Design and Development of Driver Assistance System

Dr. H. Chidananda[1], Shivasantesh Dodawada[2], Sarala Eshwar[3], Shabaz Ali[4], Vishwanath K[5]
Assistant Professor, Department of CSE[1]
Students, Department of Computer Science and Engineering[2,3,4,5]
Rao Bahadur Y Mahabaleswarappa Engineering College, Bellary, Karnataka, India

Abstract: *Advanced Driver Assistance Systems (ADAS) are intelligent systems that reside inside the vehicle and assist the main driver in a variety of ways. ADAS are intended to help the driver in his driving activities. Technological solutions are many, like Adaptive Cruise Control (ACC), Intelligent Speed Adaptation (ISA) or Collision Warning Systems (CWS). When designed with a safe Human–Machine Interface (HMI), an ADAS should increase vehicle safety and comfort. These systems may also be used to provide vital information about traffic, closure and blockage of roads ahead, detect objects beneath the vehicle, to judge the fatigue and distraction of the human driver and thus make precautionary alerts or to assess the driving performance and make suggestions regarding the same. The greatest advantage of using the assistance systems is that they enable communication between different vehicles, vehicle infrastructure systems and transportation management centres. This enables exchange of information for better vision, localization, planning and decision making of the vehicles.*

Keywords: Advanced Driver Assistance Systems

I. INTRODUCTION

Driver assistance systems (DAS) are a type of technology designed to help drivers operate their vehicles more safely and efficiently. These systems are typically found in newer cars and are becoming increasingly common as more vehicles are equipped with advanced sensors, cameras, and computer systems.

These systems use sensors and cameras to monitor the vehicle's surroundings and provide feedback to the driver through visual, auditory, or haptic signals. The goal of driver assistance systems is to enhance the safety of drivers and passengers, reduce accidents, and improve the overall driving experience.

II. LITERATURE SURVEY

Connected and automated vehicles (CAV) are expected to introduce a substantial improvement in road safety, with many researchers forecasting a significant reduction in accident frequency and severity.[1]

This paper proposes the system where the proprioceptive sensors - able to detect and respond to danger situation by analysing the behaviour of the vehicle; exteroceptive sensors – (e.g. ultrasonic, radar, lidar, infrared and vision sensors) able to respond on an earlier stage and to predict possible dangers [2]

Air pollution and climate change are some of the main problems that humankind is currently facing. The electrification of the transport sector will help to reduce these problems, but one of the major barriers for the massive adoption of electric vehicles is their limited range.[3]

III. METHODOLOGY

1. Initialy: Arduino IDE and open source pycharm is downloaded in the laptop the code for sensor is done in arduino and object detection code is done in pycharm.
2. Obstacle detection: the sensors like proximity sensor, ir sensor, ultra sonic sensor. Whenever the detect the obstacle around them they give the buzzer to the driver.

3. Object Detection: The Esp32 Cam Is Connected To The Internet It Provide Ip Adderess, By Using Yolov5 Algorithm Of Computer Vision In Pycharm Through Esp32cam Each And Every Object Is Dected That Is Placed In The Font And Under Of The Vehicle Which Assisst The Driver In Driving The Vehicle

4. Fire Detedtion: The Fire Sensor Connrcted To The Arduino When Ever The Fire Is Detected In The Vehicle It Gives Buzzer Or Alert To The Driver.

5. Far Obstacle Detection: The Ultra Sonic Sensor Is Used To Detecte

6. Drowsiness Deticion: This technology can help prevent accidents caused by tired drivers who may fall asleep at the wheel or become less attentive.

The obstacle that are far from vehicle this helps driver to take measures when the road is covered with fog or in foggy areas.

The system automaticaly shut down when the vehicle is off.

