Ritik Vaishnav

Portfolio: ritikonboard.github.io
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Education

MBM University — Jodhpur, India
Bachelor of Engineering - Electronics and Electrical Engineering; GPA: 6.5 — *July 2021 - June 2025*

Skills

Languages	Python, C++
Frameworks	PyTorch, TensorFlow, OpenCV, YOLO
Tools	ROS, FFmpeg, Carla, Pylot, Git, Linux

Experience

Wireless Systems Engineering Lab - IIIT Delhi — Delhi
Research Intern under Dr. Arani Bhattacharya — *June 2024 - Sep 2025*

- Designed and implemented a stereo-guided super-resolution perception pipeline to extend long-range object detection in autonomous vehicles.
- Integrated StereoSGBM for **real-time depth estimation** to guide selective tile offloading.
- Utilised CARN to superresolve the selected tiles and benchmarked the setup to have **136 percent more** detections than baseline YOLO.
- Implemented efficient video encoding and streaming using FFmpeg (H.264) and RTSP in CARLA, achieving ¿80percent bandwidth reduction with PSNR ¿30 dB.
- Enabled real-time vehicle control in CARLA through keyboard stroke integration for remote teleoperation.
- Optimized the Pylot pipeline by replacing Faster-RCNN with lightweight YOLOv8n, reducing detection latency and enabling dynamic cloud-based switching to YOLOv8x for complex scenarios.

Embedded Systems & Robotics Workshop — Jodhpur
Robotics Mentor — *June 2023 - Aug 2023*

- Shared all what I learnt about Electronics and Programming, during my time at ESRC under Prof. Alok Singh Gahlot, and mentored a batch of 100+ undergrads.

Projects

StereoSR for Autonomous Vehicle Perception (Sept 2025)

- Implemented stereo vision pipeline for **depth estimation** using dual camera setup in **CARLA** simulator.
- Achieved strong accuracy with ground truth validation against CARLA's native depth sensor.
- Benchmarked the setup on KITTI Stereo dataset and achieved an **MAE** of **5.70m.**

PaperPerspective (April '24)

- Implemented Perspective Transformation in real-time, eliminating the need for camera or whiteboard setups.
- Utilized OpenCV and pyvirtualcam.

Autonomous Rover with Real Time Video Feedback (March '18)

- Integrated an ESP32 Camera with a Raspberry Pi Pico-driven fast line-follower rover.
- Ensured seamless real-time video streaming through a Live Web Server.
- Optimized PID control parameters for enhanced accuracy.

Position of Responsibility

Pixellens: Film and Photography Club — Jodhpur
Founder — *March 2022 - Present*

Written, Directed, and Filmed multiple creative projects along with a super cool community of creatives.

INTERESTS

- **Research Interests:** Autonomous Vehicles, Embedded Systems, Computer Vision, IoT, Edge AI
- **Abstract Interests:** Filmmaking, Music

ACHIEVEMENTS

Presented my research work at RIISE 2025 — Delhi, India
Poster titled- How Far is Too Far? Fixing AV vision with the cloud. — *Sept 2025*

Contributed to the poster- Cloud-Assisted Autonomous Driving Over Wireless Networks — Delhi, India
Showcased the system's efficiency and scalability at ACM COMPASS 2024 — *July 2024*