

GAURAV SINGH

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RESEARCH INTERESTS

My research interests centre on AI-driven wireless communication systems with a focus on networked robotics for 6G and low latency wireless applications, use of reinforcement learning and multi-armed bandit algorithms for wireless networks optimization, digital twin assisted robot navigation, and spectrum learning. I am also strongly interested in real-world wireless testbed design, end-to-end learning for wireless communication, and AI-native protocol development for dense, low-latency, and highly mobile scenarios.

EDUCATION

University of Texas at Arlington, United States of America <i>Doctor of Philosophy in Computer Science (pursuing)</i>	2023-2028 3.625 / 4 cgpa
University of Leeds, United Kingdom <i>Master of Science in Advanced Computer Science (Artificial Intelligence)</i>	2019-2020
Centre for Development of Advanced Computing, Noida, India <i>PG Diploma in Big Data Analytics</i>	2018-2019
Delhi School of Economics, Delhi University, Delhi, India <i>Master of Business Administration in International Business</i>	2016-2018
Delhi Technological University, Delhi, India <i>Bachelor of Technology in Software Engineering</i>	2011-2015

PUBLICATIONS

- [1] **Gaurav Singh**, Arnob Ghosh, and Debashri Roy. PROTEUS: Proactive Latency-Constrained Enhanced Ubiquitous Surveillance. (2026). *International Symposium on Modeling and Optimization in Mobile, Ad hoc, and Wireless Networks (WiOpt)*.
- [2] **Gaurav Singh**, Sravani Kurma, Debashri Roy, and Vini Chaudhary. (2026). Secure and Efficient Transmission in Hybrid Sparse RIS-Enabled Internet of Robotic Things. *International Symposium on Modeling and Optimization in Mobile, Ad hoc, and Wireless Networks (WiOpt)*.
- [3] **Gaurav Singh**, Sunday Amatare, and Debashri Roy. (2025). SauRON: Smart Surveillance using Robotic Swarms with Optimized Networks. *IEEE International Conference on Computer Communications (INFOCOM)*, (NetRobiCS). **[Best Paper Award]**
- [4] **Gaurav Singh**, Sunday Amatare, Enrico Natalizo, and Debashri Roy. (2026). Realizing the 6G-Enabled Industrial Internet of Robotic Things: Targets, Enablers, and a Case Study. *IEEE IoT Magazine*.
- [5] Aavash Kharel, Raul Shakya, Eber Barrientos, **Gaurav Singh**, Xiaoqian Zhang, and Debashri Roy. "POSTER: Analysis of Latency for Wireless Connectivity in Networked Robots," 2025 IEEE 26th International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM), Fort Worth, TX, USA, 2025, pp. 154-156, DOI: 10.1109/WoWMoM65615.2025.00036.
- [6] Raju Hazari, **Gaurav Singh**, Devika Renjith, Divya Krishnan, B Pavanitha, Habeeb Olufowobi, and Debashri Roy, "Spec-SCAN: Spectrum Learning in Shared Channel using Neural Networks," In CCNC 2025 WKSHPS: 5th International Workshop on Communication and Networking for Swarms Robotics (ROBOCOM). DOI: 10.1109/CCNC54725.2025.10976013.
- [7] Sunday Amatare, **Gaurav Singh**, Raul Shakya, Aavash Kharel, Ahmed Alkhateeb, and Debashri Roy. (2024). DT-RaDaR: Digital Twin Assisted Robot Navigation using Differential Ray-Tracing. *IEEE Transactions on Intelligent Transportation Systems (TITS) (In Review)*.

- [8] Sunday Amatare, **Gaurav Singh**, Aavash Kharel, and Debashri Roy. (2024). Real-Time Localization of Objects using Radio Frequency Propagation in Digital Twin. *IEEE Military Communications Conference (MILCOM)*. DOI: <https://doi.org/10.1109/MILCOM61039.2024.10774060>
- [9] Sunday Amatare, **Gaurav Singh**, Michele Samson, and Debashri Roy. (2024). RagNAR: Raytracing Based Navigation for Autonomous Robots in Unstructured Environment. *IEEE Global Communications Conference (GLOBECOM)*. DOI: 10.1109/GLOBECOM52923.2024.10901133
- [10] Mohammad Hasibur Rahman, **Gaurav Singh**, and Debashri Roy. (2024). Speclearn: Spectrum Learning in Shared Band under Extreme Noise Conditions. *IEEE International Symposium on Dynamic Spectrum Access Networks (DySPAN)*. DOI: <https://doi.org/10.1109/DySPAN60163.2024.10632806>
- [11] **Gaurav Singh**. (2021). Sentiment Analysis of Code-Mixed Social Media Text (Hinglish). <https://arxiv.org/abs/2102.12149>
- [12] **Gaurav Singh**. (2020). Decision Tree J48 at SemEval-2020 Task 9: Sentiment Analysis for Code-Mixed Social Media Text (Hinglish). <http://arxiv.org/abs/2008.11398> [12]

RESEARCH EXPERIENCE

Latency Aware Communication among swarm of robots

Problem: Finding optimal placement for swarm of robots in a latency constrained environment for full area coverage.

