Dr. Rohit Kumar

Assistant Professor
DoAI, SVNIT Surat

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RESEARCH INTERESTS

- Optimization Techniques
- Approximation Algorithms
- Applications of AI/ML
- Wireless Sensor Networks

EDUCATION

Ph.D. in Computer Science & Engineering
Institute: Indian Institute of Technology (IIT) Bhubaneswar, Odisha, India
Thesis: Charging and Data Collection in Wireless Rechargeable Sensor Networks
Supervisor: Dr. Joy Chandra Mukherjee

M.Tech. in Computer Science & Engineering
Institute: Visvesvaraya National institute of Technology (VNIT) Nagpur, Maharashtra, India
Thesis: Recommendation System based on Analysis of User Sentiments to Rate Mobile Product and Classification of Reviews

B.Tech. in Computer Science & Engineering
Institute: Sardar Vallabhbhai National Institute of Technology (SVNIT), Gujarat, India
Thesis: A Comparative Study of Various Homomorphic Encryption Schemes in Secure Multiparty Computation

PUBLICATIONS

JOURNALS

J1 **Rohit Kumar** and Joy Chandra Mukherjee, *Approximation Algorithms for Vehicle-Aided Periodic Data Collection from Mobile Sensors with Obstacle Avoidance in WSNs*, Elsevier, Ad Hoc Networks, vol. 149:103239, 2023.

J2 **Rohit Kumar** and Joy Chandra Mukherjee, *On-demand vehicle-assisted charging in wireless rechargeable sensor networks*, Elsevier, Ad Hoc Networks, vol. 112:102389, 2021.

CONFERENCES

C1 **Rohit Kumar** and Joy Chandra Mukherjee, *On-demand Multi-Node Partial Charging Scheme using Multiple Wireless Charging Vehicles in WRSN*, 26th International Conference on Distributed Computing and Networks (ICDCN), Hyderabad, India, pp. 21–30, 2025.

C2 **Rohit Kumar** and Joy Chandra Mukherjee, *An Approximation Algorithm for Path Planning of Vehicles for Data Collection in Wireless Rechargeable Sensor Networks*, 24th International Conference on Distributed Computing and Networks (ICDCN), Kharagpur, India, pp. 207–216, 2023.

C3 **Rohit Kumar** and Joy Chandra Mukherjee, *A Vehicle-Aided Data Collection Scheme for Wireless Rechargeable Sensor Networks*, 13th International Conference on Communication Systems and Networks (COMSNETS), Bangalore, India, pp. 216–219, 2021.

C4 **Rohit Kumar** and Joy Chandra Mukherjee, *Charge Scheduling in Wireless Rechargeable Sensor Networks Using Mobile Charging Vehicles*, 12th International Conference on Communication Systems and Networks (COMSNETS), Bangalore, India, pp. 375–382, 2020.

PROFESSIONAL
EXPERIENCE

Assistant Professor: Department of AI, SVNIT Surat **(September 2024 –)**
Assistant Professor: Faculty of Technology, University of Delhi **(October 2023 – September 2024)**
Adjunct Assistant Professor: IIIT Pune **(September 2023 – October 2023)**
Trainee Engineer: e-Infochip Limited Ahmedabad **(July 2013 – April 2014)**

TEACHING
INTEREST

Undergraduate Courses:
- C Programming
- Data Structures
- Design and Analysis of Algorithms
- Theory of Computation
- Cryptography and Network Security

Postgraduate Courses:
- Advanced Algorithms

PH.D. THESIS

In the thesis, we primarily focused on designing scheduling algorithms for efficient charging of the sensors and data collection from the sensors for some problems in a large-scale wireless rechargeable sensor networks (WRSNs).

In our first work, we explored scheduling the charging of static sensors (SSs) in WRSN. We formulate the problem of charge scheduling of SSs with multiple WCVs under different sensors and WCVs constraints, where a WCV can only charge a single sensor wirelessly to its full capacity at a time, and design scheduling algorithms to optimize different objectives. For a dense, large-scale WRSN, we also devise new charge scheduling algorithms to charge the sensors based on a multi-node wireless charging scheme, where a WCV can charge multiple sensors partially and simultaneously at a time to optimize different objectives.

The second work that we investigated in the thesis was data collection from static sensors (SSs) and mobile sensors (MSs) while considering the presence of obstacles in WRSN. We formulate the data collection problem from SSs with multiple mobile sinks (SNKs) under different sensors and SNKs constraints, where an SNK visits the sensors to collect data from them, and design the approximation algorithm to optimize different objectives. We also formulate the problem of data collection from mobile sensors (MSs) in the presence of obstacles and design the approximation algorithms to determine the minimum number of SNKs that collect data from all the MSs in each time period while avoiding collision with obstacles in the area where an SNK has sufficient energy to visit the MSs. Lastly, we deal with the problem of collecting data from the MSs and SSs in the presence of obstacles using multiple SNKs, where each SNK can only travel a fixed distance. We design the approximation algorithm to find the minimum number of SNKs that collect data from all the MSs and SSs and deliver it to the base station while avoiding collisions with the obstacles in the area.

TECHNICAL
SKILLS

Programming Languages: C, C++, Python, C#.NET, Java
Databases: Oracle 9(SQL & PL/SQL), SQL Server 2005
Tools: MicroStrategy, Business Intelligence (BI)

PROFESSIONAL
ACTIVITIES

- Reviewer of IEEE TIV, Computing Springer, International Journal of Engineering and Technology Innovation