AKANKSHA TYAGI

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EDUCATION

UNIVERSITY OF ARKANSAS **GPA: 3.83/4.0** Fayetteville, AR
Master of Science in Computer Science Dec 2025
Coursework: Image Processing, Privacy Enhancing Technology , Computer Security, Graph and Combinatorial Algorithms, Full Stack Deep Learning , Machine Learning in Medical Image Reconstruction.

COLLEGE OF ENGINEERING ROORKEE (COER) Roorkee, India
Bachelor of Technology in Information Technology May 2017

SKILLS

Programming & Tools: Python, SQL, Git, C/C++, PHP, FastAPI, Docker, Jupyter, LaTeX
Data Engineering: Data Modeling, Data Pipelines, Spark, PostgreSQL
Machine Learning: PyTorch, TensorFlow, scikit-learn, Reinforcement Learning, Graph Neural Networks (GNNs)

ACADEMIC PROJECTS

Cybersecurity Lab (UArk Affiliated) Jan 2024 – Present
Research Assistantship **Advisor:** Dr. Qinghua Li

- **Reinforcement Learning for Fuzzing:** Developed RL-based models to generate test cases, significantly improving vulnerability detection and code coverage over traditional fuzzing techniques.
- **Master's Thesis** – AI-Based Anomaly Detection in Cyber-Physical Water Testbeds: Building machine learning models for real-time anomaly detection in water systems, enhancing security and resilience of cyber-physical infrastructure.

Machine Learning & Computer Vision Projects (UArk Affiliated) Jan 2024 – Present

- **Image Synthesis and Reconstruction** with Denoising Diffusion Probabilistic Model on Amsterdam Library of Textures (ALOT) dataset to generate diverse, high-fidelity artificial textures resembling originals; useful in augmenting texture data.
- **Implemented Deep Learning-based Steganography** framework to securely embed one image within another, ensuring high imperceptibility and robust recoverability of hidden data. Optimized network architecture and training parameters to increase concealment accuracy and secure data transmission.
- **Latent Diffusion Models for High-Resolution Image Synthesis**Implemented LDMs for efficient text-to-image generation by applying diffusion in latent space using pretrained autoencoders.
  Integrated cross-attention with U-Net for conditional synthesis and evaluated results on CelebA-HQ and LAION datasets using FID and IS scores.

PROFESSIONAL EXPERIENCE & INTERNSHIPS

Reinforcement Learning for Traffic Optimization (IIIT-H Affiliated) Jun 2022 – Dec 2023
Research Internship **Advisor:** Dr. Praveen Paruchuri

- Optimized lane-level dynamics and vehicle-to-vehicle communication by simulating multi-modal traffic environments using SUMO, improving overall traffic control efficiency.
- Enhanced lane selection and emergency vehicle dynamics by developing SB3-based reinforcement learning models, boosting response efficiency and safety.
- Reduced traversal times significantly by evaluating RL strategies on grid-world and real-world-inspired road networks, surpassing human-level performance and contributing to a research publication in the International Conference on Vehicle Technology and Intelligent Transport Systems (VEHITS).

CODEVENTURE TECH LLP Roorkee, India
Software Engineer Jun 2021 - Apr 2022

- Streamlined operations by optimizing workflows and improving team communication, boosting overall efficiency.
- Designed and developed a city complaint management system using PHP, WordPress, HTML, CSS, and JavaScript, enhancing civic issue reporting and response times.

PUBLICATIONS

- **Tyagi, A.**, Lowalekar, M. and Paruchuri, P., 2024. Improving Lane Level Dynamics for EV Traversal: A Reinforcement Learning Approach. In VEHITS (pp. 134-143). DOI: 10.5220/0012637200003702

  Honors: Nominee for Best Student Paper Award at the VEHITS-2024 conference.

- Uwibambe, M.L., **Tyagi, A.** and Li, Q., 2025, August. A Reinforcement Learning Approach to Multi-Parametric Input Mutation for Fuzzing. In 2025 IEEE International Conference on Cyber Security and Resilience (CSR) (pp. 174-179). IEEE. DOI: 10.1109/CSR64739.2025.11129986