

# Quick Exit Assist System for (Rollover and Drowning Accidents)

2024



## Using Embedded Linux.

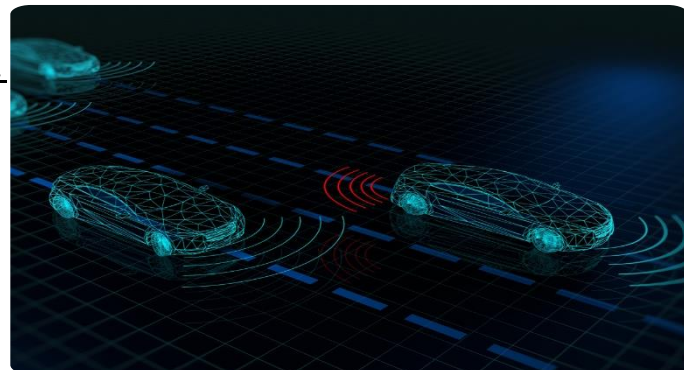
### Abstraction:

The Rollover and Drowning Accident Quick Exit Assist System is an advanced driver assistance system **based on Embedded Linux**. It is specifically designed to enhance safety during rollover and drowning accidents by providing assistance and improving survival chances for occupants trapped inside a vehicle.

**By: Rollover Detection, Emergency Alert, Window Activation, Seatbelt Release, Water Submersion Detection, Unlock the doors, Emergency Communication....**

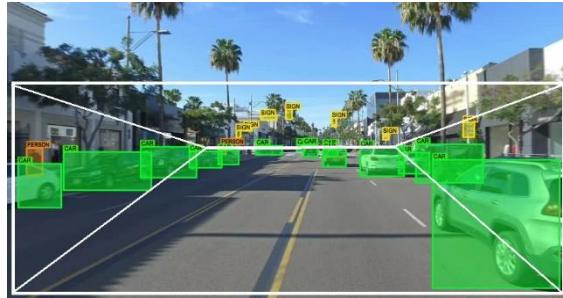
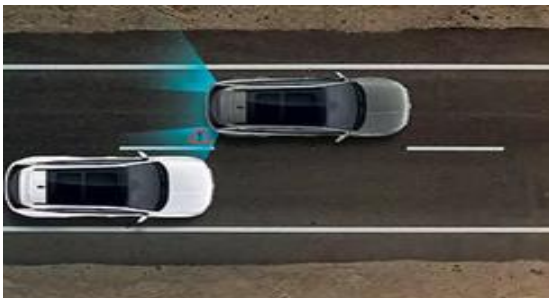
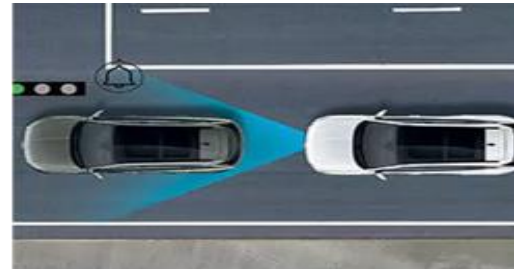


In light of the global threat posed by road accidents, this project proposal aims to develop an ADAS system that focuses on **car collision avoidance using V2V** communication and object detection. By leveraging intelligent technologies and the capabilities of Embedded Linux, the proposed system **aims to enhance road safety, reduce accidents, and minimize the severity of collisions.**



## Objective:

1. Save drivers by Emergency Exit Assistance and Emergency Communications and decrease the number of deaths from railroad accidents.
2. Decrease Vehicles accidents specially in the railroads and decrease the shipment losses for big companies.
3. Optimal Resource Utilization: such as road infrastructure and emergency services. By preventing accidents and improving traffic flow, the system helps minimize the strain on existing resources and enables more efficient use of available infrastructure.
4. Increased Comfort and Convenience: The ADAS system can enhance the overall driving experience by providing drivers with real-time information and assistance. **Features such as Lane Keeping Assist, collision warnings, adaptive cruise control, Blind Spot Monitoring and objects detection** contribute to a more comfortable and stress-free driving environment.



## Project overview:

**First** The Project focuses on developing an Advanced Driver Assistance System (ADAS) **based on Embedded Linux** for two vehicles. The objective is to enhance driver safety by enabling accident avoidance and facilitating communication between vehicles using V2V technology. The ADAS utilizes sensors and algorithms to detect collision risks and provides real-time warnings to drivers.

**Additionally**, a Rollover and Drowning Accident Quick Exit Assist System is implemented **to aid drivers in quickly and safely exiting the vehicle during rollover or submersion incidents**. The project utilizes a Raspberry Pi and ESP as the central controller which helps us to send and receive data between vehicles, while a display tablet serves as the **user interface (GUI)**. The project aims to leverage Embedded Linux, V2V communication, and advanced ADAS features to improve road safety.



## Challenges:

1. The latency of the detection or the control process.
2. Hardware Integration: Integrating the necessary sensors, communication modules, and emergency exit mechanisms into the vehicles can be a complex task. Ensuring compatibility, reliability, and seamless integration of hardware components is crucial.
3. Software Development: Developing robust and efficient software algorithms for collision detection, accident avoidance, and emergency exit assistance requires expertise in embedded systems, signal processing, and machine learning. Balancing real-time performance and accuracy can be challenging.

## Possible solutions:

1. We Can use real time communication and has Integration with Embedded Linux for example ESP (Wi-fi, MQTT, ESP-NOW) or DSRC ....
2. we can use **Yocto Project**, which can effectively address both hardware and software issues in the project. It facilitates hardware compatibility, BSP development, software optimization, dependency management, debugging, testing, security, and compliance, contributing to the overall success and quality of the project.

## TEAM Members:

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