■ Vehicle Number Plate Detection System

Team Name: CTR+Z

Upload Image Or video	Preprocess	Detect Plates	OCR	Display Results

WEB INTERFACE:
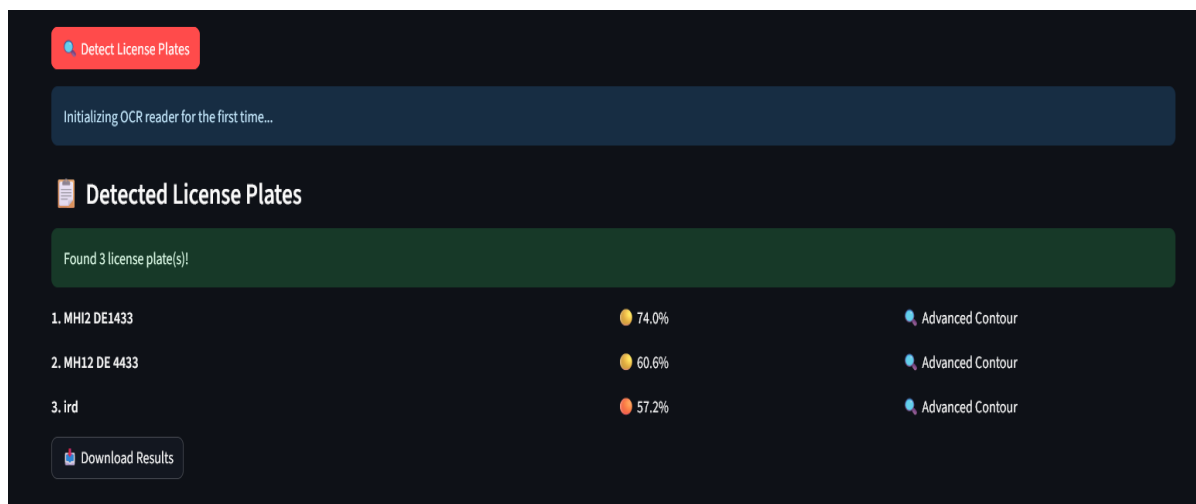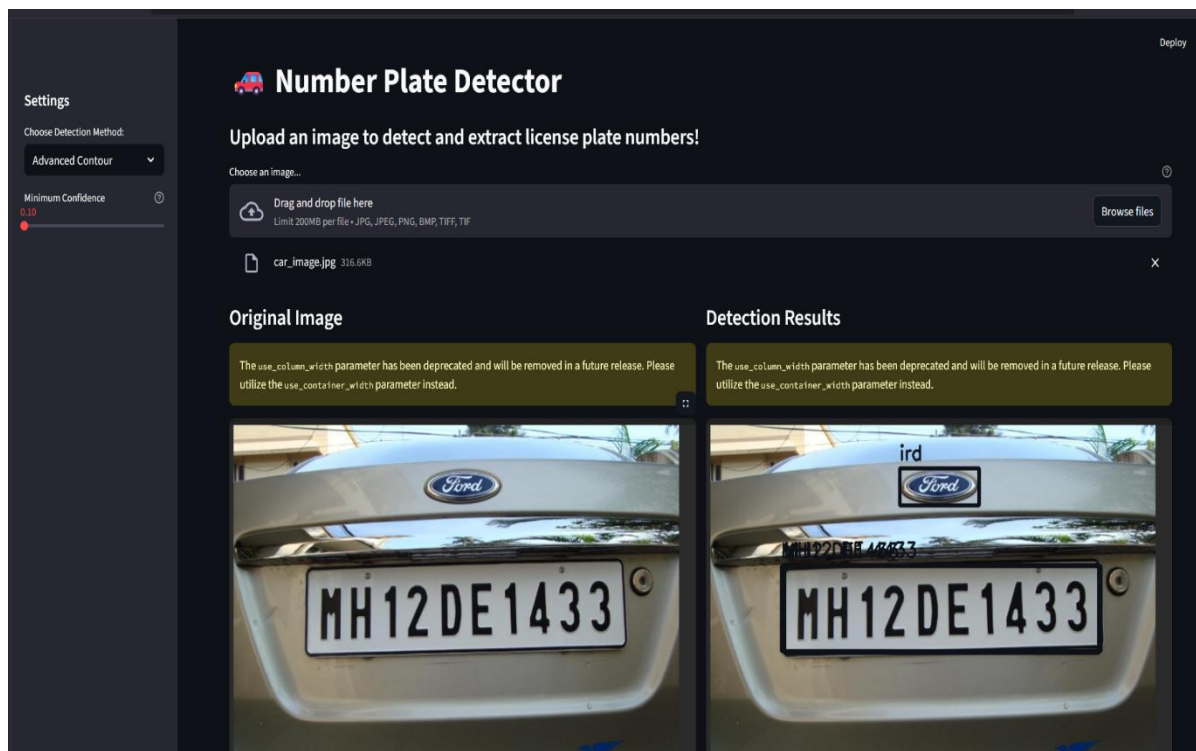
■ Introduction

