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Advance Driver Assistance System: A Systematic Overview

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***Abstract*— This paper evaluates the performance of driver monitoring systems with respect to four popular vehicles equipped with an ADA system were evaluated by simulating driver disengagement (common behaviors such as texting, reading, watching videos, or general manipulation of a mobile device) in a real-world highway.**

The necessity of Advanced Driver Assistance Systems (ADAS) is the driver's error will be reduced or even eliminated, and efficiency in the traffic and transport is enhanced. The benefits of ADAS implementations are potentially considerable because of the significant decrease in human suffering or stress, economical costs and pollution. However, there are potential problems to be expected, since task of driving an ordinary motor vehicle is changing in nature, in a direction of supervising a (partly) automated Moving vehicle.

***Keywords*— ADAS, Adaptive cruise control, Drowsiness, Navigation, Obstacle detection, Motion detection**

I. INTRODUCTION

India is a developing nation. The number of vehicles in the country has increased over the last decade as the population has grown. Though road networks have improved, the increased vehicle population has exacerbated safety concerns. It is a well-known fact that "national health is more important than national wealth." As a result, road safety is a major public health concern, and attention must be paid to road safety measures. Drowsiness while driving causes major traffic accidents. Drowsiness caused by fatigue driving is becoming more common these days. This project is primarily concerned with road accidents that occur when people are sleepy and lethargic / half asleep or otherwise drowsy while driving The project employs an infrared sensor to determine whether a person is drowsy or not based on whether their eyes are closed or open. [1] When the eyes are closed for more than 5 seconds, it detects sleep and alerts the user via a buzzer alarm. As in "The driver is sleepy." Accidents can occur as a result of inactivity, which is controlled and prevented by the alarm

There are many numbers of reasons why in recent years electronic driving aids are extremely well developed and implemented at an increasing rapid rate and speed. The first priority reason is safety (i.e. the unacceptable number of road accidents), but also the major economic principles (time is wealth, among others) are a compelling drive, while bringing comfort for the driver population is also a good sales argument. Last one which can't be ignored, environmental arguments play a pivotal role of growing importance.

Driver error is the foremost reason for causes of accidents. It stands for the mistakes made by the driver. According to the statistics 6% of world accidents are caused in India itself. Some of the main reasons for this are listening to loud music while driving car, talking in cell phones during driving, increase in number of vehicles on road, incredible roads specifically in India.

A. The two factors for accidents are loss of control and failing to avoid a vehicle in the carriage way (i.e. a collision). These factors can be hierarchically categorized as representing Driver errors (& impairment), Environment, and the Vehicle factors contributing to accidents .The incidence of alcohol was established at 3.8%, which is major reason for all accidents in England where a driver is known to be over the allowable drink drive limit (4.2%). The other important impairment related factors the situation is not very much straightforward. Impairment due to fatigue is recorded as the factor in only 0.8% of the accidents, whereas in-depth studies and large volume of anecdotal evidence shows that the above factor is more like 7-10%. This under- representation of the fatigue related accidents is now well recognized and results largely from absence of direct evidence of sleepiness or tiredness being major factors. There is no quantitative measure of all these effects on drivers. If drivers survive by an accident caused due to sleepiness they are unlikely to admit it; if they do not survive there is always often very little direct physical evidence. Other factors such as vehicle defects, which are often erroneously viewed as causes, usually need to be eliminated before the fatigue becomes apparent and dangerous.

B. Electronic aids the reduction of traffic accidents, requires the counter measures that have to be devised and introduced to prevent those behaviors contributing to major accidents. In Europe, the USA and Japan combined ergonomic and engineering approaches to hazard assessment and the indication of driver's performance limits have developed into research and development of new and appropriate (primary), safety measures. Brookhuis & Brown (1992) argue that an ergonomic approach to behavioral change via engineering measures that is in the form of electronic driving aids that needs to be adopted in order to improve road safety, transport efficiency and improve environmental quality. Driver comfort appears to be a strong asset for the development of electronic driving aids also, at least from the marketing point of view. Car manufacturers are keen on driver comfort and invest considerable amount of revenue or effort in the development and improvement in the comfort enhancing electronic aids. Some of the well-known examples of this type of applications are automotive navigation systems and adaptive cruise control systems (ACC's). Though may be expensive, prototypes of various type of systems passed a number of tests (and improvements) and most of them were successfully placed on the consumer market. Before the actual marketing, to which user needs research (or marketing research) is indispensable, but also studies on acceptance and certainly safety effects are still necessary after the implementation

