

Helmet and Number Plate Detection Using YOLOv8

This project implements an AI-Based Approach to Object Detection model using YOLOv8 to detect helmets and vehicle number plates in images. The aim is to provide an efficient solution for traffic management and safety compliance.

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Introduction

Helmet detection and number plate recognition are critical in ensuring road safety and enforcing traffic rules. This project uses YOLOv8, a state-of-the-art object detection model, to accurately detect helmets worn by riders and identify vehicle number plates in real-time.

Setup Instructions

Prerequisites

- Python 3.x
- GPU (NVIDIA) with CUDA installed (recommended for faster training)
- Libraries: Ultralytics, Gradio, Roboflow (if you use the trained model best.pt then not required) etc.

Dataset Preparation

The dataset consists of images annotated with bounding boxes for helmets and number plates. Use tools like Labelling to label the images. The dataset is then split into training, validation, and test sets.

The data.yaml file should define the classes and paths:

Training the Model

The YOLOv8 model is trained using the prepared Roboflow dataset. Key parameters include:

- **Image Size:** The size of the Images.
- **Epochs:** Number of times the entire dataset is passed through the model.

Evaluation and Inference

After training, the model is evaluated using metrics like Precision, Recall, and mAP (mean Average Precision). The trained model can then be used for Prediction on new images.

Results

The project achieved promising results in detecting helmets and number plates, with high accuracy and low inference time. Below are some sample detections:

License

This project is licensed under MIT

