SMART INDIA HACKATHON 2024

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TITLE PAGE

- **Problem Statement ID** – 1594
- **Problem Statement Title-** Student Innovation
- **Theme-** Transportation & Logistics
- **PS Category- Software**
- **Team ID-** Yet to be registered
- **Team Name** Ernakulam

VASAMA
ENFORCE TRAFFIC RULES

Problem Statement

AI-Powered Traffic Law Violation Detection and Vehicle Monitoring System

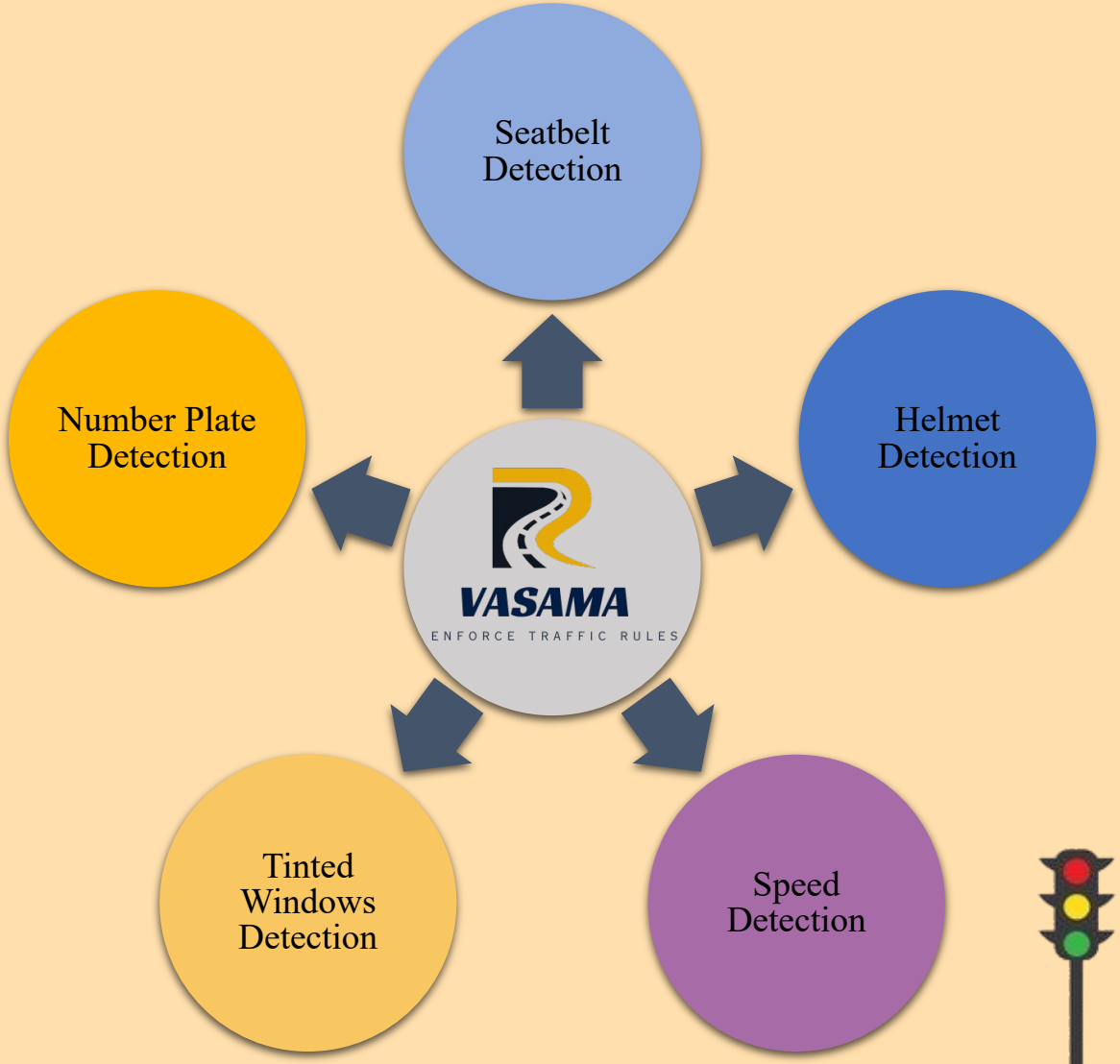
The objective of this model is to develop an AI-powered system capable of real-time detection of traffic law violations using integrated cameras. The system aims to automatically identify and monitor vehicles, detect violations such as not wearing seat belts, exceeding speed limits, riding without a helmet, carrying multiple passengers on a two-wheeler, and using illegal window tints. By leveraging computer vision and machine learning algorithms, the solution will enhance traffic management, improve road safety, and support law enforcement agencies by providing automated, accurate, and timely evidence of violations.

VASAMA

ENFORCE TRAFFIC RULES

Vasama is an advanced AI-powered prototype designed to revolutionize traffic management by enabling real-time detection of traffic law violations. Utilizing integrated cameras, Vasama identifies and monitors vehicles, detecting infractions such as seat belt non-compliance, speeding, helmetless riding, and illegal window tints. By leveraging cutting-edge computer vision and machine learning algorithms, Vasama not only enhances road safety but also supports law enforcement agencies with automated, accurate, and timely evidence, making traffic regulation more efficient and effective.

PROBLEMS TACKLED BY VASAMA



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VEHICLE NUMBER PLATE DETECTION AND RECOGNITION

The objective is to develop a model for identifying vehicle number plates and accurately reading the numbers using OCR technology.

Technologies Used:

- **Object Detection:** YOLOv7, YOLOv8
- **Optical Character Recognition:** Tesseract OCR
- **Annotation Tool:** LabelImg
- **Platform:** Google Colab

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IMPLEMENTATION PROCESS

Key Steps:

- **Data Annotation:** Annotated vehicle images using LabelImg for precise bounding boxes around number plates.
- **Model Training:** Implemented and trained object detection models YOLOv7 and YOLOv8 for plate identification.
- **OCR Integration:** Applied Tesseract OCR for accurate number recognition from detected plates.
- **Training Environment:** Utilized Google Colab for training, testing, and optimization of the models.

BUSINESS MODEL

Applications:

- Automated traffic management systems.
- Security enforcement and surveillance.
- Toll collection and parking management.

Key Learnings:

- The importance of selecting a project with practical, real-world relevance.
- Enhanced understanding of the integration of object detection with OCR technology.
- Gained hands-on experience with advanced machine learning models in a cloud-based environment.

TECHNOLOGY IN USAGE

SQL

HTML

CSS

OpenCV

Flask

TensorFlow

imblearn

Scikit-Learn

Python

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CONCLUSION

In conclusion, **Vasama** represents a significant leap forward in traffic management and law enforcement. By integrating advanced AI technologies with real-time monitoring capabilities, Vasama provides a robust solution for identifying and addressing traffic violations efficiently. The system's ability to deliver accurate and timely evidence not only aids law enforcement agencies but also contributes to enhancing overall road safety. As we continue to develop and refine Vasama, we are confident that it will play a pivotal role in fostering safer driving habits and reducing traffic-related incidents, ultimately leading to safer roads for everyone. With the help of this model, we aim to enforce a strong traffic management system in combination with the traffic police army of the county

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