This project detects and recognizes vehicle license plates using image processing and OCR. Applications include traffic management, security monitoring, and automation.

■ Libraries Used

■ **Streamlit** - Builds the interactive web app, enabling file uploads, sliders, and result display.

■ **OpenCV** - Handles image preprocessing: grayscale conversion, edge detection, contour extraction, bounding boxes.

■ **EasyOCR** - Reads and extracts alphanumeric text from plate regions with OCR.

■ **NumPy** - Performs array operations and converts images for OpenCV processing.

■ **Pillow** - Loads and manages images in formats like JPG and PNG.

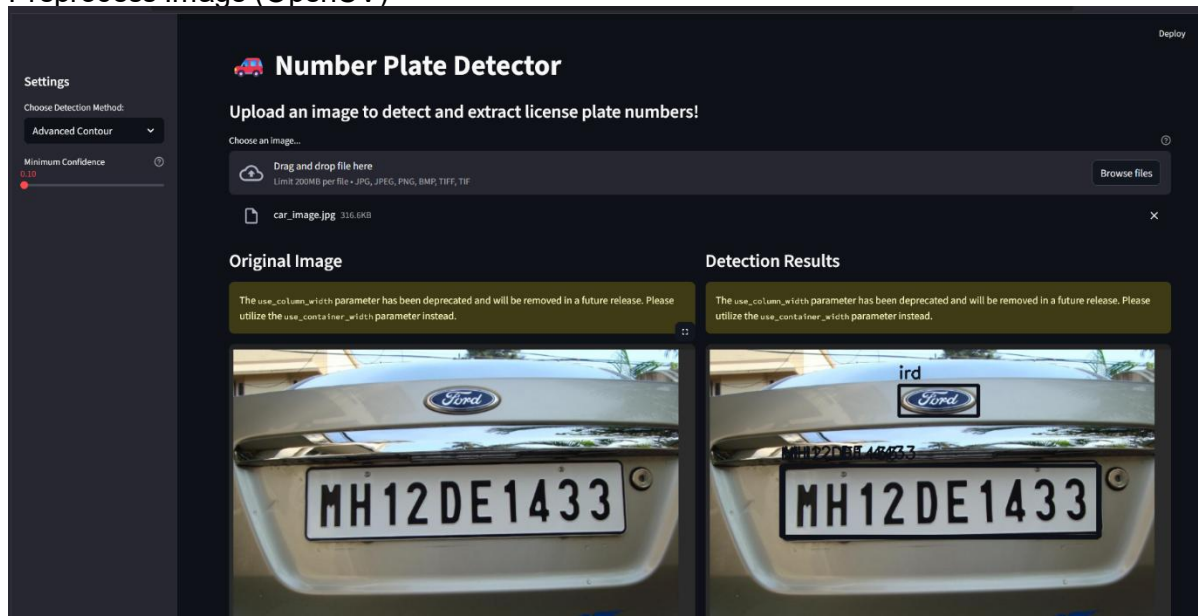■ **Time** - Adds delays for progress bar and smooth UI experience.

■ Detection Methods

■ **Simple OCR**: Directly applies OCR on the whole image. Fast but less accurate.

■ **Advanced Contour**: Uses OpenCV to locate plate-shaped regions first, then applies OCR. More accurate.

■ Workflow

1. Upload Image

2. Preprocess Image (OpenCV)

3. Detect Plate Region (Contours + Filters)

4. Extract Text (EasyOCR)

5. Display Results (Streamlit UI)

■ Conclusion

The system combines OpenCV and EasyOCR inside a Streamlit app, providing a user-friendly platform for vehicle number plate detection. It balances accuracy, speed, and usability, and can be extended to real-time video streams.