameworks: Linux, nmap, SSH, Ansible

Data Analytics: Statistical Analysis, Data Visualization, Network Analysis, Gephi, NetworkX

DevOps/Cloud: AWS, DigitalOcean, Docker, SMTP, Linux CLI, Ansible, SSH

TECHNICAL EXPERIENCE

CYBERSECURITY PROBLEMS AND CTF PLATFORM HOSTING [Oct 2022 - Apr 2025]

Hackrush, IIT Gandhinagar GitHub Repo

- Deployed and maintained CTFd platform infrastructure using Docker, integrating multiple security challenges across the Cryptography, Web, and Forensics domains.
- Developed comprehensive documentation and authored original security challenges, supporting 2+ years of continuous hackathon events and technical programs.

SELF HOSTED INFRASTRUCTURE - (CHAT PLATFORM + VPN) [Jun 2023 - Oct 2023]

- Configured Zulip on DigitalOcean with Docker + SMTP (SendGrid, Brevo); enabled production-ready uptime for 2000+ users.
- Scripted secure VPN deployment using WireGuard and OpenVPN; implemented Authelia-based 2FA admin console.
- Tools used: Docker, AWS, Ansible

MOLECULAR DYNAMICS SIMULATOR [Sep 2024 - Oct 2024]

Prof. Raghavan Ranganathan GitHub Repo

- Designed and developed a software system for particle motion simulation, implementing algorithms to solve computational physics problems under system constraints ensuring computational accuracy.
- Implemented logging to keep track of system properties like energy, temperature and pressure with time evolution.

MATERIAL CHARACTERIZATION [Jan 2024 - Apr 2024]

Prof. Superb Misra

- Conducted materials characterization analyses to evaluate various properties, identifying constituent elemental compositions.
- Techniques used: DSC, SEM, XRD, FTIR

NETWORK BASED DETECTION AND ANALYSIS OF FAKE NEWS [Jan 2024 - Apr 2024]

Prof. Udit Bhatia Project Report

- Analyzed 9000+ Twitter interactions using graph-based metrics to uncover community dynamics and detect misinformation propagation patterns for targeted interventions.
- Applied power-law modeling and network statistics to identify high-influence nodes, enabling data-driven strategies for curtailing fake news spread.
- Tools Used: NetworkX, Gephi, Python

VIABILITY OF LLMs IN SOFTWARE ENGINEERING [Aug 2023 - Nov 2023]

Prof. Shouvick Mondal Project Report

- Validated LLM-generated Python and C codes through comprehensive security assessments and integration testing.
- Developed a comparative analysis framework to be used against GenProg benchmarks, delivering recommendations for Automated Program Repair (APR) applications.

STATIC ANALYSIS OF C CODES IN COMPILATION AND DECOMPILATION [Apr 2023 - Nov 2023]

- Analyzed 100,000+ C programs, compiled using GCC, Clang, and ICC.
- Evaluated security degradation through tools like r2-ghidra and retdec.

- Tools Used: Python, Numpy, RetDec, r2-ghidra, Joblib

PROJECTS

COMPANY STRATEGY CASE STUDIES – BluSmart (EV) & Indriya (Jewelry) Reports: BluSmart, Indriya

- Conducted strategic analysis to assess market positioning, scalability, and operational efficiency.
- Collaborated in an 8-member team to evaluate business models and propose growth recommendations across EV and luxury retail sectors.

CORROSION MECHANISMS IN HIP IMPLANTS Project Report

- Analyzed corrosion behavior in biomedical alloys used in hip implants; examined mechanisms such as fretting, crevice, pitting, and trunnion corrosion under physiological conditions.
- Investigated corrosion mitigation strategies including surface coatings and ion release suppression.

SUPERCONDUCTORS AND MAGNETIC LEVITATION Project Report

- Conducted a comprehensive study on Superconductors, covering their fundamental principles, historical context, types and applications.
- Investigated practical applications of superconductivity in magnetic levitation technology, quantum computing and high field magnets, exploring current research trends and properties of topological superconductors.

CHARACTERIZATION OF Cu-Ni ALLOYS VIA HARDNESS AND X-RAY DIFFRACTION Project Report

- Conducted experimental analysis of Copper-Nickel alloys using Vickers hardness testing to quantify material resistance to plastic deformation, demonstrating increasing hardness with higher nickel content.
- Utilized X-Ray Diffraction and Bragg's Law to determine lattice parameters of *Cu-Ni* samples, observing decreasing lattice parameters with increasing nickel content, indicative of lattice contraction due to smaller nickel atomic size.

