WRONG WAY VEHICLE DETECTION AND E-CHALLAN SYSTEM

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INTRODUCTION

- Threat to Safety and Traffic: Wrong-side driving is a major hazard that endangers lives, creates traffic congestion, and violates traffic regulations in both urban and rural areas.
- Difficulty in Enforcement: Even though there are laws against wrong-side driving, traffic authorities face challenges in quickly identifying and penalizing offenders, making it hard to enforce the rules effectively.
- Lack of Strong Penalties: Existing enforcement methods are insufficient, with offenders facing low chances of punishment, resulting in frequent violations despite the regulations in place.

LITRATURE REVIEW

1 **Importance of detection system :** Wrong side vehicle detection system improves on road safety since they detect vehicles going the wrong way to avoid an accident.

2 **Technologies used** : These systems employ such technologies as sensor,cameras and artificial intelligence in identifying wrong way vehicle.

3 **Sensor based approaches :** While radar and ultrasonic sensors provide live detection of objects some of the limitation include adverse weather condition changes and physical obstacles(gong et al., 2018).

LITRATURE REVIEW

4 **Camera based detection :** System based on video analysis by means of pattern recognition algorithms can effectively observe traffic, though they need a high demand in computational complexity and their performance is highly sensitive to low visibility (Zhou et al., 2019).

5 **Challenges**: These systems using sensors as well as cameras have some limitations especially in extreme conditions or high computational needs, thus the need to enhance the reliability of these technologies.

Objectives

Objective 1

Automated detection:
Introduce the overall concept with computer vision and IoT-based sensors To monitor and capture errantly placed vehicles in the wrong lane or carriage In real live fashion

Objective 2

Vehicle Identification:
For identification of the violating vehicle, the ANPR technique should be incorporated to capture and recognize the number plate

Objective 3

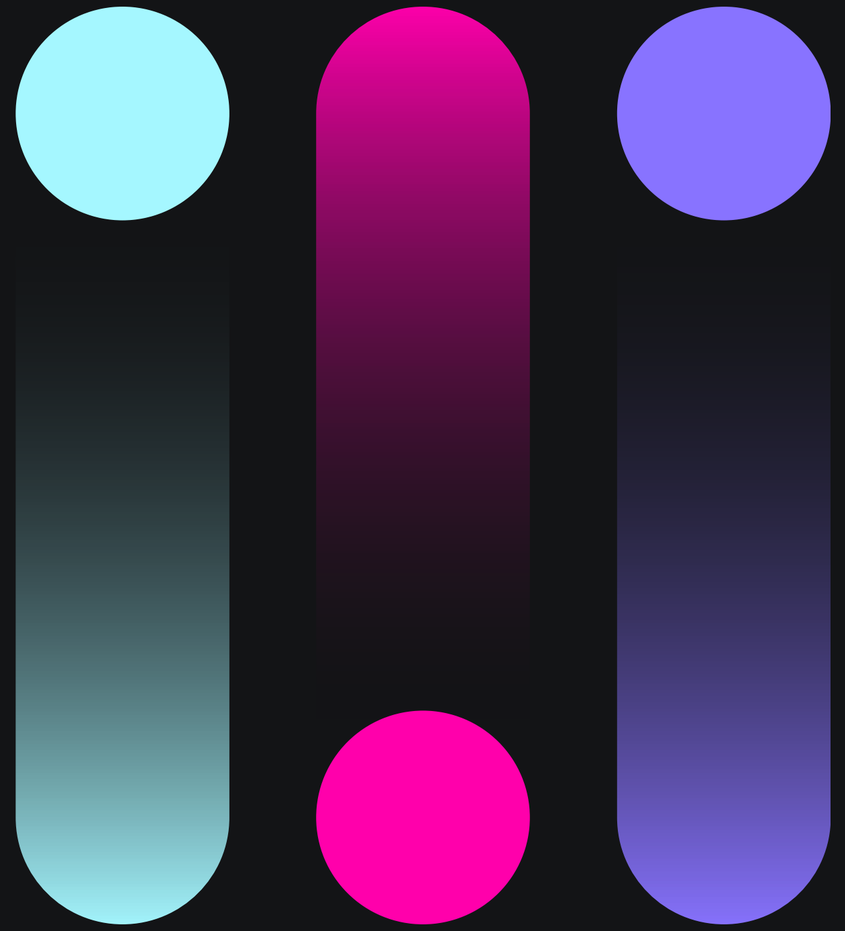
E-Challan System:
Set up automated ticketing with an e-challan feature that sends out tickets to the wrongdoers with photographic or videographic proof of the offense committed.

Objective 4

Real-Time Alerts:
Alert traffic authorities or police when need be, in real-time to take appropriate necessary action.

