Accurate Detection and Recognition of Dirty Vehicle Plate Numbers for High-Speed Applications

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Agenda

- 1. Introduction & Problem Statement
- 2. Literature Review
- 3. Proposed Methodology
- 4. Novelty & Contribution
- 5. Gap Analysis
- 6. Timeline & Work Plan
- 7. Conclusion & Future Scope

Introduction & Problem Statement

- - Importance of License Plate Recognition (LPR)
- - Challenges:
- • Dirt/Mud/Obstructions
- • Motion blur at high speeds
- • Reduced recognition accuracy → fraud & enforcement gaps
- - Goal: Robust recognition of dirty/obscured plates at high speeds.

Literature Review

- Existing ANPR Systems: Fail under dirt/motion blur
- OCR Optical Char Recognition (Tesseract, CNN): Reduced accuracy on noisy images
- GAN Generative Adversarial Networks -based Augmentation: Limited real-world use
- Conclusion: Need for robust dirty plate recognition.

Proposed Methodology

- 1. Image Acquisition → Kaggle datasets
- 2. License Plate Detection → YOLO
- 3. Object Segmentation → Isolate plates
- 4. Character Recognition → Tesseract/CNN
- 5. Fraud Detection → Repeated failures flagged

YOLO

Gets Number
Plat from Car

CNN Tesseract
OCR

Try to detect
Actual Number

GY59KLL

If repeated

Algorithms to Explore

- • YOLO → License Plate Detection
- • Tesseract OCR → Baseline Recognition
- • Custom CNN → Dirty plate recognition

Novelty / Contribution

- - Dirty Plate Simulation → Image augmentation
- - Custom CNN for OCR → For noisy/dirty plates
- - Fraud Detection Layer → New addition
- - Real-time Suitability → Optimized for highways

Gap Analysis

- Existing Systems:
- - Good for clean plates
- - Poor dirty plate accuracy
- - Minimal fraud detection

- Proposed Work:
- - Dirty plate accuracy improved
- - Dedicated fraud detection
- - Real-time, high-speed suitable

Timeline of Proposed Work

- Phase 1 (Current) → Literature Review, Dataset Collection
- Phase 2 → Model Design & Training (YOLO & OCR)
- Phase 3 → Testing & Validation
- Phase 4 → Final Integration & Report Writing

Conclusion & Future Scope

- - Robust LPR for dirty/high-speed vehicles
- - Future Scope:
- • Real-time system integration
- • Edge AI deployment
- • GAN-based preprocessing exploration

Suggesions from Mentor REVIEW 2

- Grounding concept Visual LLM Visual Matric
- Which model does better on grounding
- Augmentation is needed classification for mud and dirty
- No further processing
- Visual models are doing really good text out of image
- Get data set and compare accuracy
- Image correction techniques
- Identify the data sets

Data Sets

- https://github.com/detectRecog/CCPD
- https://www.kaggle.com/datasets/saisirishan/indian-vehicle-dataset
- We have added MP4 Vdos as inputs
- Usually criminals are captured in vdos

