Road/Car Detection Using AI

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AI course project

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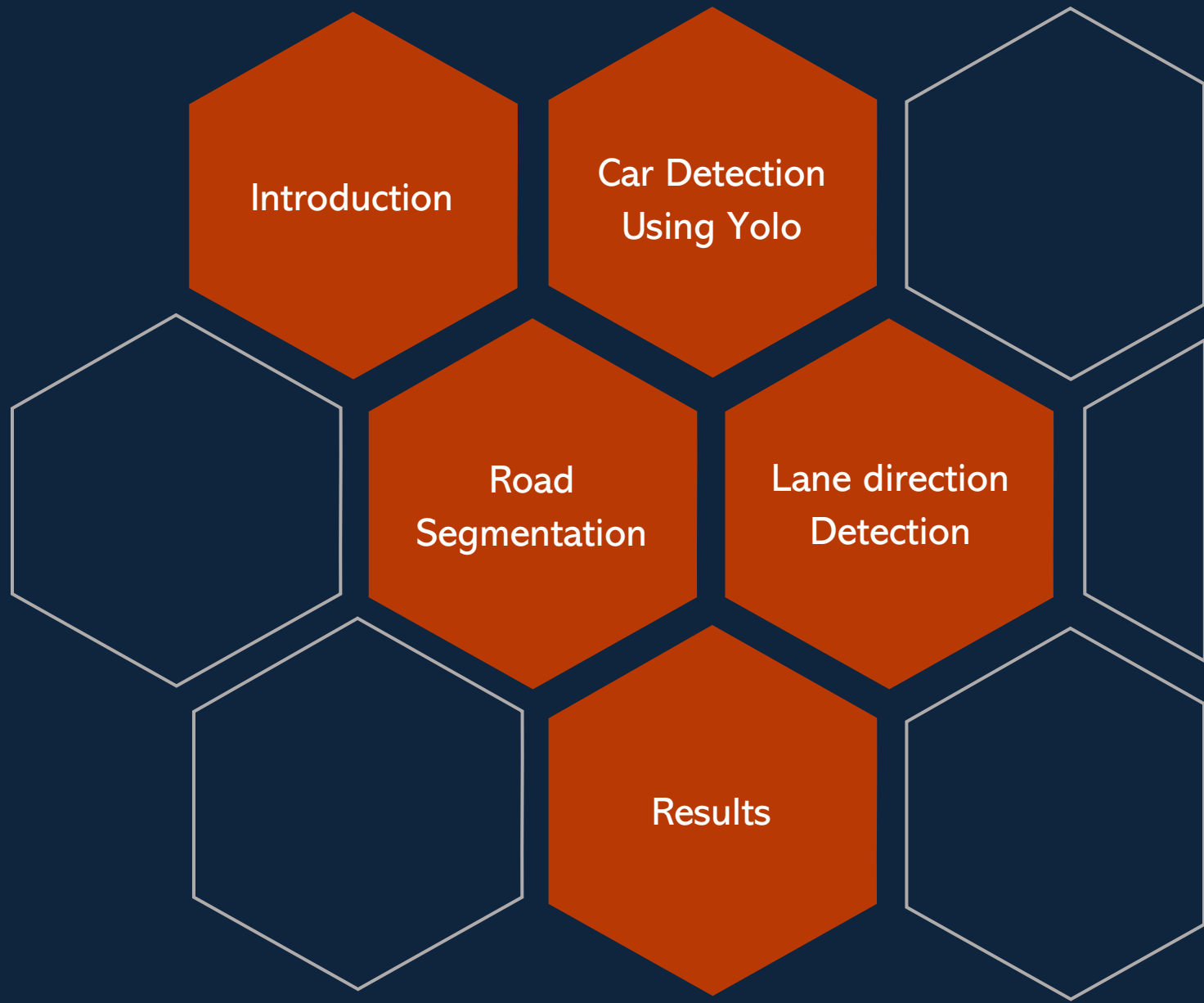
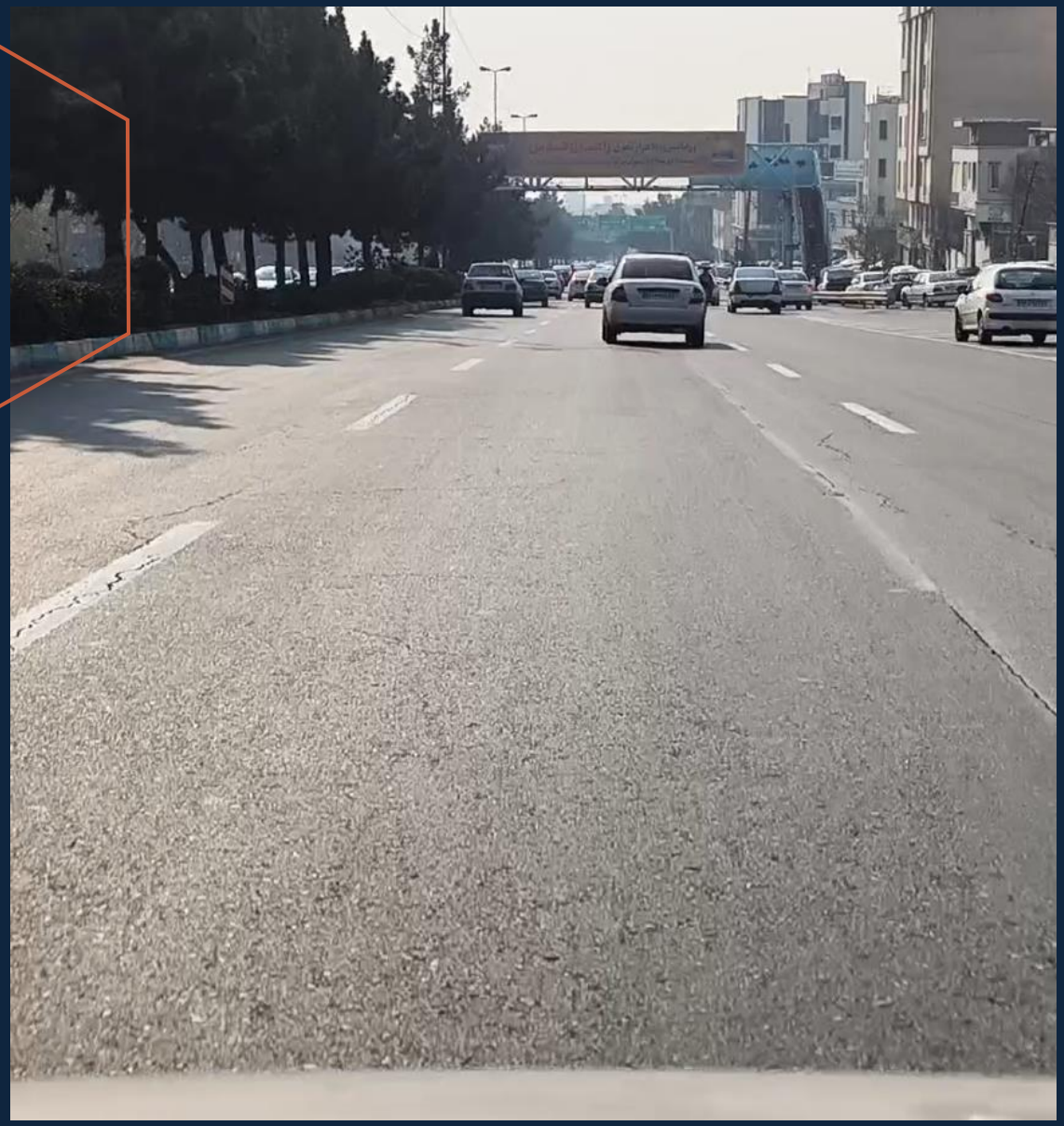
Agenda

