

AMMAR RAFAQ SHEIKH

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EDUCATION

St. Joseph Engineering College, Mangalore <i>Bachelor of Engineering in Artificial Intelligence and Machine Learning</i>	2023 – 2027 CGPA: 7.5/10
St. Aloysius PU College, Mangalore <i>Pre-University (Physics, Chemistry, Mathematics, Computer Science)</i>	2021 – 2023

CORE TECHNOLOGIES

Languages: Python, Java, C++, SQL, JavaScript
AI & Machine Learning: PyTorch, Hugging Face Transformers, OpenCV, NumPy, Pandas, scikit-learn, Deep Learning, Computer Vision, Vision Transformers, Object Detection, Multi-Object Tracking
Frameworks & Backend: FastAPI, Flask, React, Pydantic
Developer Tools: Git, GitHub Actions (CI), Docker, MySQL, Linux, Jupyter, VS Code
Engineering Practices: REST APIs, OOP, Data Structures & Algorithms, Unit/Integration Testing (pytest), Static Typing (mypy strict), Typed Data Contracts, OCR, LLMs, Reproducibility

PROJECTS

TrafficPulse – Evidence-First Traffic Violation Detection Research Platform GitHub – Ongoing
Python, PyTorch, Hugging Face Transformers, Pydantic, PyAV, pytest, mypy, GitHub Actions

- Architected an evidence-first computer-vision pipeline (ingestion → detection → tracking → typed observations → rule engine → confirmed event → evidence → human review → simulated penalty) that separates perception from violation reasoning, so a single model detection never counts as a violation.
- Implemented the first two planned violation pipelines end-to-end offline – wrong-way driving and illegal stopping – via PTS-accurate PyAV ingestion, an RT-DETR detector behind a swappable adapter interface, greedy IoU tracking, and per-track finite-state-machine reasoning with temporal hysteresis; the remaining four are designed but not yet built.
- Defined 17 frozen Pydantic domain contracts (detections, tracks, eight observation variants, confirmed events, evidence manifests, review cases, simulated penalties) with deterministic JSON Schema export and SHA-256 scene-configuration hashing, keeping the reasoning layer replayable from a typed log without a GPU or a model.
- Built a governance-first dataset registry across 8 candidate sources (incl. IDD, CCPD, HELMET, BrnoCompSpeed) recording license and leakage-prevention status before acquisition, and designed an evaluation methodology for detection, tracking, and event-level metrics, including a future CNN-vs-ViT helmet-classification comparison.
- Gated the codebase with 900+ automated pytest tests, strict mypy, and ruff enforced through GitHub Actions CI; kept the core package ML-free by lazily loading PyTorch/Transformers only behind an optional detector extra.

DIP Learning Simulator 6th Semester PBL
1st Place Project
Python, FastAPI, React, OpenCV, NumPy, Three.js

- Architected a full-stack Digital Image Processing learning platform spanning 5 modules and 19 interactive tools, pairing a Python/FastAPI backend with a React + Three.js frontend for real-time visualization.
- Implemented core DIP algorithms end to end – enhancement, restoration, segmentation, filtering, feature extraction, and frequency-domain transforms – using OpenCV and NumPy, exposed as parameter-tunable interactive tools rather than static demos.
- Extended the platform with automated code explanations, PDF lab-report generation, and session recording, aimed at closing the gap between running an algorithm and understanding it.
- Awarded **1st Place** among 6th-semester Project-Based Learning submissions.

ScanPayGo – Smart Bus Occupancy System

Python, Flask, JavaScript, MySQL
– Designed and built a QR-based passenger scanning and payment system for public bus transactions, covering occupancy tracking end to end from scan to settled transaction.
– Implemented the Flask backend – transaction processing, input validation, and database-driven record management – with MySQL as the system of record.

CERTIFICATIONS

- **AI Fluency for Builders** – Anthropic × CodePath, 2026
- **AI Fundamentals with IBM SkillsBuild** – Cisco Networking Academy, Jan 2026
- **Introduction to Cybersecurity** – Cisco Networking Academy, Nov 2025
- **Asymmetric Cryptography and Key Management** (With Honors) – University of Colorado, Coursera, Dec 2024

ACHIEVEMENTS

- Awarded **1st Place**, 6th Semester Project-Based Learning Competition, for the DIP Learning Simulator.
- Selected to represent St. Joseph Engineering College at the **Smart India Hackathon (SIH)**.
- Contributed to a **Guinness World Records** mosaic achievement organized by IISJ Al Abeer.