C. Advanced Driver Assistance Systems, commonly called ADAS, are the systems to help the driver in the driving process. When designed with a safe and appropriate Human-Machine Interface, they should increase the safety of car and more generally the road safety. Advanced driver assistance systems (ADAS) are technologies that provide a driver with needed information, automate difficult and repetitive tasks, and lead to the overall increase in safety of the car for. Some of these technologies have proven to an improved driving experience and better overall road safety. GPS navigation, taking an example, has become increasingly the most common in OEM infotainment systems since first being introduced in the 1990s. However, a lot more of ADAS are right on the cutting edge of the emerging automotive technologies. Some of these systems will have staying power to stick around, and you can expect to see at least a few of them in future car. Others may disappear or be replaced by better implementations and modernization of the same basic idea. Since ADAS rely on electronics and mostly include firmware elements, the development of these cutting edge systems is governed by the international safety standards such as IEC-61508 and ISO26262.

II. LITERATURE REVIEW

1. 'A Partial Least Squares Regression-Based Fusion Model for Predicting the Trend in Drowsiness'. Hong Su et.al, International Journal of Computer Science Trends and Technology, 2008.

This paper proposes a new technique of modeling driver drowsiness with multiple eyelid movement features based on an information fusion technique - partial least squares regression (PLSR), with which to cope with the problem of strong collinear relations among eyelid movement features and, thus, predicting the tendency of the drowsiness. With a set of electro-oculogram signals measured in an experiment conducted in Sweden, 14 typical eyelid movement features are first extracted. Then, statistical analyses from 20 subjects indicate that the eyelid movement parameters can characterize a driver's degree of drowsiness. The intrinsic quantitative relationships between eyelid movement features and driver drowsiness degree are modeled by PLSR analysis. The developed model provides a framework for integrating multiple sleepiness features together and defining the contribution of each feature to the decision and prediction result. The predictive precision and robustness of the model thus established are validated, which show that it provides a novel way of fusing multi- features together for enhancing our capability of detecting and predicting the state of drowsiness

2. Camera based Drowsiness Reference for Driver State Classification under Real Driving Conditions' Bin Yang, International Journal of Computer Science Trends and Technology, June, 2010.

Experts assume that accidents caused by drowsiness are significantly under-reported in police crash investigations (1-3%). They estimate that about 24-33% of the severe accidents are related to drowsiness. In order to develop warning systems that detect reduced vigilance based on the driving behavior, a reliable and accurate drowsiness reference is needed. Studies have shown that measures of the driver's eyes are capable to detect drowsiness under simulator or experiment conditions. In this study, the performance of the latest eye tracking based in-vehicle fatigue prediction measures are evaluated .These measures are assessed statistically and by a classification method based on a large dataset of 90 hours of real road drives. The results show that eye- tracking drowsiness detection works well for some drivers as long as the blinks detection works properly. Even with some proposed improvements, however, there are still problems with bad light conditions and for persons wearing glasses. As a summary, the camera based sleepiness measures provide a valuable contribution for a drowsiness reference, but are not reliable enough to be the only reference .complete content and organizational editing before formatting. Please take note of the following items when proofreading spelling and grammar:

3. 'Speed Controlled Techniques of Induction Motor Drive', Jaswant Singh, Arya College of Engineering & IT, Jaipur, India, January 2018.

This paper propose a comparative study of different controlled techniques of induction motor drive, gives an overview of the induction motor (IM) drives. It also examines various control methodologies, using voltage and current control. Induction motors are extensively used in industrial and household appliances and consume more than 50% of the total generated electrical energy. In this paper presents exhaustive literature review of various techniques of a 3-phase Induction Motors such as PWM.

4. 'Driver Monitoring Based on Low-Cost 3-D Sensors', Garcia, International Journal of Computer Science Trends and Technology, August 2014.

A solution for driver monitoring and event detection based on 3-D information from a range camera is presented. The system combines 2-D and 3-D techniques to provide head pose estimation and regions-of-interest identification. Based on the captured cloud of 3-D points from the sensor and analyzing the 2-D projection, the points corresponding to the head are determined and extracted for further analysis. Later, head pose estimation with three degrees of freedom (Euler angles) is estimated based on the iterative closest point's algorithm. Finally, relevant regions of the face are identified and used for further analysis, e.g., event detection and behavior analysis. The resulting application is a 3-D driver monitoring system based on low-cost sensors. It represents an interesting tool for human factor research studies, allowing automatic study of specific factors and the detection of special event related to the driver, e.g., driver drowsiness, inattention, or head pose.