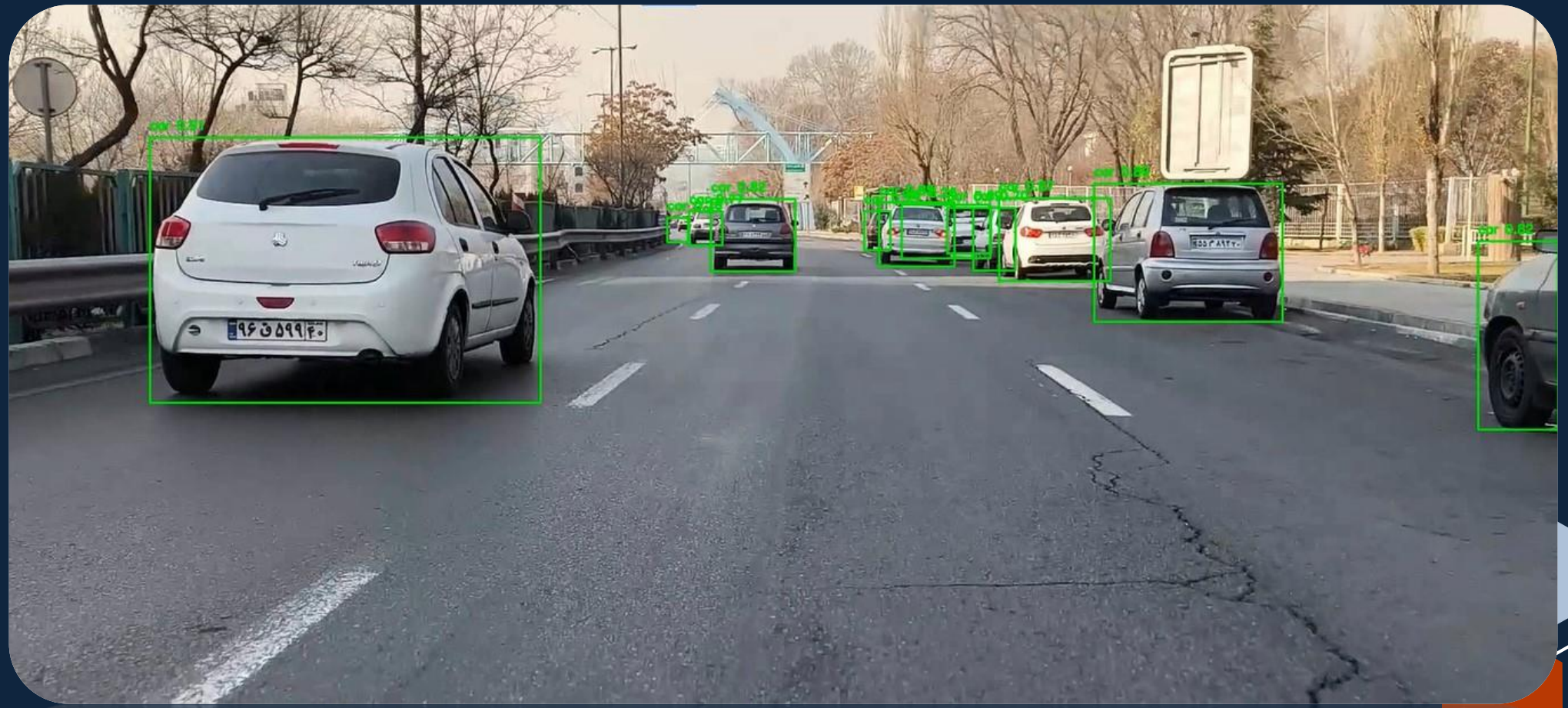

Introduction
Car Detection Using Yolo
Road Segmentation
Lane direction Detection
Results

Introduction

- Problem
- Test Data



Car Detection Using Yolo



Road Detection

Using Pre-Trained model available on GitHub

Feature	HybridNets Multitask Road Detection	LaneNet	ApolloScape Lane Detection
Use Case	Road detection, lane detection	Lane detection	Lane detection
Output	Road segmentation, lane segmentation	Lane segmentation	Lane segmentation
Key Strength	Multitask detection for road, lanes, and other features	Robust lane detection	Works well with urban road scenes
Complexity	Moderate (multitask learning)	Moderate (single task)	High

