kxt2vgkg6

March 12, 2025

1 License Plate Detection and Reading System

1.1 Introduction

This project implements a real-time license plate detection and reading system using computer vision and deep learning. It can detect vehicles and their license plates from video feeds, and perform OCR (Optical Character Recognition) to extract the plate numbers. The system utilizes YOLO (You Only Look Once) for object detection and PaddleOCR for text recognition.

1.2 Features

- Real-time vehicle detection
- License plate detection and localization
- Optical Character Recognition (OCR) for license plate text extraction
- Visual display of detected plates with:
  - Highlighted license plate regions
  - Extracted plate numbers
  - Cropped and enlarged plate images
- Support for video file processing
- Clean visualization with custom border drawing

1.3 Prerequisites

- Python 3.8 or higher
- Required libraries (can be installed via requirements.txt)

1.4 Installation

1. Clone the repository:

```
[ ]: git clone <repository-url>
     cd <project-directory>
```

2. Install the required dependencies:

```
[ ]: pip install -r requirements.txt
```

3. Download the required model files:
   - Place the license plate detection model in `Models/license_plate_model.pt`
   - Place the vehicle detection model in `Models/yolo11n.pt`

1.5 Usage

1. Place your input video in the `Testing Resources` directory

2. Run the main script:

```
[ ]:
python Main_code_file.py
```

3. Controls:
   - Press 'q' to quit the application

1.6 Output

The system will display: - Real-time video feed with detected vehicles and license plates - Bounding boxes around detected vehicles and license plates - License plate numbers displayed above the detected plates - Cropped and enlarged views of detected license plates

```
[ ]:
## Project Structure

Models/
  license_plate_model.pt
  yolo11n.pt
Testing Resources/
  video 2.mp4
Main_code_file.py
requirements.txt
```

1.7 Technical Details

- Vehicle Detection: YOLOv8n model
- License Plate Detection: Custom trained YOLO model
- OCR Engine: PaddleOCR
- Image Processing: OpenCV
- Video Processing: 1080x600 resolution

1.8 Notes

- The system is optimized for clear, front-facing license plates
- Performance may vary based on video quality and lighting conditions
- Make sure you have sufficient computational resources for real-time processing

1.9 Contributors

Project by: Mudassar Khan