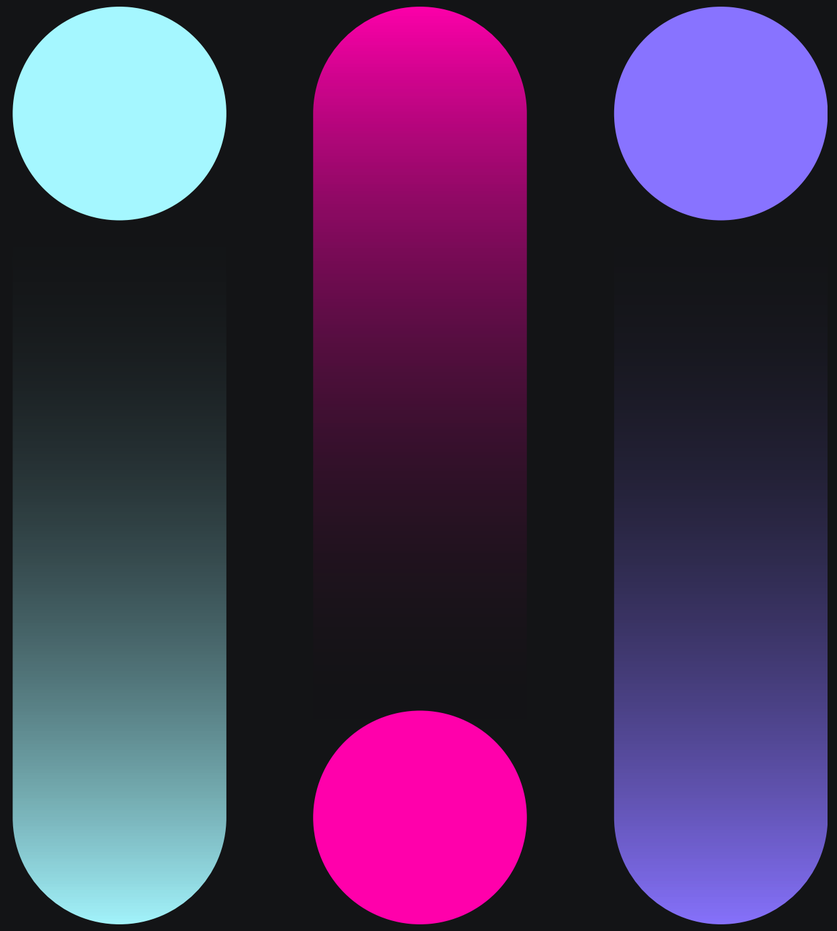
HARDWARE REQUIRMENTS

- High-Resolution Cameras
- Automatic Number Plate Recognition (ANPR) Cameras
- Proximity Sensors
- SIM Modules
- Computing Hardware
- Networking Equipment
- Power Supply and Backup
- Environmental Enclosures



SOFTWARE REQUIRMENT

- Operating Systems
- Video Management Software (VMS)
- Computer Vision Software
- ANPR Software
- Proximity Detection Software
- Database Management System (DBMS)
- E-Challan Management Software
- Web and Mobile Application
- Communication Software
- Security Software



MODULES

- **Video Capture and Processing Module:**
  Purpose: Captures and processes video feeds from surveillance cameras.
- **Vehicle Detection and Tracking Module:**
  Purpose: Detects and tracks vehicles in the video feed.
- **Wrong-Way Driving Detection Module**:
  Purpose: Identifies vehicles driving in the wrong direction.
- **YOLO-Based ANPR (Automatic Number Plate Recognition) Module**:
  Purpose: Detects and reads vehicle number plates using YOLO for localization.

