



## “AI ADAS SYSTEM”

**Mrs. kanupriya, Ali Saif, Shivani Sharma, Ritika Sharma**

kanupriya.sharma03@gmail.com, aszaidi72@gmail.com, shivanisharma005@gmail.com, ritikasharma.sharma05@gmail.com  
ELECTRONICS AND COMMUNICATION ENGINEERING SHRI RAM GROUP OF COLLEGES, MUZAFFARNAGAR

**Abstract:** This project focuses on the design and implementation of AI ADAS SYSTEM employing advanced electronics. The primary objective is to enhance the protection of vehicles and driver against the terrible accidents happening on roads. The proposed system incorporates a combination of ultrasonic and IR sensors, LED, buzzer, Arduino and webcam for security purpose. The implemented ADAS system demonstrates high efficiency in detecting and preventing daily accidents. The webcam detects the position and movements of the driver. If the driver will feel sleepy and drowsiness then vehicle will be on auto mode and when a hurdle come in between then vehicle will stop and buzzer start honing. This project successfully establishes an advanced vehicle security system through the integration of cutting-edge electronics. The system not only detects the driver's movement but also keep our vehicle safe. The effectiveness of the system in real-world scenarios highlights its potential for widespread adoption in the automotive industry, contributing to the ongoing efforts to enhance vehicle security.

**Keywords:** headlight, vehicle, temporary blindness, Buzzer.

### INTRODUCTION

In today's fast pacing world, everyone has ownership of vehicles as it is the most important part of our life. But also, with that there are increasing accident cases day by day due reckless driving and or many more reasons like sometime driver sleep at the time of driving, the camera will detect the driver's eyes and if driver will sleep then car will be on auto mode. Significant automotive safety improvements in the past (e.g., shatter-resistant glass, three-point seatbelts, airbags) were passive safety measures designed to minimize injury during an accident. Today, ADAS systems actively improve safety with the help of embedded vision by reducing the occurrence of accidents and injury to occupants.

The implementation of cameras in the vehicle involves a new AI function that uses sensor fusion to identify and process objects. Sensor fusion, similar to how the human brain process information, combines large amounts of data with the help of image recognition software, ultrasound sensors, and radar. This technology can physically respond faster than a human driver ever

could. It can analyse streaming video in real time, recognize what the video shows, and determine how to react to it. Adaptive cruise control is particularly helpful on the highway, where drivers can find it difficult to monitor their speed and other cars over a long period of time. Advanced cruise control can automatically accelerate, slow down, and at times stop the vehicle, depending on the action's other objects in the immediate area. Unseen area detection systems use sensors to provide drivers with important information that is otherwise difficult or impossible to obtain. Some systems sound an alarm when they detect an object in the driver's unseen area, such as when the driver tries to move into an occupied lane.

Automatic emergency braking uses sensors to detect whether the driver is in the process of hitting another vehicle or other objects on the road. This application can measure the distance of nearby traffic and alert the driver to any danger. Some emergency braking systems can take preventive safety measures such as tightening seat belts, reducing speed, and engaging adaptive steering to avoid a collision. Driver drowsiness detection warns drivers of sleepiness or other road distractions. There are several ways to determine whether a driver's attention is decreasing. In one case, sensors can analyse the movement of the driver's head and heart rate to determine whether they indicate drowsiness. Other systems issue driver alerts similar to the warning signals for lane detection. The driver monitoring system is another way of measuring the driver's attention. The camera sensors can analyse whether the driver's eyes are on the road or drifting. Driver monitoring systems can alert drivers with noises, vibrations in the steering wheel, or flashing lights. In some cases, the car will take the extreme measure of stopping the vehicle completely.

ADAS technologies contribute to increased accessibility and inclusivity in the realm of transportation. For individuals with disabilities or limited mobility, features like adaptive cruise control and automated emergency braking can enhance their ability to operate vehicles safely and independently. ADAS assists in mitigating the challenges faced by differently able individuals, empower them to navigate roads with greater confidence and autonomy. Furthermore, voice-activated controls and intuitive

user interfaces make vehicle operation more accessible for individuals with visual impairments or dexterity limitations.