5. 'Driver drowsiness detection system under infrared illumination for an intelligent vehicle', M.J. Flores, International Journal of Computer Science Trends and Technology, 2011

Statistics on traffic accidents reveal that human error is the main cause of deaths and injuries on roads worldwide every day. In order to reduce the amount of such fatalities, a module for an advanced driver assistance system, which caters for

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automatic driver drowsiness detection and also driver distraction, is presented. Artificial intelligence algorithms are used to process the visual information in order to locate, track and analyze both the driver's face and eyes to compute the drowsiness and distraction indexes. This real-time system works during nocturnal conditions as a result of a near- infrared lighting system. Finally, examples of different driver images taken in a real vehicle at nighttime are shown to validate the proposed algorithms

6. 'Driver Drowsiness Recognition Based on Computer Vision Technology', Chenget , International Journal of Computer Science Trends and Technology
, 2012.
Driver drowsiness is one of the major causes of traffic accidents. This paper presents a nonintrusive drowsiness recognition method using eye-tracking and image processing. A robust eye detection algorithm is introduced to address the problems caused by changes in illumination and driver posture. Six measures are calculated with percentage of eyelid closure, maximum closure duration, and blink frequency, average opening level of the eyes, opening velocity of the eyes, and closing velocity of the eyes. These measures are combined using Fisher's linear discriminant functions using a stepwise method to reduce the correlations and extract an independent index. Results with six participants in driving simulator experiments demonstrate the feasibility of this video-based drowsiness recognition method that provided 86% accuracy

7. ‘A Real-Time Embedded Blind Spot Safety Assistance System’, Bing-Fei Wu, Institute of Electrical and Control Engineering, National Chiao Tung University, 14 October 2011.
This paper presents an effective vehicle and motorcycle detection system in the blind spot area in the daytime and nighttime scenes. The proposed method identifies vehicle and motorcycle by detecting the shadow and the edge features in the daytime, and the vehicle and motorcycle could be detected through locating the headlights at nighttime. First, shadow segmentation is performed to briefly locate the position of the vehicle. Then, the vertical and horizontal edges are utilized to verify the existence of the vehicle. After that, tracking procedure is operated to track the same vehicle in the consecutive frames. Finally, the driving behavior is judged by the trajectory. Second, the lamps in the nighttime are extracted based on automatic histogram thresholding, and are verified by spatial and temporal features to against the reflection of the pavement. The proposed real-time vision-based Blind Spot Safety-Assistance System has implemented and evaluated on a TI DM6437 platform to perform the vehicle detection on real highway, expressways, and urban roadways, and works well on sunny, cloudy, and rainy conditions in daytime and night time. Experimental results demonstrate that the proposed vehicle detection approach is effective and feasible in various environments.

8. Driver Drowsiness Detection through HMM based Dynamic Modeling’, Eyosiyas, International Journal of Computer Science Trends and Technology, June, 2014**.**
Drowsiness is one of the main causes of severe traffic accidents occurring in our daily life. In order to reduce the number of drowsiness-induced accidents, various researches have been conducted with the aim of finding practical and non-invasive drowsiness detection systems by using behavioral measuring techniques. Many of the previous works on behavioral measuring techniques have mainly focused on the analysis of eye closure and blinking of the driver. It is recently that more attention started to shift to inclusion of other facial expressions and only few, among those researches, have been done on the analysis of temporal dynamics of facial expressions for drowsiness detection. In this paper we propose a new method of analyzing the facial expression of the driver through Hidden Markov Model (HMM) based dynamic modeling to detect drowsiness. We have implemented the algorithm using a simulated driving setup.