Methodologies: Deep Q-Learning (DQN), Submodular Optimization, Statistical Analysis

Tools: Turtlebot4, Agilex LIMO PRO, Gazebo, Python

Papers: WiOpt'26, IEEE Infocom Workshop '25, IEEE WoWMoM Poster '25, IEEE IoT Magazine.

Robot Navigation Using Ray Tracing Data

Problem: Finding optimal path for robot navigation using ray tracing data in unstructured environments

Methodologies: Q-Learning, Deep-Q Learning (DQN)

Tools: Sionna, Blender, Python

Papers: IEEE Globecom '24, IEEE TITS '24 (under review), IEEE MILCOM '24.

Securing Communication using Hybrid RIS

Problem: Maximizing Secrecy Rate under power constraints by optimizing HRIS configuration and BS beamforming.

Methodologies: Contextual multi-armed bandit algorithm, Actor-Critic Algorithm

Tools: Python

Papers: WiOpt'26.

Detecting Radar in CBRS Band

Problem: Detecting Radar signals in the CBRS Band among LTE and 5G signals using the spectrograms

Methodologies: YOLO v3, YOLO v5, YOLO v8

Tools: Python, MATLAB

Papers: IEEE DySpan '24, IEEE CCNC WKSHPS '25.

AWARDS AND RECOGNITION

- **Dr. Ramez Elmasri Endowed Scholarship Fund Award** (2026)
- **Graduate Dean's Research Assistantship** (2026)
- **Jeff and Lisa Smith Outstanding Graduate Researcher Award** (2025)
- **IEEE Transactions on Mobile Computing 2025 Reviewer Certificate** (2025)
- **NSF Travel Grant to Participate in Colosseum Young Gladiators 2024** (2024)
- **Graduate Dean's Summer Research Assistantship & Dissertation Fellowship** (2024)
- **First Prize for Teaching Assistant (TA) at CSE SCRF workshop held at UTA** (2024)
- **Participated in the UR2PhD Graduate Student Mentor Training Course** (2024)

INTERNSHIPS

Metals and Minerals Trading Corporation (MMTC) Limited, Delhi

Student Intern (MBA)

- Gained exposure to the international agricultural commodities market, including import workflows, import documentation requirements, and key operational terminologies. (Jun 2017 – Jul 2017)

National Informatics Centre (NIC), Govt. of India, Delhi

Student Intern (B.Tech)

- Strengthened Java fundamentals and learned Android app development basics; built a simple customer feedback and complaint-logging mobile application. (Jun 2014 – Jul 2014)

Computer Management Corporation (CMC) Limited, Delhi

Student Intern (B.Tech)

- Developed foundational Java programming skills, including OOP, exception handling, multithreading, UI development, database connectivity, and socket programming; created basic Java applications and applets. (Dec 2013)

ACADEMIC PROJECTS

● Sentiment Analysis of Code-Mixed social media text written in Hinglish

(MSc)

Description: Developed a high-performing sentiment classifier for the SemEval-2020 code-mixed Hinglish dataset. Improved baseline F1-score from 0.532 to 0.6852 using extensive preprocessing, custom stopwords and Hindi spell-checker creation, multiple vectorization techniques, and an ensemble of ML/DL models. [code] (Jun 2020 – Sep 2020)

● Robotics and Computer Vision

(MSc)

Description: Led a team of four to create a vision-based robotic navigation system capable of recognizing rooms by color and identifying characters on posters using OpenCV techniques such as HoughCircles, contour analysis, ORB features, and template matching. [code] (Nov 2019)

● Comparative Analysis of Customer Satisfaction of Honda and Maruti Suzuki Cars

(MBA)

Description: Designed a customer feedback survey for Honda and Maruti vehicle owners and performed statistical analysis using SPSS, including graphical comparison and t-tests to evaluate satisfaction levels. (Apr 2018 – May 2018)

● Social Box

(B.Tech)

Description: Built a web-based platform enabling users to upload, stream, and share media (audio/video/text) with integrated chat functionality, developed using Adobe Dreamweaver and WAMP Server. (Mar 2015 – May 2015)

● Chat server and Port scanner

(B.Tech)

Description: Developed a Java-based client-server communication system supporting multi-user chat with an integrated port-scanning utility for connection diagnostics. (Mar 2014 – Apr 2014)

ONLINE CERTIFICATIONS

● Coursera Certificates

Deep Learning Specialization - <https://coursera.org/share/daf0d5c8fdd1937cad263e8ba32c2c38>

(Mar 2021)

DeepLearning.AI Tensorflow Developer - <https://coursera.org/share/b7be5905828aa7eee44f5c8c9570ac05>

(Apr 2021)

Natural Language Processing Specialization - <https://coursera.org/share/5e8e7500d44ae162d0897d6ddf1ddaed>

(Apr 2022)

● HackerRank Certificates

SQL (Intermediate) Certificate - <https://www.hackerrank.com/certificates/8cc61d92d156>

(Sep 2020)

REFERENCES

● Dr. Debashri Roy – PhD Supervisor

Assistant Professor,
Department of Computer Science and Engineering,
The University of Texas at Arlington,
Email: debashri.roy@uta.edu

● Dr. Arnob Ghosh

Assistant Professor,
Electrical and Computer Engineering Department,
New Jersey Institute of Technology,
Email: arnob.ghosh@njit.edu