

# Shahid Shabeer Malik

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Computer Vision Engineer | AI/ML Engineer

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## SUMMARY

Computer Vision Engineer with expertise in real-time perception, 3D reconstruction, and spatial understanding. Experienced in SfM/SLAM, depth estimation, camera calibration, and multi-sensor fusion, with hands-on experience in ROS-based robotic sensor integration and motion planning for data acquisition using an industrial robotic arm. Strong background in deep learning and transformer-based vision models, with simulation-driven validation in Unreal Engine and CARLA.

## EDUCATION

• Master of Science in Computer Science, Saint Louis University, USA	Aug 2023-Dec 2025
• Bachelor of Technology Computer Science and Engineering, Jamia Hamdard University, India	Sep 2020-May 2023

## WORK EXPERIENCE

### Graduate Research Assistant (Computer Vision, AI/ML Engineer), SLUAIR Lab, Saint Louis University Sep 2023-July 2025

- Built real-time event-driven perception pipelines integrating event, RGB, and polarization sensors.
- Improved low-light 3D reconstruction using event cameras with rotating polarization optics.
- Developed a novel satellite pose estimation pipeline using SfM, MVS, and Gaussian Splatting.
- Automated multi-sensor data acquisition with ROS and Arduino-based time synchronization on a robotic arm.

### Project Lead (Computer Vision), SLUAIR Lab, Saint Louis University Oct 2024-April 2025

- Led a team of graduate students in developing a computer vision project, fusing event and RGB data for enhanced feature tracking using Neural Networks.
- Performed multiple sensor setup, data acquisition using real sensors.
- Simulated a 15GB multi-sensor UAV dataset in Unreal Engine and CARLA for 3D reconstruction and pose estimation.

### Tech Lead, Open Source SLU, Saint Louis University Aug 2025- Dec 2025

- Built large-scale 3D scene reconstructions using drone imagery, SfM/SLAM, and Gaussian Splatting.
- Developed interactive Three.js/WebGL visualization for real-time exploration and analysis.

## KEY PROJECTS

### Satellite Pose Estimation & 3D Reconstruction using Event Cameras Jan 2024 - Dec 2024

- Led research on satellite pose estimation using event cameras under challenging space lighting conditions.
- Developed a novel SfM pipeline integrating MVS and Gaussian Splatting for dense 3D reconstruction.
- Evaluated event-based reconstruction using E2VID, FireNet, ETNet, and HyperE2VID, demonstrating improved robustness over RGB methods.

### LW-DETR - Transformer-Based Object Detection Aug 2025 - Dec 2025

- Fine-tuned LW-DETR (transformer-based object detector) on a custom SLU campus dataset with tailored data preprocessing and hyperparameter tuning.
- Implemented a complete training and evaluation pipeline, delivering state-of-the-art detection and classification results within the cohort.

### Project Montis - 3D Digital Twin Sep 2025 - Dec 2025

- Built a high-resolution 3D digital twin from drone imagery using photogrammetry, SfM and Gaussian Splatting, generating mesh and point-cloud representations at scale.
- Developed interactive WebGL visualizations with Three.js, enabling real-time rendering, dynamic updates, and LLM-powered geospatial querying for spatial analysis and path planning.

## PUBLICATIONS

- **Shahid Shabeer Malik** et. al. "EvSat3D: Satellite Pose Estimation and 3D Reconstruction with Event Camera." IEEE Access .
- **Shahid Shabeer Malik**, Aneeque Khan, "Anxiety, Depression and Stress prediction among college students using Machine Learning Algorithms" IEEE Xplore.

**TECHNICAL SKILLS:** Programming : Python, JavaScript, C++, SQL, PHP, HTML/CSS · **Computer Vision & ML:** PyTorch, TensorFlow, Keras, OpenCV, NumPy, SciPy, Open3D · **3D & Simulation:** Three.js, WebGL, Blender (Python API), Unreal Engine, CARLA, ROS/ROS2