9. ‘Visual Analysis of Eye State and Head Pose for Driver Alertness Monitoring’, G. Kong, International Journal of Computer Science Trends and Technology, 2013.
This paper presents visual analysis of eye state and head pose (HP) for continuous monitoring of alertness of a vehicle driver. Most existing approaches to visual detection of non-alert driving patterns rely either on eye closure or head nodding angles to determine the driver drowsiness or distraction level. The proposed scheme uses visual features such as eye index (EI), pupil activity (PA), and HP to extract critical information on non-alertness of a vehicle driver. EI determines if the eye is open, half closed, or closed from the ratio of pupil height and eye height. PA measures the rate of deviation of the pupil center from the eye center over a time period. HP finds the amount of the driver's head movements by counting the number of video segments that involve a large deviation of three Euler angles of HP, i.e., nodding, shaking, and tilting, from its normal driving position. HP provides useful information on the lack of attention, particularly when the driver's eyes are not visible due to occlusion caused by large head movements. A support vector machine (SVM) classifies a sequence of video segments into alert or non-alert driving events. Experimental results show that the proposed scheme offers high classification accuracy ethnicity and gender in real road driving conditions.

III. RESEARCH METHODOLOGY

The following ADAS are available in various production models from a variety of OEMs

3.1 Adaptive Cruise Control

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

3.2 Glare-Free High Beam and Pixel Light

Glare-free high beam and pixel light uses sensors to adjust to darkness and the vehicle's surroundings without disturbing oncoming traffic. This new headlight application detects the lights of other vehicles and redirects the vehicle's lights away to prevent other road users from being temporarily blinded.

3.3 Adaptive Light Control

Adaptive light control adapts the vehicle's headlights to external lighting conditions. It changes the strength, direction, and rotation of the headlights depending on the vehicle's environment and darkness.

3.4 Automatic Parking

Automatic parking helps inform drivers of blind spots so they know when to turn the steering wheel and stop. Vehicles equipped with rearview cameras have a better view of their surroundings than traditional side mirrors. Some systems can even complete parking automatically without the driver's help by combining the input of multiple sensors.

3.5 Autonomous Valet Parking

Autonomous valet parking is a new technology that works via vehicle sensor meshing, 5G network communication, and cloud services that manage autonomous vehicles in parking areas. Sensors provide the vehicle with information about where it is, where it needs to go, and how to get there safely. All this information is methodically evaluated and used to perform drive acceleration, braking, and steering until the vehicle is safely parked.

3.6 Navigation System

Car navigation systems provide on-screen instructions and voice prompts to help drivers follow a route while concentrating on the road. Some navigation systems can display exact traffic data, and if necessary, plan a new route to avoid traffic jams. Advanced systems may even offer heads-up displays to reduce driver distraction.

3.7 Night Vision

Night vision systems enable drivers to see things that would otherwise be difficult or impossible to see at night. There are two categories of night vision implementations: Active night vision systems project infrared light and passive systems rely on the thermal energy that comes from cars, animals, and other objects.

3.8 Blind Spot Monitoring

Blind spot 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 blind spot, such as when the driver tries to move into an occupied lane.

3.9 Automatic Emergency Braking

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.

3.10 Crosswind Stabilization

This relatively new ADAS feature supports the vehicle in counteracting strong crosswinds. The sensors in this system can detect strong pressure acting on the vehicle while driving and apply brakes to the wheels affected by crosswind disturbance.

3.11 Driver Drowsiness Detection

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 analyze 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.

3.12 Driver Monitoring System

The driver monitoring system is another way of measuring the driver's attention. The camera sensors can analyze 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.

3.13 5G and V2X

This hot new 5G ADAS feature provides communication between the vehicle and other vehicles or pedestrians with increased reliability and lower latency, generally referred to as V2X. Today, millions of vehicles connect to cellular networks for real-time navigation. This application will enhance existing methods and the cellular network to improve situational awareness, control or suggest speed adjustments to account for traffic congestion, and provide real-time updates to GPS maps. V2X is essential to support over-the-air software updates for the now-extensive range of software-driven systems in cars, from map updates to bug fixes to security updates and more.

