Tackling Illegal Parking & Finding Parking Spaces

Leveraging YOLOv8 for Urban Mobility Solutions

Agenda

Illegal Parking and Assist in Finding Parking Spaces

Illegal Parking

- **Traffic Disruptions:** Illegal parking blocks lanes, causing traffic congestion and delays
- **Safety Hazards:** Illegally parked vehicles block visibility, causing accidents and unsafe conditions
- **Economic Costs**: Illegal parking results in fines and towing expenses

Finding Parking Spaces

- **Time Wastage:** Drivers waste time searching for parking

- **Environmental Impact:** Searching for parking increases fuel use & pollution

Objectives and Solution Overview

Reduce Illegal Parking

Implement a computer vision system to detect and monitor illegal parking in real-time

Enhance Parking Utilization

Identify available parking spaces and provide real-time information to drivers

Improve Urban Mobility

Decrease traffic congestion and emissions by streamlining the parking process
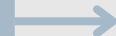
Revolutionizing Urban Mobility

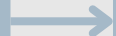End-to-End Process for Training and Deploying YOLOv8 Model with Roboflow
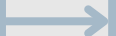
Overall Workflow Diagram
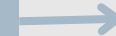
Training Pipeline

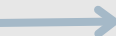Training Data Preparation → Pre-Processing → Segmentation & Feature Extraction → Training → Model Saving

Testing Pipeline

Test Data Preparation → Pre-Processing → Segmentation & Feature Extraction → Recognition → Post-Processing → OCR Output → Output Results

Training Pipeline

Training Data Preparation   Download dataset using Roboflow

Pre-Processing   Perform initial dataset preparation and augmentation, such as resizing, normalization, and augmentation techniques to enhance the dataset

Segmentation & Feature Extraction   Use YOLOv8 to process images through CNN layers for feature extraction and object segmentation

Training   Train the YOLOv8 model with annotated data

Backpropagation & Gradient Descent: Optimize model weights

Loss Functions: Binary Cross-Entropy & MSE

Model Saving   Save the best model weights after training

Testing Pipeline

Test Data Preparation — Apply preprocessing steps to test images, such as resizing and normalization

Pre-Processing — Apply further preprocessing steps to test images, such as additional normalization or augmentation if needed

Segmentation & Feature Extraction — Run inference using the trained YOLOv8 model to extract features and segment objects in test images.

Recognition — Detect objects and their bounding boxes. Apply Non-Maximum Suppression to filter overlapping bounding boxes (integrated within the YOLO model)

Post-Processing — Use EasyOCR to recognize text from detected license plates
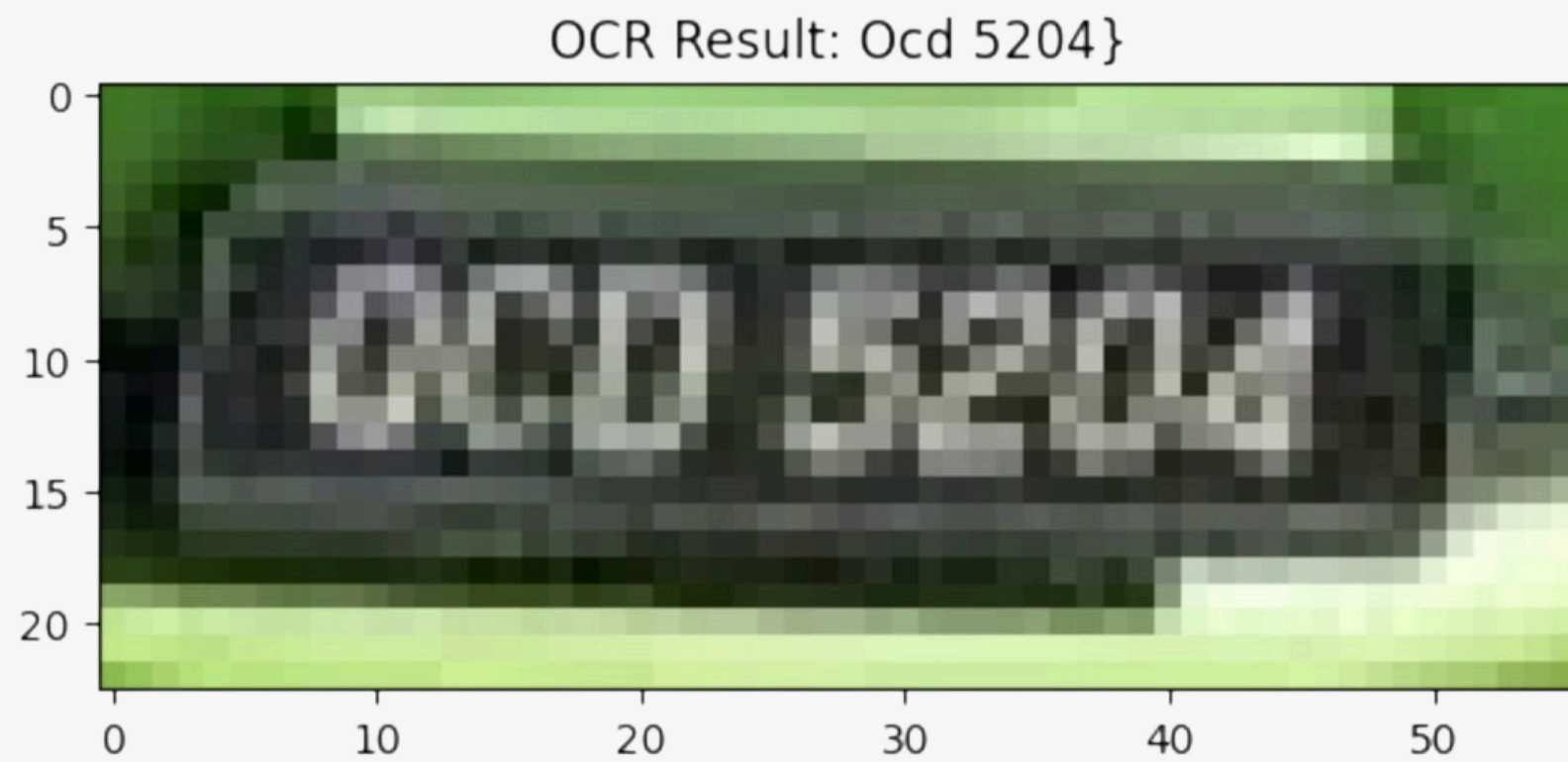
OCR Output — Display cropped license plate images and OCR text results

Output Results

Output Results | Present the final results, including the detected objects and recognized text

Live Demo

Try on mobile