Steps

- Step one : we will use Yolo / other models can be checked for accuracy

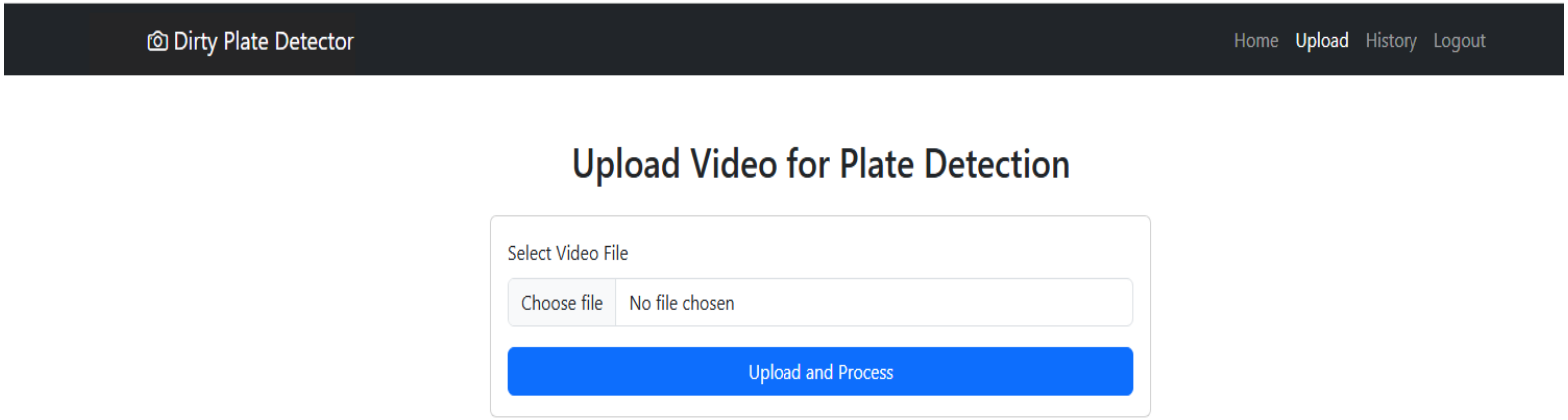
- Step 2 : we will use PaddleOCR

or geminiv11 for Visual LLM capabilities

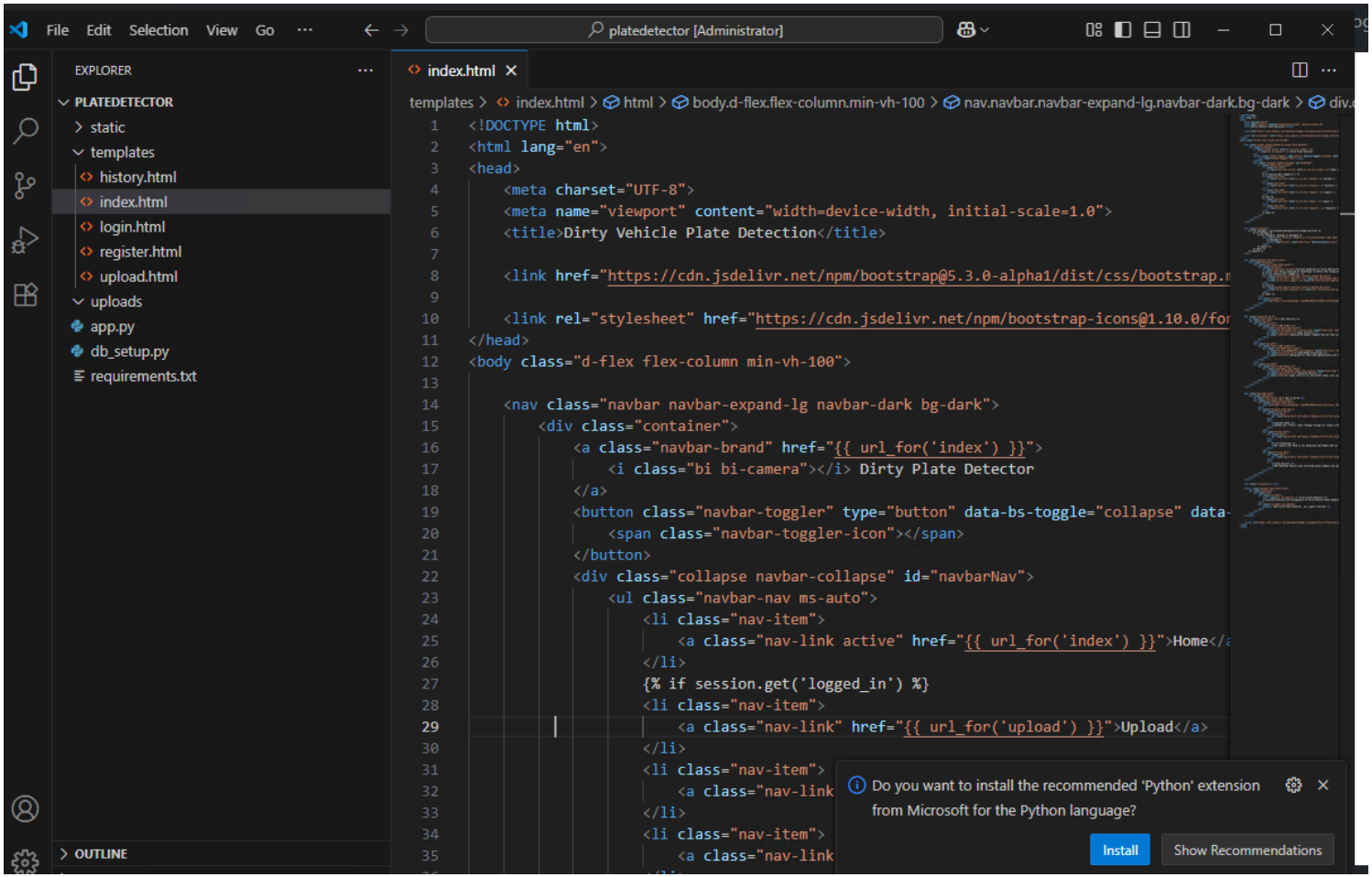
Updates for review 2

- Develop portal using flask
- Database to be used Mysql
- Mp4 processing to be included
- Data to be kept in github repo
- https://github.com/j33tu/mtechpes25.git
- working model to be presented
- Compare multiple model for accuracy

Front end


Dirty Plate Detector
Home
Upload
History
Logout
Upload Video for Plate Detection
Select Video File
Choose file
No file chosen
Upload and Process

Front end code



Database mysql