STATISTICAL EQUITY STUDY Report: Berkshire Hathaway

- Analyzed 59 years of stock performance data using comparative normal distribution and time-series visualization.
- Identified growth drivers across industry sectors using 2021 stock data; revealed consistent outperformance of Berkshire over market benchmarks.

INDUSTRY LANDSCAPE ANALYSIS – Iron & Steel Sector Iron & Steel Industry Report

- Mapped global production flows and process technologies across major manufacturers.
- Studied economic and technical operations for metallurgical processes for Blast Furnace, Basic Oxygen Furnace, and Electric Arc Furnace techniques.

SEMICONDUCTOR MATERIAL RESEARCH – CPU Design Pipeline Project Report

- Investigated semiconductor manufacturing stages in modern CPU production.
- Assessed future material candidates including Ga_2O_3, $HfSe_2$, and $ZrSe_2$ for next-gen chip fabrication.

RELEVANT COURSEWORK

CORROSION AND DEGRADATION OF MATERIALS

- Understood various corrosion mechanisms for different material systems and their mitigation strategies.
- Studied electrochemical principles underlying corrosion processes, including thermodynamics and kinetics.

COMPUTER NETWORK AND SECURITY

- Learnt about Computer Networks, user permissions and various other security protocols used for technical systems.
- Worked with Wireshark for packet analysis and understanding network protocols.

COMPUTATIONAL PROCESS DESIGN GitHub Repo

- Wrote LAMMPS scripts for water membrane filtration and polymer chain miscibility using MC simulations.
- Worked with Quantum Espresso for computing ground state properties of *Pt* and MoS_2 band structures.

COMPUTATION AND COGNITION Report, Colab Link

- Implemented the Delta and perceptron learning rules as part of Neural Network Algorithms.

NETWORKS AND COMPLEX SYSTEMS Report

- Learnt and understood various statistical and mathematical tools and techniques used for solving large scale graph systems from a networks perspective.
- Worked with a dataset of over 200 nodes, identifying edges, connectivity and various other network attributes.

INVERSE MODELLING Presentation

- Worked on various Inverse Modelling techniques to find solutions to physics and astronomical problems with real world data.

COMPUTATIONAL PHYSICS Colab Notebook

- Applied Robust Least Squares, RK4, RK2, and various other techniques to solve time evolution of physical systems.

POSITIONS OF RESPONSIBILITY

PROBLEM STAKEHOLDER, HACKRUSH - IIT Gandhinagar [Oct 2022 - Apr 2025]

- Conducted Cybersecurity workshops training sessions and competitions for 100+ participants, instrumental in growing the culture for Cybersecurity at IIT Gandhinagar.
- Developed and curated original CTF challenges across Cryptography, Web, and Forensics domains, enhancing the learning experience for participants.

CONVENER, STUDENT SENATE - IIT Gandhinagar [Apr 2024 - Apr 2025]

- Elected head of the highest student representative body; Led various policy formulation initiatives increasing accountability.
- Updated documents 3 years out of date with various levels of versioning, bringing all documents to current standards.

MANAGEMENT COORDINATOR, TECHNICAL COUNCIL - IIT Gandhinagar [Jun 2023 - Apr 2024]

- Managed a 6-member team to execute a tech orientation program for 250+ freshmen across 3 venues.
- Spearheaded the induction of 300+ students into technical clubs, formalizing them into institutionally recognised entities.

DOCUMENTATION & OUTREACH COORDINATOR, ACADEMIC COUNCIL - IIT Gandhinagar [Jun 2023 - Apr 2024]

- Editor-in-Chief of *The Quill*, a monthly academic digest featuring faculty, students, and alumni.
- Established documentation standards, led publication initiatives, creating processes for documenting council activity.

STUDENT GUIDE COORDINATOR - IIT Gandhinagar [Oct 2022 - Apr 2024]

- Managed the Student Guide team as a Junior Undergraduate, leading a team of 30 members; improved efficiency of the mentorship structure for 300+ first-year students.
- Personally mentored 12 first-year students on academics, well-being, and campus engagement.