

Problem Statement

TITLE : Vehicle Cut In Detection

Category: Artificial Intelligence, Machine Learning, LLM, NLP

Participants: 1st-4th Semester Students.

Unique Idea Brief (Solution)

We have approached the problem by collecting extensive sensor data from the Indian driving dataset and from other resources, ensuring diverse conditions, then we had preprocessed the data by extracting frames, augmenting, and normalizing it. Then we had trained an YOLO model to detect vehicles, and used RNN to analyze frame sequences and predict cut-in events. Then we had Validated and tested the model using separate datasets, optimized for metrics like precision, recall, and F1-score.

Features Offered

- 📌 Real-Time Detection
- 📌 Object Tracking
- 📌 Multi-Sensor Integration[LIDAR, RADAR,CAMERAS]
- 📌 Alert System
- 📌 Data Logging[For further improvements]
- 📌 Exclusive User Interface

Process flow

 Data collection

 Data preprocessing

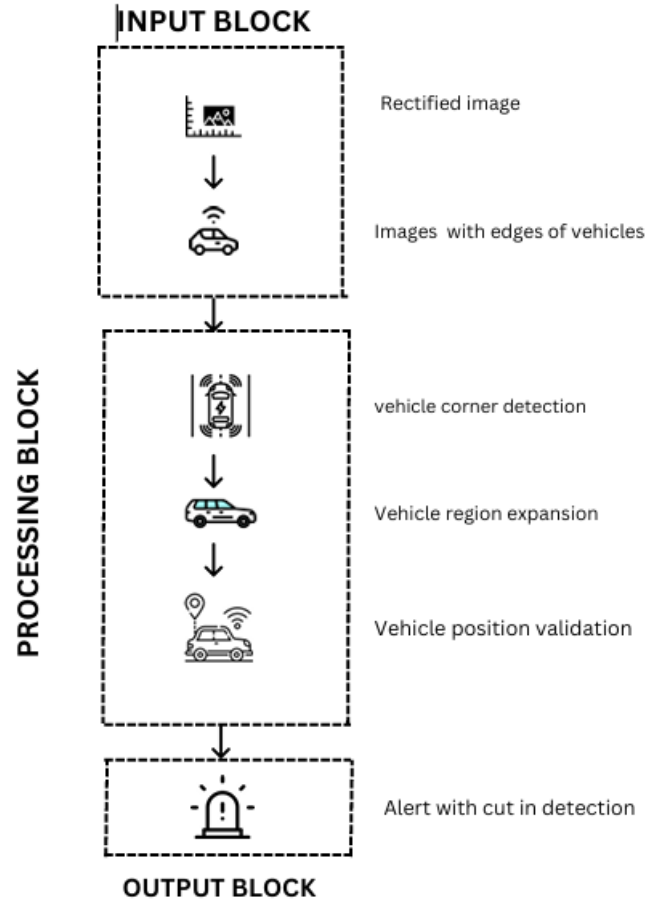
 Cut in detection

 Model training

 Validation and testing

 Deployment

Architecture Diagram



Technologies used

- 📌 India driving dataset for input data's
- 📌 Opencv, labelling for labelling and preprocessing
- 📌 TensorFlow, pytorch, keras, yolo, RNN models for model training
- 📌 Nvidia Jetson[Not used, recommended for future update]

Team members and contribution:

Team members:

T.A SURIYA PRAKASH - 22ECR206

B. SURIYA - 22ECR205

We had jointly worked for this project by collecting data's, training , validation and implementation.

Conclusion

The vehicle cut-in detection system developed in this project successfully leverages deep learning and AI technologies to improve driving safety. Through meticulous data collection, preprocessing, and the application of advanced object detection and sequence analysis models, the system can accurately identify and predict vehicle cut-in events in real-time.