Sourabha Bharadwaj

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Education

Indian Institute of Technology (IIT) Bhubaneswar **July 2017 – July 2021**

Bachelor of Technology (Honors) in Computer Science and Engineering *Bhubaneswar, Odisha, India*

- **CGPA**: *9.31 / 10.0.* **Class Rank**: *3 / 55*
- **Thesis Advisor**: *Dr. Sudipta Saha*

Research Interests

- Machine Learning + Systems, Operating Systems, Quantum Computing

Publications

Concurrent Transmission for Multi-Robot Coordination **RoboCom, CCNC 2022**

***Sourabha Bharadwaj**, Karunakar Gonnabathula, Sudipta Saha, Chayan Sarkar, Rekha Raja*

- A novel split architecture providing **centimeter**-level spatial and **millisecond**-level temporal precision in a low-resource, decentralized, 5-robot setup
- Won the **Best Paper Award** for our works and presentation with a cash prize of **1000€** sponsored by *Technology Innovation Institute, Abu Dhabi*, along with an article featured on TechXplore and NewsAzi

Research Experience

Decentralized and Smart Systems Research Group (DSSRG) **IIT Bhubaneswar**

Undergraduate Researcher, advised by Dr. Sudipta Saha *Jan 2021 – May 2021*

- **Project**: *Network Structure Discovery in Large-scale Decentralized Network (BTech Thesis)*
- Implemented **network topology cognition** algorithms to estimate the central node in a large-scale decentralized wireless sensor network
- Devised a neighborhood-guided network discovery algorithm using the synchronous transmission protocol, *Glossy*, achieving cognition within **50%** of total steps needed in the randomized algorithm
- Employed data compression via Run-Length Encoding to enable network graph sharing among nodes with as little as **8 Bytes** for up to **200 nodes** within a span of 10 milliseconds in each communication cycle when run on **Contiki-OS** and **Cooja** simulator, as well as public testbeds such as Indriya and FlockLab

Undergraduate researcher, advised by Dr. Sudipta Saha *July 2020 – Dec 2020*

- **Project**: *Concurrent Transmission for Multi-Robot Coordination*
- Designed, implemented, and tested a novel split architecture for a low-resource, **multi-robot IoT environment**, enabling energy-efficient communication and computation using the synchronous communication protocol, Glossy
- Designed collaborative shape formation experiments like square-shape and concentric circles on 5 AlphaBot and GoPiGo bots run using **Raspberry Pi** for computation and **TelosB** for communication in leader-follower strategy for evaluation
- Achieved **millisecond**-level temporal precision and **centimeter**-level spatial precision with our novel strategy
- Published works at CCNC 2022's RoboCom Workshop and received Best Paper Award (Check Publications)

Undergraduate researcher, advised by Dr. Sudipta Saha and Dr. Animesh Srivastava (Google) *July 2018 – July 2020*

- **Project**: *Encrypted Display in AR/VR setup*
- Implemented a secured screen and window sharing and viewing service across Linux and Android devices in **C++**
- Exploited the **X11 Window System** to reorder window hierarchy, **UFW** to customize the firewall, **MPEG** to assist in video streaming, and **OpenCV** to dynamically track and decode secure screen's QR code and replace with desired windows in target devices

Work Experience

D. E. Shaw India (Data Warehouse and Analytics Team) **Bangalore, India**

Member of Technical Staff *May 2021 – Sept 2023*

- Integrated an internal **database versioning** tool to enable seamless monthly releases with hassle-free rollbacks
- Designed star-schema in **SQLServer** inspired by **Kimball dimensional model** for **7** scattered datasets ranging from applicants, compensation, employment to attrition for seamless and efficient querying with **50%** reduction in query size
- Designed and implemented **ETL pipelines** in **Java Spring Batch** and proprietary **Python** infra for real-time data aggregation and processing
- Optimized data fetching by building **GraphQL** APIs for firmwide teams to consume the processed data
- Setup backend system infra such as CNAMEs, **Kerberos** certificates, Load balancers, and **CRON**s to host the team's DWH application on dedicated restricted **Linux servers**
- Setup ETL **monitoring alerts**, data access audits, and **data integrity checks** to ensure high quality and accuracy of the warehouse data
- Spearheaded the design, discussions, and development of two data and visualization-intensive analysis tools built using **React/Redux**, **Highcharts**, and **Pivot tables** in **JavaScript** for leadership teams and HC to make impactful, data-driven decisions in the firm's employment and attrition processes

Winter Intern *Jan 2021 – May 2021*

- Customized the **Jenkins CI/CD** pipeline and deployed internally with a suite of unit tests covering **functional tests** and **data quality** checks to ensure exhaustive pre-release testing
- Optimized statistical algorithms and **REST** APIs serving existing dashboard by reducing load-times by **30%** and data-transfer size by **20%**, fast-tracking the hiring processes across the firm
- Deployed the application over internal **cloud infra** for high-availability (HA) of the application

Summer Intern *Apr 2020 – June 2020*

- Built GraphQL APIs, and customized and **chart-integrated Pivot tables** to enable seamless analyses over a large feature set of around **100** features in combined applicant and employment data
- Implemented **recursive GraphQL data-flattener** and **query constructor** algorithms to make the analysis tool dynamic and GraphQL schema-agnostic
- My internship experience was featured as a LinkedIn post

Scholastic Achievements

- Department rank **3** out of **55** students in the Computer Science branch at IIT Bhubaneswar at the end of 8 semesters, *2021*
- Secured **10/10 GPA** in Spring 2021 at IIT Bhubaneswar, *2021*
- Ranked **1764** out of **1.2 million** contesting candidates in **JEE Advanced** examination, *2017*
- Ranked **7** out of **200,000** contesting candidates in **Karnataka CET** (Engineering entrance) examination, *2016*

Relevant Coursework

- Data Structures
- Analysis of Algorithms
- Operating Systems
- Computer Networking
- Database Systems
- Machine Learning
- Discrete Structures
- Software Engineering
- Coursera's ML Specialization (certificate)
- Coursera's DL Specialization (certificate)

Technical Skills

Languages: Python, Java, C++, JavaScript, SQL
Technologies/Frameworks: Linux, Contiki-OS, Spring Batch, GraphQL, Jenkins, React/Redux, TensorFlow, Git

Extracurricular

Neuromancers **Jan 2018 – May 2021**

Member and Student Guide *IIT Bhubaneswar*

- Participated in various coding competitions including ACM-ICPC as part of the institute's coding club
- Guided juniors in preparing and performing well for industry-based internship opportunities

Google Developer's Student Club **Jan 2020 – May 2021**

Member and Student Guide *IIT Bhubaneswar*

- Provided talks to juniors on using Git, GitHub, and Object-oriented programming in Java
- Collaborated and prepared a roadmap for juniors to advance in the fields of Machine and Deep Learning

National Service Scheme (NSS) **July 2017 – July 2018**

Member *IIT Bhubaneswar*

- Volunteered to teach science and mathematics to underprivileged Class I to Class X students at the institute adopted neighboring villages
- Volunteered to campaign and spread awareness in the villages about cleanliness and education