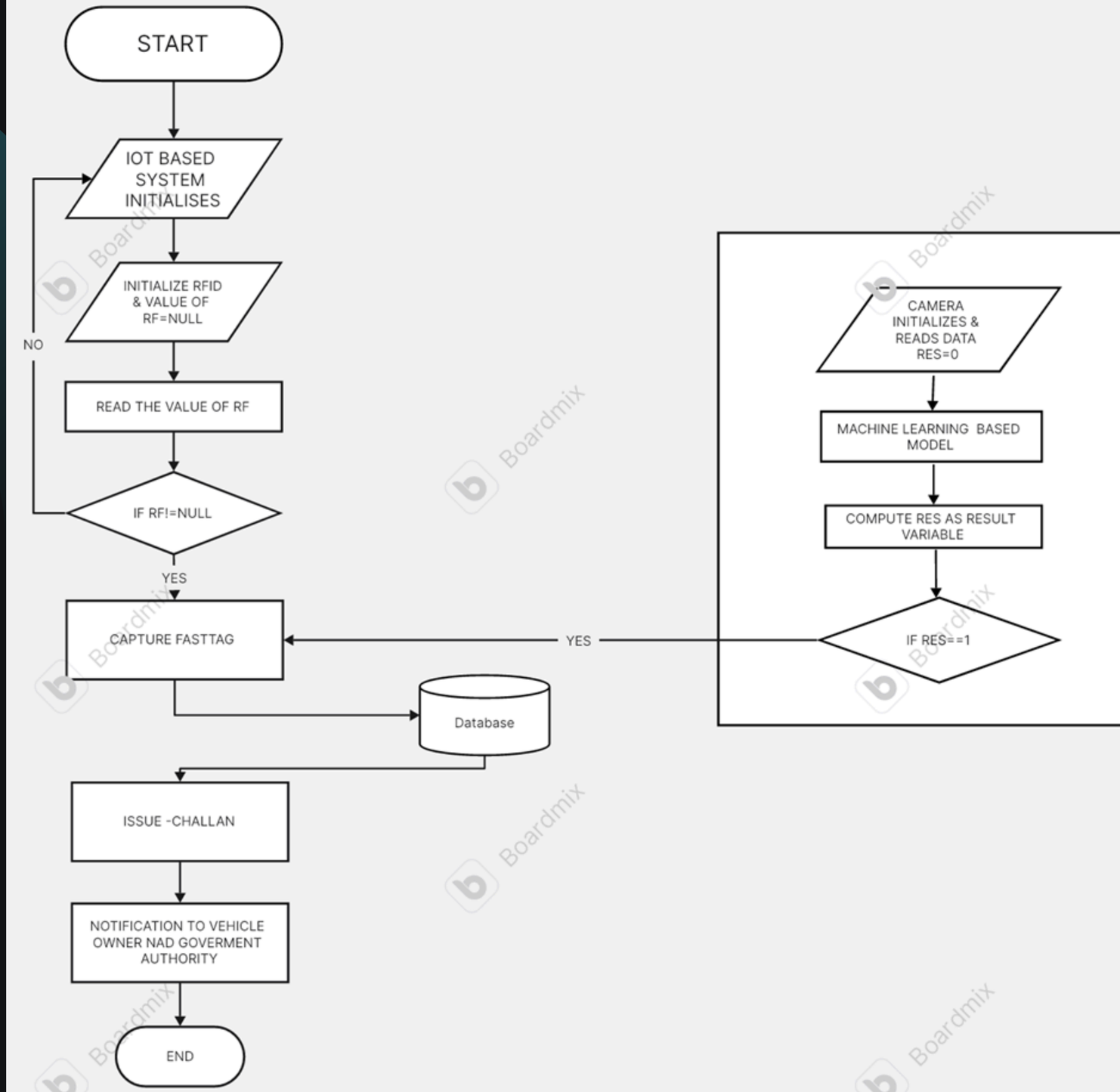
MODULES

- **Violation Logging and Management Module:**
  Purpose: Logs detected violations and manages the violation database.
- **E-Challan Generation and Management Module:**
  Purpose: Automatically generates and manages e-challans for violations
- **Proximity Sensor Integration Module:**
  Purpose: Provides additional verification for wrong-way driving detection using sensors.
- **Communication Module:**
  Purpose: Manages data exchange between cameras, sensors, and central server.

MODULES

- **Notification and Alert Module:**
  Purpose: Sends alerts to traffic authorities and violators.
- **Web-Based Monitoring and Control Module:**
  Purpose: Web interface for real-time system monitoring and management.
- **Mobile Application Module:**
  Purpose: Provides public access to view and pay e-challans.
- **Database Management Module:**
  Purpose: Manages all data related to violations, vehicle information, and e-challans.

WORKFLOW


START
IOT BASED SYSTEM INITIALISES
INITIALIZE RFID & VALUE OF RF=NULL
READ THE VALUE OF RF
IF RF!=NULL
NO
YES
CAPTURE FASTTAG
Database
ISSUE -CHALLAN
NOTIFICATION TO VEHICLE OWNER NAD GOVERMENT AUTHORITY
END
YES
CAMERA INITIALIZES & READS DATA RES=0
MACHINE LEARNING BASED MODEL
COMPUTE RES AS RESULT VARIABLE
IF RES==1

REFRENCES

Books and Texts:

- "Computer Vision: Algorithms and Applications" by David L. Poelman and David M. H. Johnson. Springer, 2018.
- "Intelligent Transport Systems: Technologies and Applications" by George Y. K. Yeung. CRC Press, 2020.

Research Papers and Articles:

- N. H. Lin, Y. L. Aung, and W. K. Khaing, "Automatic Vehicle License Plate Recognition System for Smart Transportation," 2018 IEEE International Conference on Internet of Things and Intelligence System (IOTAIS), Bali, Indonesia, 2018, pp. 97-103, doi: 10.1109/IOTAIS.2018.8600829.
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- Goel, S.K., Kavita, Shukla, M. (2018). Enforcement of Automatic Penalty (e-Penalty) to Govern the Traffic Rule Violators in Digitized INDIA Using I.C.T. In Hemanth, D., Smys, S. (eds) Computational Vision and Bio Inspired Computing. Lecture Notes in Computational Vision and Biomechanics, vol 28. Springer, Cham. https://doi.org/10.1007/978-3-319-71767-8_68.

THANKYOU