**Helmet Detection**

**Team Members**

May Myat Noe Oo

Nay Chi Moe Oo

Min Sett Paing

Akeri Myint Zaw

May Phyo Thu

Chan Aye Naing

**Ideal Proposal**

**1. Project Idea:** This project develops a **YOLOv8-based deep learning system** that automatically detects riders **with or without helmets** and simultaneously **tracks vehicle license plates** from CCTV or traffic footage. The goal is to support smart traffic monitoring, improve safety enforcement, and promote responsible riding behavior.

**2. Relevance to Sustainable Development Goals (SDGs): SDG 3 – Good Health and Well-Being** by reducing road-traffic injuries through helmet compliance and **SDG 11 – Sustainable Cities and Communities** by advancing smart, AI-enabled traffic management.

**3. Literature Examples**

|  |  |  |  |
| --- | --- | --- | --- |
| **Paper (year)** | **Model** | **Dataset (source/region)** | **Accuracy (metric)** |
| A Deep Learning Approach for Helmet Detection and Fine Generation System (2025) | **YOLOv3** + OpenCV/OCR for plates | Mixed COCO-style images; Kaggle >10k riders (helmet/no-helmet) | **>95%** (overall accuracy) |
| Real-Time Helmet & Triple-Riding Detection with Email Alerts (2025) | **YOLOv5** + PaddleOCR (plates) | Custom video stream (real-time) | **94.1% mAP@50** |
| Intelligent Real-Time Helmet & License Plate Device (2024) | **Modified YOLOv8 + SPP** | India; roadside videos → images | Vehicle **64%**, Helmet **95%**, Plate **93%** (accuracy) |
| Smart Traffic Violation Detection (Sri Lanka) (2025) | **YOLOv8 (n/s/m)** + EasyOCR | Local Sri Lanka traffic videos | Vehicle **93%**, Helmet **87.9%**, Plate **59.9%**, Triple-rider **80%** (accuracy) |
| Helmet Detection Based on Improved YOLOv8 (2024) | **YOLOv8 (improved)** | **Roboflow** curated set (Helmet / No-Helmet / Person / Two-Wheeler) | High **mAP** reported (real-time); exact % not stated in summary |
| Detecting Motorcycle Helmet Use with Deep Learning (Myanmar) (2019) | **RetinaNet (ResNet-50)** | **Myanmar**: 254 hrs video, 13 sites, ~91k frames, ~10k motorcycles | **72.3% mAP** (weighted), ~14 FPS |

### ****4. Describe Your Data:**** The project will use a combination of ****local traffic images**** and a ****global helmet detection dataset from Roboflow****, consisting of labeled JPG/PNG images for riders with and without helmets, used for training and testing after standard preprocessing such as resizing, normalization, and augmentation.

### ****5. Approach (Machine Learning or Deep Learning):**** A **Deep Learning** approach will be applied, with the proposed system integrating **motorcycle detection (ImageAI)**, **helmet/non-helmet classification (fine-tuned YOLOv8)**, **people counting**, and **license plate recognition (OpenCV + Tesseract OCR)**, with all detected information saved in **CSV format** for further analysis.