
RESEARCH INTEREST

Actively investigating security vulnerabilities and potential enhancements in perception models in **Cyber-Physical Systems**, leveraging Machine learning and Computer Vision frameworks. My current focus lies in **Vision-Language Models (VLMs)** for robust scene understanding, and **Diffusion models** for simulating novel scenarios for navigation and planning. I have experience in reconstruction methods such as **3D-Gaussian splatting (3DGS)** along with point cloud generation for environment modeling.

SELECTIVE RESEARCH ARTICLES

Arkajyoti Mitra, Paul Agbaje, Afia Anjum, Mert D. Pesé, Habeeb Olufowobi; **FedVLM: Scalable Personalized Vision-Language Models through Federated Learning**, *European Conference on Artificial Intelligence (ECAI'25)* [Accepted]
Arkajyoti Mitra, Pedram MohajerAnsari, Mert D. Pesé, Habeeb Olufowobi; **Beyond the Glow: Adversarial Analysis of Luminescent Markers in Autonomous Vehicle Perception Systems**, *USENIX Symposium on Vehicle Security and Privacy (VehicleSec'25)*
Aqsa Yousaf, Arkajyoti Mitra, Paul Agbaje, Afia Anjum, Habeeb Olufowobi; **DAPS-AGF: Depth-Aware Perceptual Similarity with Adaptive Gradient Filtering for Enhanced Outdoor Scene Reconstruction**, *End-to-End 3D learning (ICCV Workshop'25)* [Accepted]
Paul Agbaje, Afia Anjum, Arkajyoti Mitra, Habeeb Olufowobi; **Privacy-Preserving Intrusion Detection System for Internet of Vehicles using Split Learning**, *International Conference on Big Data Computing, Applications and Technologies (BDCAT'23)*
Paul Agbaje, Afia Anjum, Arkajyoti Mitra, Gedare Bloom, Habeeb Olufowobi; **A Framework for Consistent and Repeatable Controller Area Network IDS Evaluation**, *International workshop on Automotive and Autonomous Vehicle and Security (AutoSec'22)* [Best paper award]

EDUCATION

University of Texas, Arlington, USA <i>Doctor of Philosophy (Pursuing), Computer Science</i>	Fall'20 - Present GPA: 3.9/4.0
Indian Institute of Technology (Indian School of Mines), Dhanbad, India <i>Master of Technology, Computer Science and Engineering</i>	2017 - 2019 CGPA: 8.65 / 10

RESEARCH PROJECTS & EXPERIENCE

Vision-Language Model (VLM) for Visual Question-Answering (VQA) Tasks ● Fine-tuning VLMs (Florence2, SmolVLM2, Phi 1.5) on VQA benchmark datasets such as OK-VQA, Text-VQA, GSM100K. ● Leveraging VLMs for reasoning and unknown terrain navigation .	Ongoing
3D Reconstruction ● Building digital twin environment using 3DGS for safer development of Autonomous Driving . ● Hyperparameter tuning for scene reconstruction and improving the quality of the scene while reducing memory footprint .	Ongoing
Generative Modelling ● Building Flow-Matching models to develop velocity fields for point cloud generation . ● Exploring Diffusion models such as DDPM for spatial generation .	Ongoing
MITRE eCTF Competition (Entered Attack Phase) ● Lead a team and developed a secure medical device using MAX78000FTHR Board ● Secured 25 th position worldwide	Jan. 2024 - April 2024
CyberTractor Workshop ● Secured <i>second</i> position by identifying/patching a security vulnerability on control area network (CAN) through replay attacks.	July 2022 - July 2022
CyberTruck Workshop ● Developed a spoofing attack on CAN bus that can compromise vehicular components such as brakes and fuel indicator.	June 2022 - June 2022
Computer-Aided Identification of Astrocytoma Tumor Grades using Brain MRI ● Developed a framework that detects and classifies brain tumors from the MRI scans of patients.	June 2018 - May 2019

TECHNICAL SKILLS

Programming languages and Software: Python, MATLAB, C++, C, CARLA (simulator)

Machine Learning Application Frameworks: PyTorch, TensorFlow, Diffusers, Transformers

WORK EXPERIENCES

University of Texas, Arlington

August 2020 – Present

Graduate Teaching Assistant/Research Assistant

- Current research focus is applying vision-language models for autonomous driving and improving latent representation for seamless navigation. I conduct my research in the Cyber-Physical System Security (CSS) Lab.
- Collaboratively working on projects, reviewing as well as writing research papers, mentor undergrads and master students for doing research. Varied experiences are helping me in improving communication skills, critical thinking, and resource-and-time management.

Indian Institute of Technology (Indian School of Mines), Dhanbad

July 2018 – May 2019

Teaching Assistant

- Being teaching assistant under different lecturers helped in gaining experience and working under various conditions and environment.
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AWARDS AND SCHOLARSHIPS

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| ● Travel grant to attend VehicleSec'25 | August 2025 |
| ● Travel grant to attend VehicleSec'24 | February 2024 |
| ● Travel grant to attend TAPIA'23 | September 2023 |
| ● Travel grant to attend CyberTractor workshop | June 2022 |
| ● Travel grant to attend CyberTruck workshop | July 2022 |
| ● Best paper award in AutoSec'22 | April 2022 |
| ● Second Best Paper award by Computer Society of India (CSI), Kolkata | August 2016 |
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OTHER ACTIVITIES

- Volunteered for VehicleSec'24
- Volunteered for SC'22