SUBHRAJIT DAS

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EDUCATION

PhD in Computer Science and Engineering *2025 - Present*
Indian Institute of Technology Gandhinagar, Gandhinagar, India
Director's PhD Fellow

M.Tech. in Computer Science and Engineering *2023 - 2025*
Indian Institute of Technology Gandhinagar, Gandhinagar, India
CPI: 9.84
Specialization: Computer Systems.

M.Sc. in Computer Science *2021 - 2023*
University of Kalyani, Kalyani, India
CGPA: 9.76
First Class with Distinction
First Rank in University

B.Sc. (Honours) in Computer Science *2018 - 2021*
Panihati Mahavidyalaya, Sodepur, India *(Affiliated to WBSU)*
CGPA: 9.89

Higher Secondary (Class XII) *2016 - 2018*
Kalyangarh Vidyamandir, Ashoknagar, India, *(Affiliated to WBCHSE)*
Science Stream: Physics, Chemistry, Mathematics, Computer Science
Percentage: 86.20

Secondary (Class X) *2010 - 2016*
Prafulla Nagar Vidyamandir, Habra, India, *(Affiliated to WBBSE)*
Percentage: 79.28

RESEARCH INTERESTS

CPU Parallelism, Distributed Systems and Usable Security

RESEARCH EXPERIENCE

Accelerating Large Integer Arithmetic with Parallel Addition, Subtraction, and Vedic-Based Multiplication Using AVX512 Jan 2024 - Apr 2025
Supervisors: Prof. Abhishek Bichhawat, Prof. Yuvraj Patel IIT Gandhinagar

- Designed high-performance faster data-parallel algorithms for large integer addition and subtraction using AVX512 for most cases.
- Achieved average execution-time speedup of 2.06x for addition and 2.32x for subtraction (up to 131k bits) compared to the GNU Multiple-Precision Arithmetic Library (GMP).
- Designed a faster Vedic-based multiplication algorithm for large integers using AVX512-IFMA for 256-bit operands, with execution-time speedup of 1.83x compared to the GMP library.
- Additionally, designed approximate variants of the proposed algorithms for large integer addition and multiplication, achieving average execution-time speedup of 2.52x and 2.80x, respectively, compared to GMP.

Studies on Various Maximal Covering Location Problems using Genetic and Artificial Bee Colony Algorithms Sep 2022 - Jun 2023
Supervisors: Prof. Priya Ranjan Sinha Mahapatra and Dr. Soumen Atta University of Kalyani

- Implemented an algorithm to solve the NP-Hard Maximal Covering Location Problem using Genetic Algorithm with Local Refinement, showing promising results in various SJC data sets in terms of both achieving near-optimal benchmark results and computational time. However, in some instances, the benchmark results were missed by a small margin, while it beats some of the existing models in terms of computational time by a multi-fold time.
- Designed and implemented an algorithm to solve the NP-Hard Probabilistic Maximal Covering Location Allocation Problem using Artificial Bee Colony Algorithm with Regional Facility Enhancement, achieving optimal benchmark results of commercial solver CPLEX in 50% of cases, with an average computational time of 85.83 seconds, with an average gap of 0.01%, but matched accuracy with other meta-heuristics models while beating most of the preceding models in computational time.

Reversible Multiplier Accumulate Unit Jan 2021 - Aug 2021
Supervisors: Mr. Biswanath Sen Panihati Mahavidyalaya

- Proposed a reversible design of the Multiplier Accumulate Unit (MAC) using reversible gates for low power consumption and heat dissipation, helping us in energy saving.
- Additionally, proposed a reversible design of Adder/Subtractor and Information Shifter, which is helpful for addition/subtraction and shifting information at a very low power energy.

TEACHING EXPERIENCE

Teaching Assistant Jul 2023 - Present
Dept. of CSE IIT Gandhinagar

- Assisted with courses such as Distributed Systems and Cloud Computing, Computer & Network Security, Compilers, and Data Structures and Algorithms - I.

Guest Lecture on SIMD and Code Profiling Oct, 2025
Computer Systems, CS 612 IIT Gandhinagar

- Given a couple of guest lectures on exploiting x86-64 data parallelism using compiler auto-vectorization, intrinsics and also profiling code with Linux perf and relevant syscalls for the course CS 612 - Computer Systems.

Guest Lecture on RAID April, 2025
Operating Systems, CS 330 IIT Gandhinagar

- Given a guest lecture on RAID for the course CS 330 - Operating Systems.

Principal Instructor Nov 2024
Dept. of CSE IIT Gandhinagar

- Conducted a Student-Run Course (SRC) titled "Code Profiling and Optimization" in collaboration with a colleague, under the mentorship of *Prof. Abhishek Bichhawat*. The course, part of the Student Academic Council initiative, focused on code profiling, performance benchmarking, and leveraging various tools and libraries for code optimization.

