Keshav Gupta

keshav0306.github.io | keshavgupta06 | keshav0306

Education

- **University of California, San Diego** — *September 2025 - Present*
  Masters of Science in Computer Science (CSE) — San Diego, California
- **International Institute of Information Technology, Hyderabad** — *August 2021 - May 2025*
  B.Tech in Computer Science with Honors in Computer Vision : ***GPA : 8.83/10*** — Hyderabad, India

Skills

- **Programming Languages :** Python, C, C++, CUDA,Javascript, Bash, x86, HTML/CSS
- **Tools :** Pytorch, OpenCV, MySQL, Open3D, OpenGL, Blender, CARLA, ROS 2, Wandb, Docker, Slurm
- **Coursework :** Computer Vision, Robotics, NLP, RL, GPU Prog., Optimization, Distributed Systems

Publications

[1] **DashCop: Automated E-Ticket Generation for Two-Wheeler Traffic Violations Using Dashcam Videos [🌐]**
IEEE/CVF Winter Conference on Applications of Computer Vision (WACV 2025)
Deepti Rawat,* ***Keshav Gupta****, Aryamaan Basu Roy, Ravi Kiran Sarvadevabhatla*

[2] **Diffusion-FS: Multimodal Free-Space Prediction via Diffusion for Autonomous Driving [🌐]**
IEEE/RSJ International Conference on Robots and Systems (IROS 2025)
Keshav Gupta*, Tejas Stephen Stanley, Pranjal Paul, Arun K. Singh, K. Madhava Krishna*

[3] **SymGS : Leveraging Reflective Symmetries for 3DGS Compression**
Association for the Advancement of Artificial Intelligence (AAAI 2026, Phase 2 Under Review)
Keshav Gupta*, Akshat Sanghvi*, Shreyas Reddy Palley, Astitva Shrivastava, Charu Sharma, Avinash Sharma*

Experience

- **Machine Learning Researcher** — *June 2023 - May 2025*
  Center for Visual Information and Technology (CVIT) - Advised by Dr. Ravi Kiran — Hyderabad, India
  ◦Achieved SOTA performance (**82**% F1, **2**× higher) in violation based road-event video analysis, leading to a publication at **WACV 2025**. Developed a novel system featuring a new MOT algorithm (+**2** HOTA over SOTA) and a joint instance segmentation and association model (**1.5**× better over prior work).
- **Machine Learning Researcher** — *January 2024 - May 2025*
  Robotics Research Center (RRC) - Advised by Dr. K Madhava Krishna — Hyderabad, India
  ◦Developed a novel self-supervised method for predicting multimodal free-space segments using diffusion for autonomous driving. Work accepted at **IROS 2025**.
- **Machine Learning Researcher** — *July 2024 - May 2025*
  Machine Learning Lab (MLL) - Advised by Dr. Charu Sharma and Dr. Avinash Sharma — Hyderabad, India
  ◦Achieved a SOTA **108**× compression ratio for 3D Gaussian Splatting by developing an interpretable model that leverages local symmetries, outperforming the previous SOTA by **1.8**×. Work submitted to **AAAI 2026**.
- **Graduate Student Researcher** — *September 2025 - Present*
  Visual Computing Lab - Advised by Dr. Manmohan Chandraker — San Diego, California, USA
  ◦Exploring the intersection of LLM agents and perception challenges in autonomous driving.

Selected Projects

- **Computer Vision Projects and Paper Implementations** *[2D and 3D Object Detection, Neural Networks]*
  ◦Re-Implemented **DETR3D** [], **CenterNet** [], **CLIP** [], and **Polygon YOLO** [] covering 2D/3D object detection and self-supervised learning; achieving within 5–10% of reported benchmarks.
  ◦Developed a system based on a SIGGRAPH paper that realistically simulates objects physical responses to virtual forces directly from video, demonstrated robustness on 10+ noisy real-world clips.[]
- **Robotics** *[Mobile Robotics, SLAM]*
  ◦Built **2D SLAM** pose-graph optimizer using weighted least squares, improving robot trajectory RMSE by 35%. []
  ◦Developed feature-based **visual odometry** pipeline with RANSAC-based essential matrix estimation; achieved trajectory drift < 2% on KITTI sequences. []
- **Window Manager and Compositor for Linux** *[Operating Systems, Computer Graphics]*
  ◦Built a Linux Window Manager & Compositor in C with framebuffer compositing, shading, and rasterization; achieved render latency comparable to X11 even with 20+ simultaneously open windows. []
- **2D and 3D Games** *Concepts: [Computer Graphics, Game Development]*
  ◦Built a **2D Jetpack Joyride Clone** [], a **3D Car Racing Game** [] in **OpenGL C++** optimized for 60 FPS performance.

Awards & Roles

- Dean's Award for Academic and Research Excellence (IIIT-Hyderabad)
- Teaching Assistant for the course **Computer Vision**