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IV. FIGURES

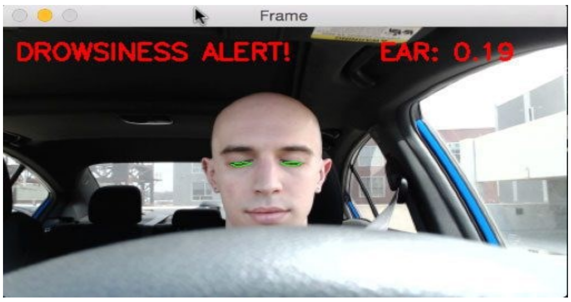

Figure 1 Drowsiness Alert

Figure 2. Adaptive Cruise Control

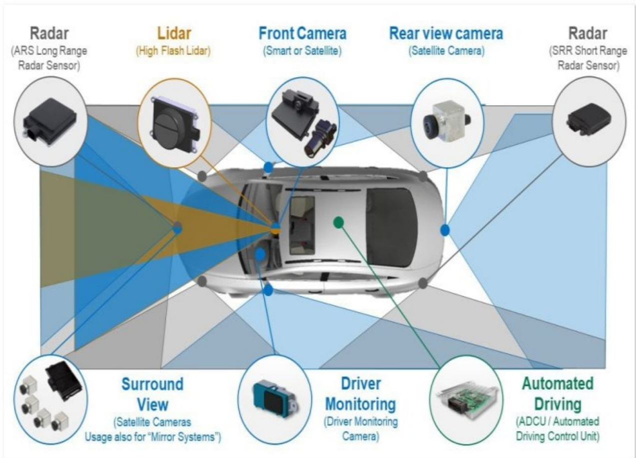

Figure 3. Features of a Vehicle

V. MECHANISM

5.1 Speed Control and Obstacle Detection

One of the major causes of road accident in the world is driving too fast, recent studies shows that one third of the serious road accidents are due to inappropriate speed, as well as change in road way (like presence of road work or unexpected obstacles).So in order to avoid such kind of accidents and to alert the drivers and to control their vehicle speed in such kind of places the highway department have placed the signboards. But sometimes it may not possible to view that kind of signboards and there is a chance for accident. So there is an utmost need to design a system which can control the speed of vehicles mainly when any obstacles come in front of the vehicle. Here we are

designing a speed control and obstacle detection system for vehicles which can intimate the driver about the obstacle ahead and limit the speed of vehicle automatically even if the diver fails to apply the brake

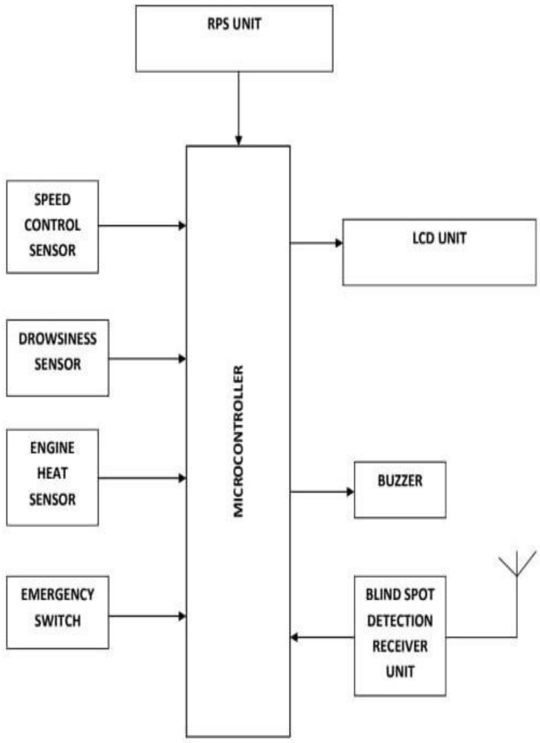

Figure 4. Block Diagram

In presence of human IR radiations, the sensor detects the radiations and converts it directly to electrical pulses, which is fed to the inverter circuit. The inverter circuit consists of a transistor, which gets into saturation with application of high base current and eventually develops a low collector voltage thus the transistor output is low. This low inverter output is connected to the microcontroller Based on the input received by the microcontroller; it controls the motor driver, which in turn controls the motion of the motor.

5.2 Motion Detection using PIR Sensor:

A PIR or a Passive Infrared Sensor can be used to detect presence of human beings in its proximity. The output can be used to control the motion of door. Basically, motion detection use light sensors to detect either the presence of infrared light emitted from a warm object or absence of infrared light when an object interrupts a beam emitted by another part of the device.

A PIR sensor detects the infrared light radiated by a warm object. It consists of pyro electric sensors which introduce changes in their temperature (due to incident infrared radiation) into electric signal. When infrared light strikes a crystal, it generates an electrical charge. Thus a PIR sensor can be used to detect presence within a detection area of approximately 10mtrs.