PROJECTS

Organizational Impact of Security Features on Email Accounts Jan 2025 - Present
Co-Investigator IIT Gandhinagar

- Ongoing project investigating the impact of security features on the usability of organizational email systems.
- Focuses on user behavior in response to changes in organizational policies, particularly within academic institutions.

Online Authentication Habits of Indian Users [1] Oct 2023 - May 2024
Team Contributor IIT Gandhinagar

- Conducted a structured survey with 90 Indian participants, analyzing awareness, usage, and perceptions regarding password habits, password managers, and Two-factor Authentication (2FA).
- Highlighted many interesting insights, including a tendency to use default settings, and emphasized the need for tailored strategies to enhance password security.

Instant Payment Gateway Feb 2024 - April 2024
Team Contributor IIT Gandhinagar

- Developed an instant payment system using microservices architecture (Go, gRPC, Docker) with a single-server deployment, processing up to 400 requests/second and 1000+ concurrent connections, ensuring secure, fault-tolerant transactions via Nginx load balancing and sharded MySQL/SQLite.
- Designed key components (Authenticator, Payment Handler, Resolver, Banks) for transaction coordination, failure recovery, and notifications, leveraging ELK Stack and wrk for performance benchmarking.

TennisServe: A Parallel Game Matching Server Jan 2024 - April 2024
Individual Contributor IIT Gandhinagar

- Developed a simulation of a tennis game matching server where multiple players send requests for games: singles, doubles, male, female, or mixed. Utilized OpenMP threads to handle client requests and MPI calls for player communication. Managed the availability of limited tennis courts (4 courts) to continuously match players' requests.

PUBLICATIONS

[1] P. Choudhary*, **Subhrajit Das***, M. P. Potta*, P. Das, and A. Bichhawat, "Online authentication habits of indian users," in *Proceedings of BuildSEC'24, Building a Secure & Empowered Cyberspace*, IEEE Society on Social Implications of Technology (SSIT), New Delhi, India, Dec. 2024.

RELEVANT CERTIFICATION

Certification in Teaching, Indian Institute of Technology Gandhinagar, Semester II, 2023-24

POSITIONS OF RESPONSIBILITY

Volunteer Dec 16-18, 2024
FSTTCS 2024 IIT Gandhinagar

- Volunteered at the 44th conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2024), organized by IARCS in association with ACM India.
- Assisted in organizing and managing the in-person event, including coordinating sessions, helping attendees, and ensuring smooth operations throughout the conference.

Class Representative Oct 2021 - June 2023
Dept. of CSE, MCS University of Kalyani

- Elected as Class Representative for the Batch 2021-2023 M.Sc. in Computer Science.
- Facilitated communication between faculty, administration, and batch-mates in matters ranging from class-related concerns to advocating for a fee reduction for the batch.

ACHIEVEMENTS

Selected for Director's Fellowship for admission into PhD at IIT Gandhinagar	*Jan 2025*
Best Paper Award for "Online Authentication Habits of Indian Users" at BuildSEC'24	*Dec 2024*
MoE Scholarship for Teaching Assistantship, IIT Gandhinagar	*Jul 2023*
All India Rank of 530 in the GATE 2023 Computer Science examination	*Mar 2023*
Qualified for West Bengal SET in Computer Science for Lecturership	*Mar 2023*
Awarded with UGC NET JRF in Computer Science	*Dec 2022*
Qualified for UGC NET in Computer Science for Lecturership	*Dec 2022*
Swami Vivekananda Merit-cum-Means Scholarship, Govt. of West Bengal	*Oct 2021*

SKILLS/HOBBIES

Programming Languages	C, C++, Java, MATLAB, Assembly, Go, Python, R, Shell, SQL, Prolog, Kotlin, HTML, CSS, JavaScript, JSP
Tools/Libraries/Simulators	Git, Docker, gRPC, OpenMP, MPI, AVX, Valgrind, PERF, GDB, Wireshark, NS2, Mininet
Operating Systems	Linux/Unix, Windows
Hobbies	Enjoying Music and Travelling
Languages	Bengali (native), English (fluent), and Hindi (intermediate)
Other Interests	Geopolitics, Financial Instruments

EXTRA-CURRICULAR ACTIVITIES

Selected for the 37th Inter IIT Aquatic Meet 2023 Training Camp at IIT Gandhinagar

Completed Fifth-Year Examination in Fine Art (2017) from Sarbabharatiya Sangeet-o-Sanskriti Parishad with First Class in Theory and First Division with Distinction in Practical

Received multiple awards and medals as an Off-Spin bowler in Cricket during high school years, competing in district and state-level tournaments, including those organized by the Cricket Association of Bengal