AUTOMATED LICENSE PLATE DETECTION SYSTEM

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ITAI 1378

Tier: 2 — Object Detection

PROBLEM

- Manual license plate identification is slow and error-prone.
- Users: parking lots, toll systems, apartments, security staff.
- Why important: improves speed, reduces errors, enables automation.

SOLUTION OVERVIEW

- A YOLO-based computer vision system that detects license plates automatically.
- Pipeline: Image → YOLOv8 → Bounding Box → Output.
- Real-time automated license plate detector.

TECHNICAL APPROACH

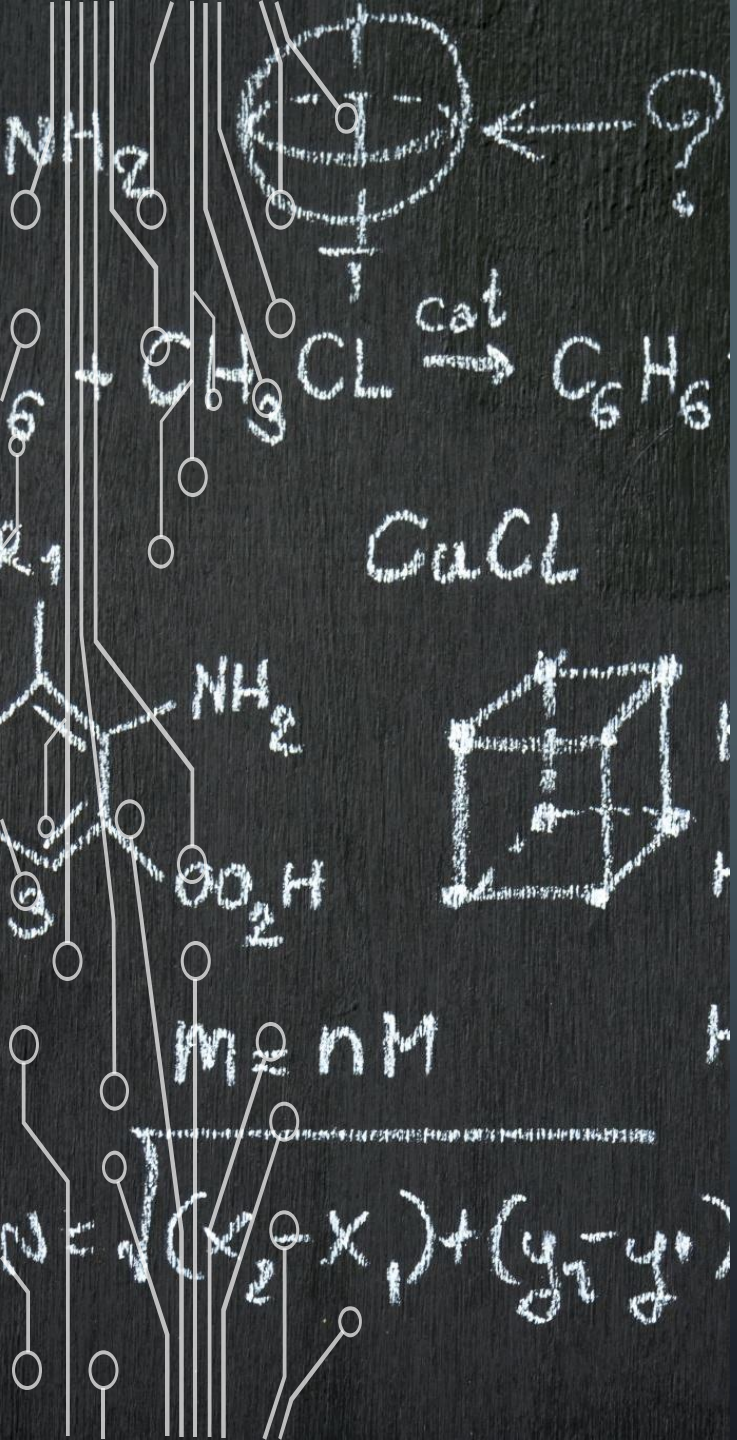
- Technique: Object Detection
- Model: YOLOv8 (Ultralytics)
- Framework: PyTorch
- It's fast, accurate, and easy to fine-tune.

DATA PLAN

- Dataset: Roboflow Vehicle Registration Plates
- Size: 300–1000 labeled images
- Label: 'license_plate'
- Preparation: dataset cleaning, YAML validation, augmentation

SYSTEM DIAGRAM

- [Input Image] → [Preprocessing] → [YOLOv8 Detection] → [Output Bounding Box]



SUCCESS METRICS

- Primary: mAP50 ≥ 0.85
- Precision ≥ 90%
- Latency < 0.05 sec per image

WEEK-BY-WEEK PLAN

- Week 10: Dataset setup
- Week 11: Train YOLOv8
- Week 12: Evaluate and improve
- Week 13: Build demo
- Week 14: Documentation
- Week 15: Presentation

CHALLENGES & BACKUP

- Dataset unzip issues - Use alternate Roboflow sets
- Low accuracy - Add augmentation, tune epochs
- Training limits - Use YOLOv8n + Colab Pro

RESOURCES NEEDED

- Compute: Google Colab
- Frameworks: PyTorch, Ultralytics
- Dataset: Roboflow
- Cost: $0