1. Project Title

AI-Based Road Accident Detection System using YOLOv8

2. Introduction

This project detects road accidents in video streams using the YOLOv8 object detection model.
 The system processes every video frame, identifies accident-like scenarios, and generates an output video with detection bounding boxes.

3. Folder Structure

```
Project/
│
├── main.py              → Core accident detection script
├── generate_video.py      → Script for video reading/processing
├── requirements.txt       → Python dependencies
│
├── data/              → Test videos and sample input (separate ZIP)
├── yolov8n.pt           → YOLOv8 pre-trained model weights (separate ZIP)
│
└── venv/              → Virtual environment (excluded from submission)
```

4. Workflow

- Load YOLOv8 model from yolov8n.pt

- Read video from the data/ folder

- Process frames using the YOLO inference engine

- Detect objects and potential accident triggers

- Annotate frames with bounding boxes

- Export final processed video

5. How to Run

pip install -r requirements.txt

python main.py

6. 4-Month Progress Timeline

Month 1 – Research & Setup

- Studied YOLOv5, YOLOv7, YOLOv8

- Set up Python virtual environment

- Collected sample videos for testing

Month 2 – Model Integration

- Integrated YOLO inference in Python

- Built basic detection script (main.py)

- Initial tests on low-resolution videos

Month 3 – Video Pipeline

- Wrote generate_video.py for video processing

- Added frame-by-frame analysis

- Improved detection accuracy

- Debugged FPS issues

Month 4 – Finalization

- Cleaned code

- Organized folder structure

- Wrote documentation

- Prepared final deliverables

7. Conclusion

This project successfully demonstrates accident detection in videos using YOLOv8. The system can be extended with real-time CCTV input.