SAURABH PARKAR

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Summary

I am a graduate of the M.S. program in *Applied Artificial Intelligence* at Stevens Institute of Technology, where I joined the *Analytics and Information Security Lab (AISecLab)* and gained hands-on research experience in AI-driven wireless sensing and communication. My research focused on *dual-modality ISAC systems*, combining 28 GHz 5G NR and narrowband FMCW radar for contactless respiration monitoring using deep learning. I was awarded *1st Place at the ECE Research Scholarship Expo – Spring 2024* for my work on federated RF fingerprinting in O-RAN architectures. I also developed a deep learning–based *V2X slicing predictor* for QoS-aware network allocation and a CNN-based classifier for respiratory patterns. Outside of core research, I provided hands-on SDR-based experimentation training at *NSF CyberTraining Summer 2024*. My research interests include mmWave ISAC, edge AI, and SDR-based experimentation.

Education

Stevens Institute of Technology	**Sept 2023 – May 2025**
Master of Science in Applied Artificial Intelligence : GPA - 3.96/4.0	*Hoboken, NJ*

Mumbai University	**Aug 2019 – May 2023**
Bachelor of Engineering in Computer Engineering : GPA - 8.81/10	*Mumbai, MH*

Research Experience

Stevens Institute of Technology — **Sept 2024 – Present**
Graduate Research Assistant — *Hoboken, NJ*
Advisor: Prof. Shucheng Yu

Thesis: Contactless Respiratory Sensing using mmWave 5GNR and FMCW Radar *Sept 2024 - Jun 2025*

- Developed a dual-modality contactless respiration monitoring system using 28 GHz 5G NR and 2 MHz FMCW radar within an ISAC framework, leveraging USRP-2974 SDRs and phased array antennas.
- Built real-time signal acquisition and preprocessing pipelines; extracted respiration features from CSI and radar returns under indoor LoS conditions.
- Boosted model robustness through synthetic augmentation and achieved 98% accuracy across four breathing patterns using a 1D CNN trained on multi-modal features.

Project 1: Federated Learning for RF Fingerprinting for Device Authentication *Jan 2024 - Jun 2024*

- Implemented federated learning for RF device fingerprinting on the Open RAN (O-RAN) architecture; deployed a custom xApp on the Near-RT RIC for privacy-preserving, distributed training across base stations.
- Simulated and validated performance on the POWDER testbed using X310/B210 USRPs, achieving 99.75% classification accuracy in real-time 5G O-RAN conditions.
- Awarded 1st Prize at ECE Research Expo Spring 2024 for innovation in secure and scalable wireless edge intelligence.

Project 2: Deep Learning-Based Network Slicing for V2X Communication *June 2024 - Aug 2024*

- Developed a deep learning-based network slicing predictor xApp to classify V2X sessions into Low Latency, High Bandwidth, and General slices for dynamic QoS management.
- Trained on Berlin V2X dataset with engineered thresholds, achieving 92% prediction accuracy and enabling adaptive resource allocation via Near-RT RIC.
- Validated performance on an O-RAN testbed with simulated RSUs and UEs, replicating real-world mobility and traffic scenarios.

Professional Experience

Stevens Institute of Technology — **Jan 2025 – May 2025**
Graduate Student Grader – Course: AAI-551 — *Hoboken, NJ*

- Evaluated weekly programming labs, homework, and exams, applying a detailed rubric covering Python syntax, OOP, and data structure fundamentals.
- Held office hours to debug code, clarify lecture material, and guide best practices, resolving student questions.
- Assisted the instructor to refine grading rubrics, develop sample solutions, and maintain grade records in the Canvas LMS for transparent, consistent assessment.

Line Leverage   May 2024 – Dec 2024

Machine Learning Intern   *Staten Island, NY*

- Sourced and curated statistical data on NBA teams and players.
- Analyzed statistical factors to identify key features influencing team performance.
- Developed and implemented machine learning models to predict match outcomes based on historical performance, enhancing risk management and optimizing betting strategies.

Projects

Semi-Supervised Water Boundary Detection using Drone Imagery | *Python, scikit-learn, pandas*   **Sept 2023**

AAI-695 – Applied Machine Learning

- Downsized Geo TIFF images for computational efficiency.
- Implemented K-means clustering for auto-labeling sea and land pixels.
- Integrated SVM-C classifier for precise water boundary classification.
- Directly classified unseen data for efficient analysis.
- Utilized high-resolution drone imagery for accurate detection.
- Optimized semi-supervised learning with both labeled and unlabeled data.

CIFAR-10 Image Generation Using Generative Adversarial Network | *Python, PyTorch, NumPy*   **Sept 2023**

AAI-627 – Data Acquisition, Modeling and Analysis: Big Data Analytics

- Constructed Generator and Discriminator networks from scratch in PyTorch.
- Implemented a robust GAN architecture for image generation tasks.
- Employed the CIFAR-10 Dataset for training the GAN model.
- Enabled the generation of diverse images representing 10 distinct classes.
- Successfully generated synthetic images using the trained GAN model.
- Demonstrated the model's ability to produce realistic and varied visuals across different categories.

Honors/ Awards

ECE Research Scholarship Spring'24   **June 2024**

Provost Masters Fellowship   **Sept 2023**

Presentations/ Workshops

Presentations:

P.1 S. Parkar, X. Xue, S. Yu, "Federated Learning for RF Device Fingerprinting Over Open Radio Access Networks", 1st Symposium on Emerging Topics in Networks, Systems, and Cybersecurity, Stevens Institute of Technology, NJ, USA, August 2024. *(Poster Presentation)*

Workshops:

W.1 NSF CyberTraining: O-RAN-Based Cyberinfrastructure for Future-Generation Wireless Communication and Sensing, Stevens Institute of Technology, NJ, USA, June 2025. *(Trained Students on SDR Devices and Hands-On Experimentation)*

Technical Skills

Programming Languages: Python, C, C++, MATLAB
Operating Systems: Windows, Linux, Unix
Technologies/Frameworks: TensorFlow, NumPy, pandas, scikit-learn, Matplotlib, Docker, Kubernetes, GNU-Radio, srsRAN.
Algorithms: Machine Learning, Deep Learning, Natural Language Processing (NLP), Data Engineering, Machine Vision, Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN).

Relevant Coursework

Data Acquisition/Modeling/Analysis, Applied Machine Learning, Probability & Stochastic Processes, Engineering Programming: Python, Data Acquisition: Deep Learning, Pattern Recognition & Classification, Practicum in Applied Artificial Intelligence, Applied Data Structures & Algorithms, Engineering Programming: C++, Engineering Mathematics I–IV, Engineering Mechanics, Basic Electrical Engineering, Engineering Graphics, C Programming, Discrete Structures and Graph Theory, Data Structure, Digital Logic and Computer Architecture, Computer Graphics, Analysis of Algorithm, Database Management System, Operating System, Microprocessor, Theoretical Computer Science, Software Engineering, Computer Network, Data Warehousing and Mining, System Programming and Compiler Construction, Cryptography and System Security, Mobile Computing, Artificial Intelligence, Internet of Things, Machine Learning, Big Data Analytics, Machine Vision, Blockchain, Distributed Computing, Applied Data Science