The AI ADAS SYSTEM works on security purpose, as many accidents has been happened all over the world. This system will care about driver's safety.

## LITERATURE SURVEY

According to the August 2016 Traffic Safety Facts Research Note by the National Highway Traffic Safety Administration (NHTSA), "The Nation lost 35,092 people in crashes on U.S. roadways during 2015." This 7.2% increase was "the largest percentage increase in nearly 50 years." An analysis revealed that about 94% of those accidents were caused by human error and the rest by the environment and mechanical failures.

The opportunity to reduce car accidents is making ADAS even more critical. Automatic emergency braking, pedestrian detection, surround view, parking assist, driver drowsiness detection, and gaze detection are among the many ADAS applications that assist drivers with safety-critical functionality to reduce car accidents and save lives.

## METHODOLOGY

When the driver will sleep and feeling drowsiness the webcam detects the movement of the person and the system has been developed with python and Arduino programming. We have used multiple libraries like (open cv2, Numpy dlilib and serial).OpenCV-Python is a library of Python bindings designed to solve computer vision problems. Python is a general-purpose programming language started by Guido van Rossum that became very popular very quickly, mainly because of its simplicity and code readability.In Python we have lists that serve the purpose of arrays, but they are slow to process. NumPy aims to provide an array object that is up to 50x faster than traditional Python lists. The array object in NumPy is called ndarray, it provides a lot of supporting functions that make working with ndarray very easy. Arrays are very frequently used in data science, where speed and resources are very important.Dlib is a popular toolkit for machine learning that is used primarily for computer vision and image processing tasks, such as face recognition, facial landmark detection, object detection, and more. Serial is used in this project to communicate from the CPU.From this camera sense the eyes of a person in every two minutes and send signal to the CPU the CPU will send the signal to Arduino. If eyes are close then the entire sensor activated, the vehicle will be on auto mode and whole command in the hand of Arduino. By following a systematic methodology encompassing these steps, developers can design, build, and deploy AI-based ADAS systems that enhance vehicle safety, improve driving experience, and pave the way for autonomous driving in the future.

## CONCLUSION:

In conclusion, AI has revolutionized the automotive industry by powering advanced driver assistance systems that enhance safety, improve efficiency, and provide a better overall driving experience. However, addressing challenges and ensuring the reliability and security of AI-based ADAS systems will be critical for their widespread adoption and continued success in the future.

We have reported on the outcomes of a research and demonstration project on ultrasonic radar sensor for security system for human or object interference in a small space. By Using a GSM and camera it quality can be making better for any security purpose. The result in this project is genuine and is a product of sincerity and hard work. The system has been successfully implemented and the aim is achieved without any deviation. There is a lot of future scope for this project because of its security capacity. It can be used in many applications. The product can also be developed or modified according to the rising needs and demand. Our robot that is fully functional and is operating as per our expectations. The Solar panel is charging the battery bit by bit at 20 mA per second and is increasing its endurance. In the beginning we were facing problems with the RF module. The communication was being established only when the transmitter on the robot and the receiver on the robot were facing each other. Even the range of was not up to mark. To solve this problem we attached antennas made of thin wires at both the transmitter and receiver. Doing so enhanced its range and also improved the quality of signal between them, thereby reducing lag. At present the range is around 10 to 15 meters. Due to size and cost constraints we have used components that were cheap. This is the reason for its small range and endurance. This project is a prototype because it cannot do what other heavy duty and expensive robots can do.

The sensors are working fine. We have tested them under various situations and they have always relayed the correct information. The ultrasonic sensor which is used to detect close enemies will trigger the servo motor responsible for the gun's trigger as soon as it finds someone right in front of it. We have kept the ultrasonic sensor's range less than 1 ft., just for representation. Having kept a larger range would have resulted in confusion with other far away objects.

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