IV. RESULT

In our system which we developed achieved finding object or obstacle detection through sensors to detect the collision which coming near to car while accident.
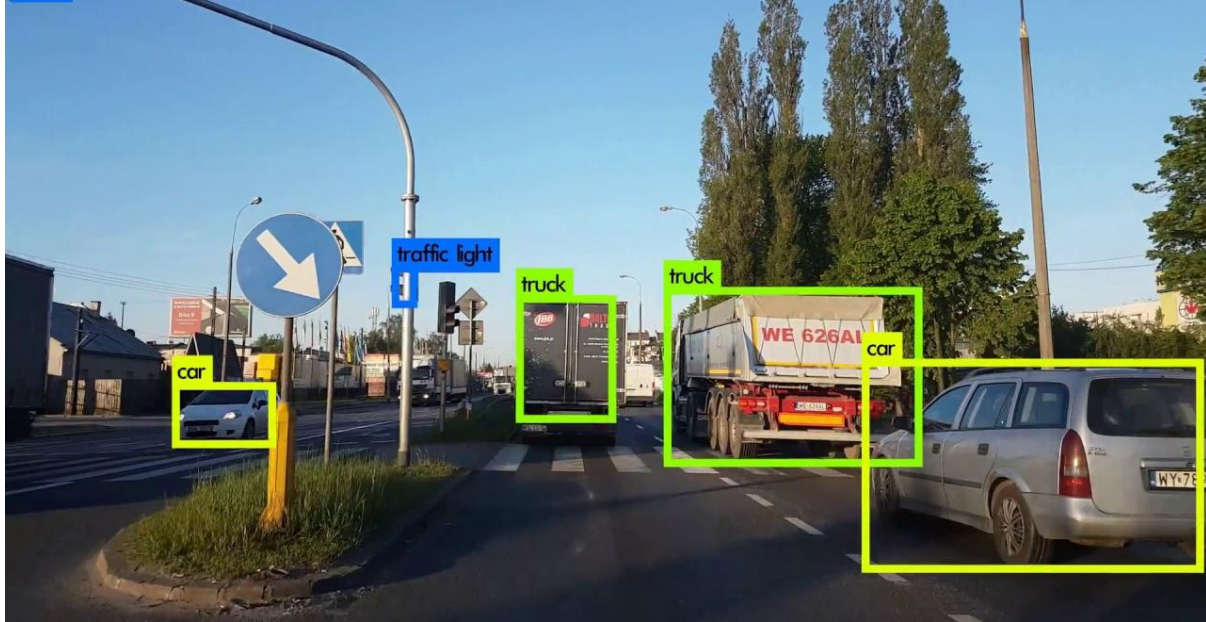
Fig.[1]
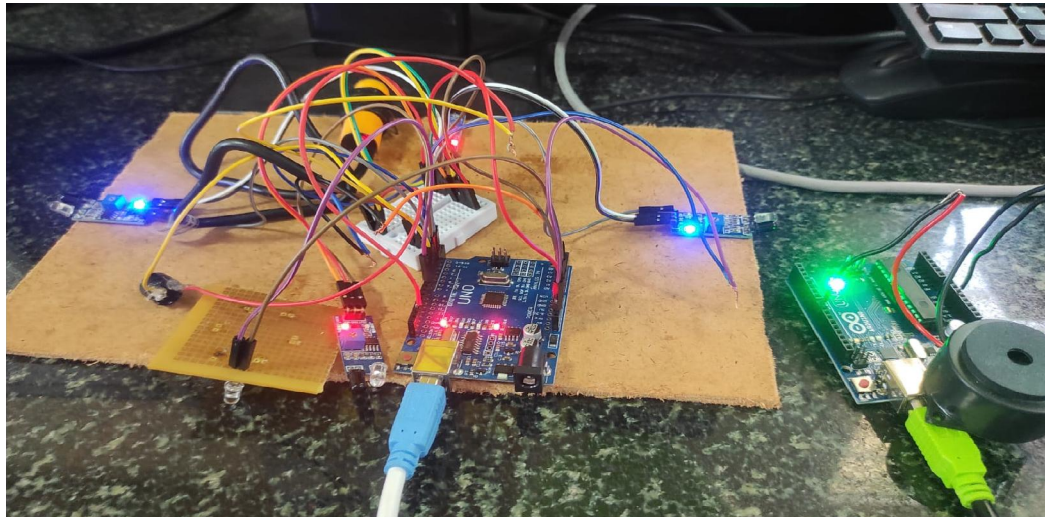
Driver drowsiness detection is *a car safety technology which helps prevent accidents caused by the driver getting drowsy*.

Fig. [2]

Final phase in this process is detection of objects like car, truck, & living animals under the car before we start and drive the car without causing any accident.

Fig.[3]

V. CONCLUSION

The design and development of a driver assistance system is a complex and multifaceted process that requires careful consideration of numerous factors. It involves a team of experts in various fields, including software engineering, electrical engineering, mechanical engineering, and human factors.

The goal of a driver assistance system is to enhance the safety and convenience of driving, by providing automated or semi-automated features that can help drivers avoid accidents or mitigate their impact. The system may include features such as lane departure warning, adaptive cruise control, collision avoidance, blind spot monitoring, and parking assistance.

The design and development process typically involves several stages, including requirements gathering, concept design, prototyping, testing, and validation. During each stage, the system is refined and improved based on feedback from stakeholders, including end-users, regulatory bodies, and industry experts.

Once the system has been designed and developed, it must be thoroughly tested and validated to ensure that it meets all relevant safety and performance standards. This may involve testing the system under various driving conditions and scenarios, as well as assessing its reliability and durability over time.

REFERENCES

[1] Leandro Masello , German Castignani , Barry Sheehan , Finbarr Murphy , Kevin McDonnell "On the road safety benefits of advanced driver assistance systems in different driving", version of Record, 13 Aug 2022. https://doi.org/10.1016/j.trip.2022.100670

[2] D. Jiménez, S. Hernández, J. Fraile-Ardanuy, J. Serrano, R. Fernández and F. Álvarez, "Modelling the effect of driving events on electrical vehicle energy consumption using inertial sensors in smartphones", Energies, vol. 11, 2018. https://www.mdpi.com/1996-1073/11/2/412

[3] Adam Ziebinski, Rafal Cupek, Damian Grzechca, Lukas ChruszczykReview of Advanced Driver Assistance Systems November 2017AIP Conference Proceedings 1906(1):120002DOI:10.1063/1.5012394 https://www.researchgate.net/publication/321364551_Review_of_advanced_driver_assistance_systems_ADAS