Lane Detection + Road Segmentation + Car Detection

1. Import and download libraries:
   - cv2, Download Related files from GitHub

2. Open video using cv2.VideoCapture()

3. Initialize road detection:
   - Set model and anchor paths
   - Initialize HybridNets model with thresholds

4. Set up video writer:
   - Create output video file with desired codec/resolution

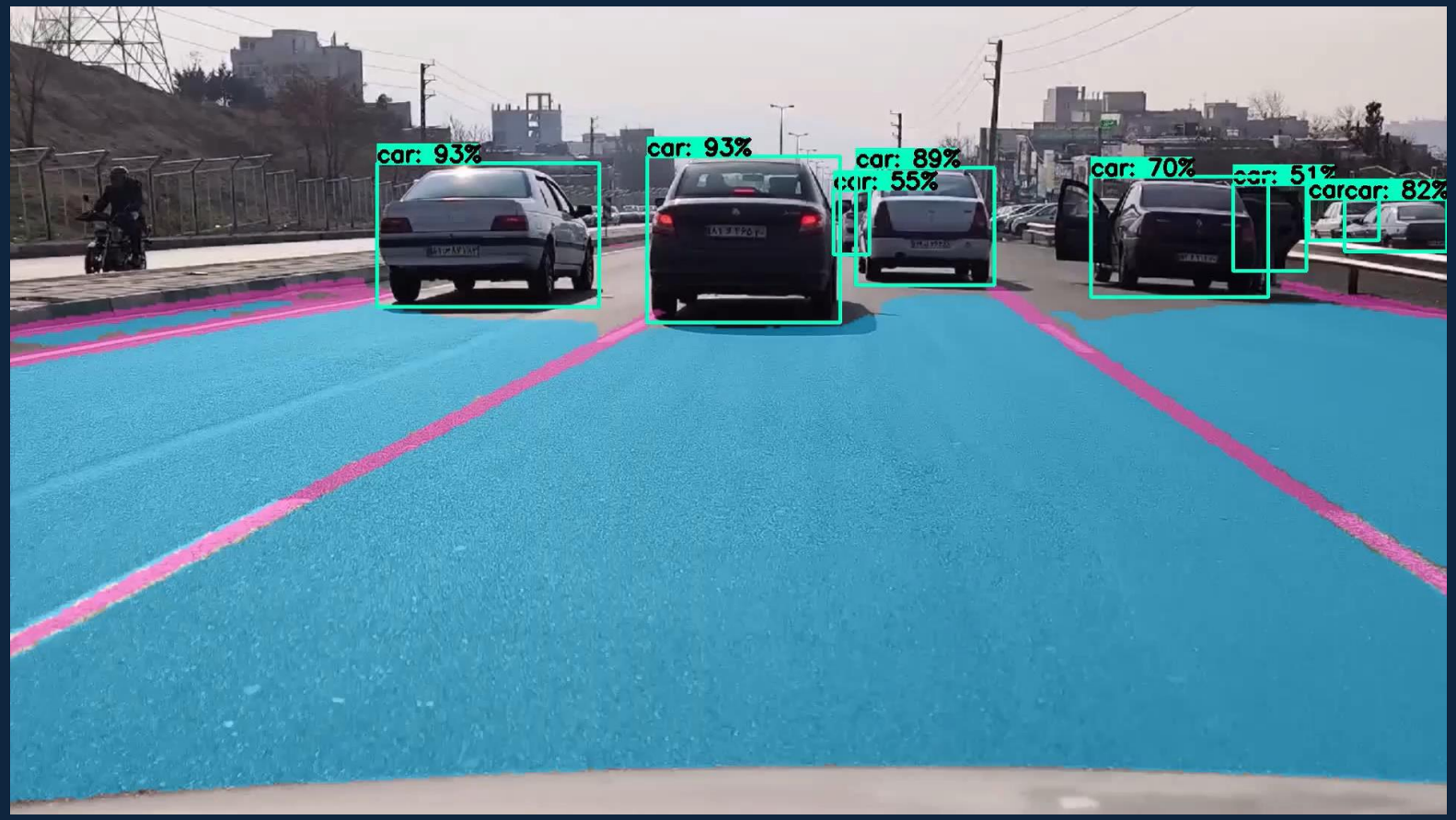
5. Process video frames:
   - While video is open:
     - Read frame from video
     - Pass frame to roadEstimator for detection
     - Draw detections on the frame

6. Display and save

Source: https://github.com/ibaiGorordo/ONNX-HybridNets-Multitask-Road-Detection

What Hybridnets Do?

- ❑ Load Pre-trained Model
- ❑ Prepare input
- ❑ Estimate Road
- ❑ Draw segmentation and Boxes
- ❑ Prepare Output



Road Direction

- ❑ Create Mask
- ❑ Select ROI
- ❑ Calculate direction

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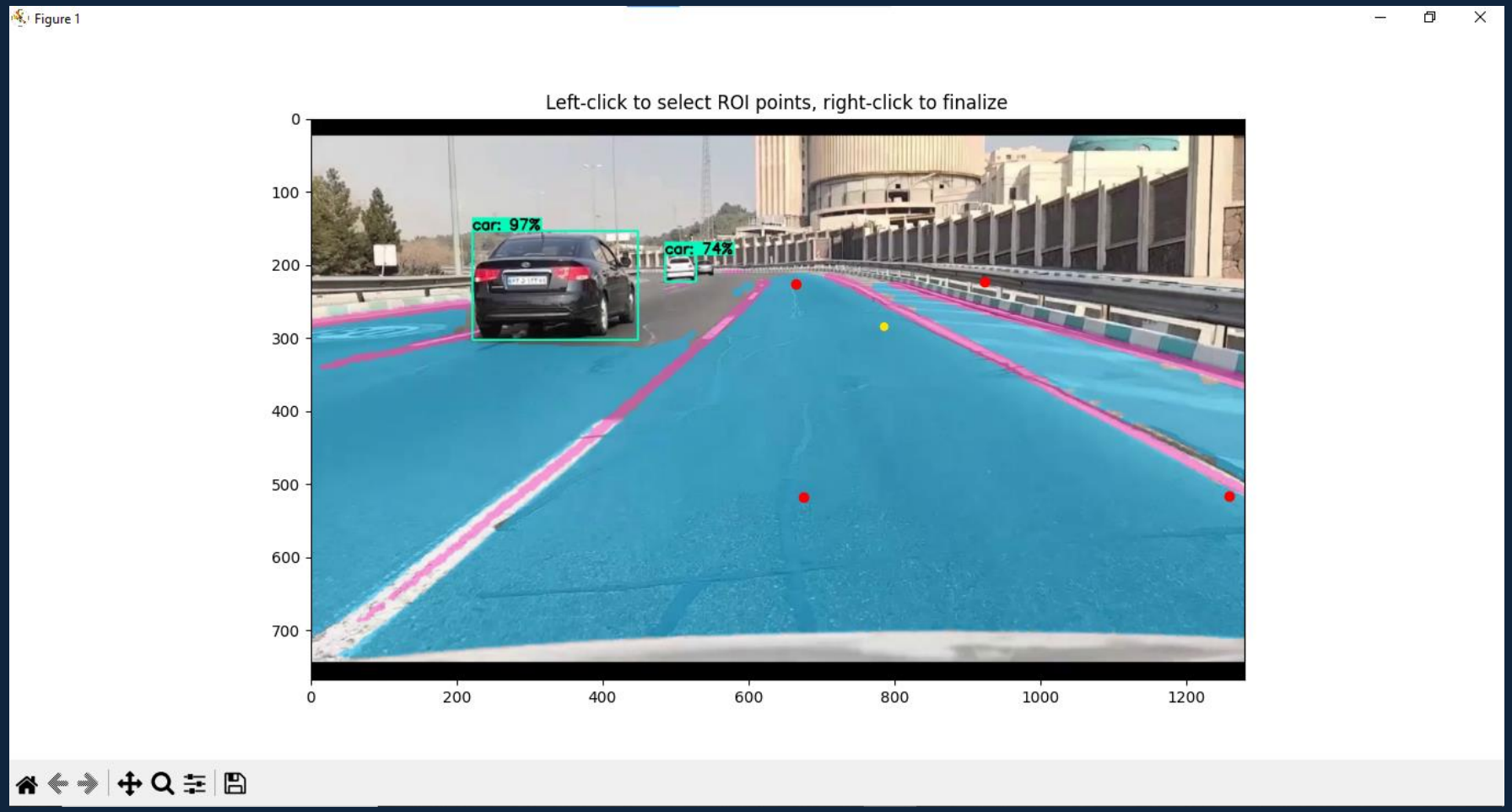

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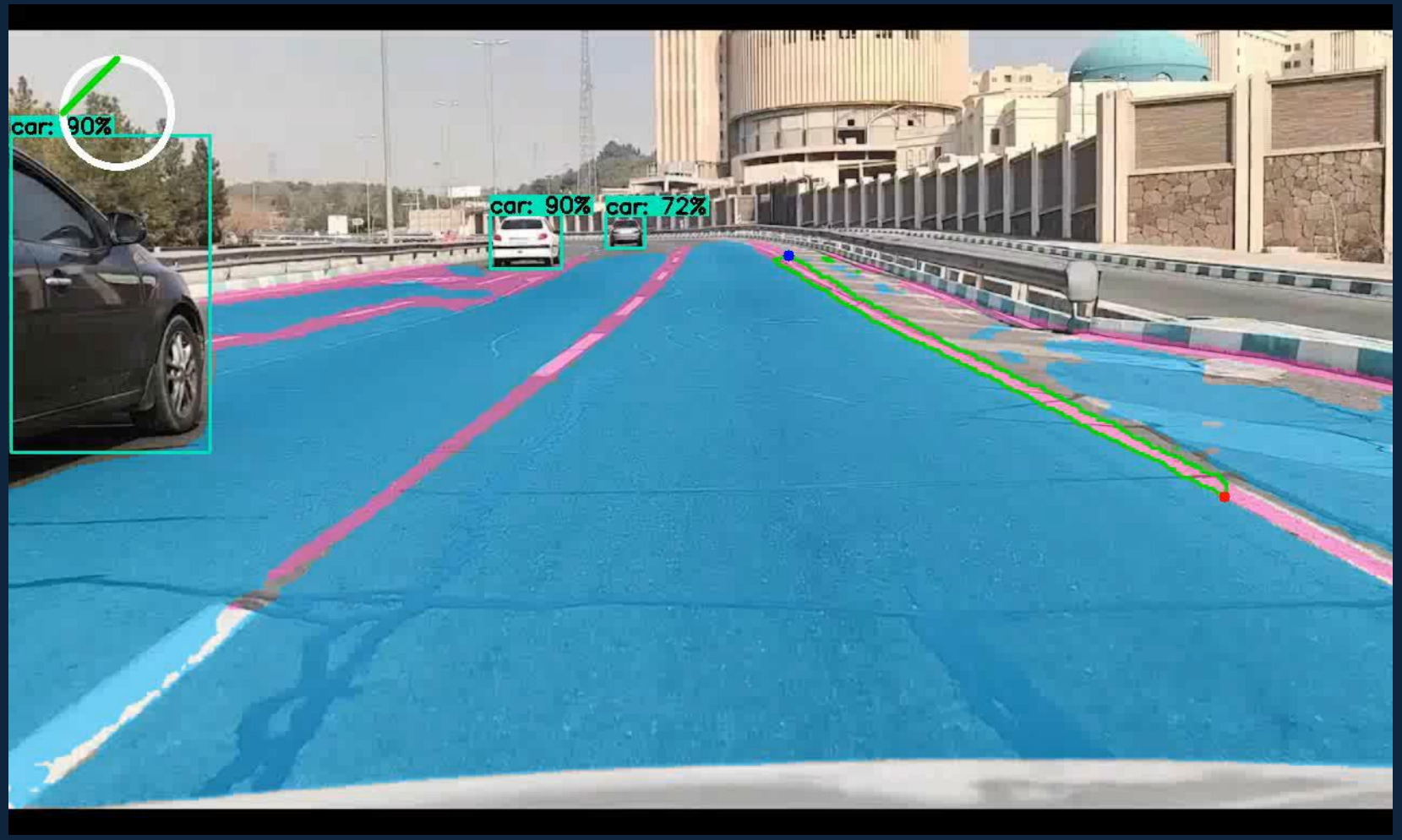
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$



Videos and Tests




Thank you