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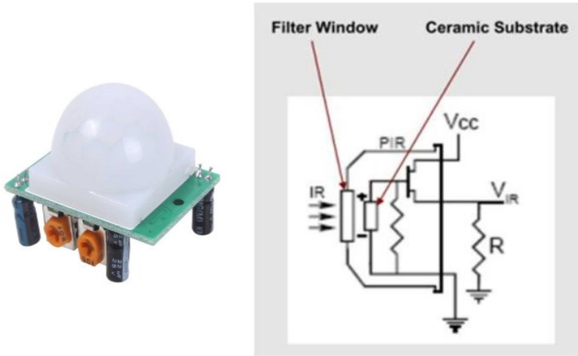

Figure 5. PIR SENSOR

5.3 Engine Heat Sensor

Figure 6. Engine Heat sensor

The Engine Temperature Sensor measures the engine temperature. Thereby, it gives an indication of the temperature of the engine whenever there is a high rise in the engine temperature.

A THERMISTOR is a resistance thermometer, or a resistor whose resistance is dependent on temperature. The term is a combination of "thermal" and "resistor". It is made of metallic oxides, pressed into a bead, disk, or cylindrical shape and then encapsulated with an impermeable material such as epoxy or glass.

Thermistors are available with either a negative temperature coefficient, (NTC) of resistance or a positive temperature coefficient (PTC) of resistance. The difference being that NTC thermistors reduce their resistance as the temperature increases, while PTC thermistors increase their resistance as the temperature increases.

The engine heat sensor circuit working is simple here we used a 10k Thermistor to detect the fire and LM358 Operational amplifier in comparator mode. What the thermistor does is when the temperature of the room OR area increases it increases the resistance and as we look at the circuit diagram it is connected as a voltage divider to non-inverting input so its value is more than the inverting input hence the output of comparator becomes high and it activates the alarming sound.

5.4 Drowsiness Detection System

Figure 7 .Googles

Driver Drowsiness Detection Driver drowsiness detection is one of the car safety technologies which helps to prevent accidents caused by the driver getting drowsy. Various studies have also suggested that around 20% of the road accidents happening are fatigue-related, up to 50% on certain amount of roads. Some of the current systems learn driver patterns and can detect when a driver is becoming drowsy. Technology: Various technologies may be used to try to detect driver drowsiness.

a) Steering pattern monitoring primarily uses the steering input from electric power steering system.

b) Vehicle position in lane monitoring uses the lane monitoring camera.

c) Driver eye/face monitoring requires one of the cameras watching the driver's face.

d) Physiological measurement requires body sensors for measurement of parameters like brain activity, heart rate, skin conductance, muscle activity.

5.5 IR Sensor Module Circuit

The IR sensor circuit diagram explains the links. The photodiode is connected to the variable resistor by all LM358 (PIN 2) inverting ends to change the sensor's sensitivity. And the photodiode and resistor linkage is joined to the non-inverting end (PIN 3).

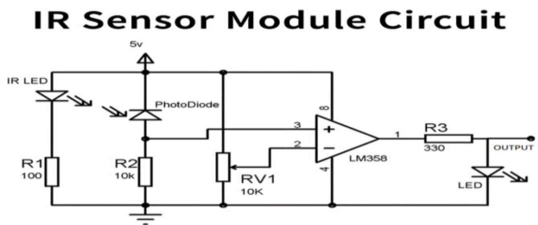

Figure 8 Passive Infrared sensor

There is no IR radiation to photodiode when we switch ON the circuit, and the comparator output is LOW. If we take an item (not a black object) in front of an IR set, the IR emitted by an IR LED reflects the thing and ejects it. The voltage drops across the photodiode, and the voltage across the resistance R2, now increases as reflected IR Falls on Photodiode. When the voltage at R2 (connected to the comparator's non-inverting end) is greater than the voltage at the inverted end, the result is important.

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The Proposed system is intended to overcome the draw backs of existing system. In the proposed system we are using a spectacle from of IOT based component. This system alerts the driver from being drowsy or fatigue.

The hardware component used for the Proposed system is mentioned below:

1. IR Sensor
2. Arduino Nano
3. Battery
4. Buzzer
5. Glass

We use a Nano Arduino which is connected to the optical glass and buzzer chip which is connected to the battery is fixed on the other side. The Ground wire which is connected from Buzzer to Arduino of the D2 Pin. From the eye Blink Sensor, the wire is connected to the A2 Pin. After giving the connection the code is generated in the system when we blink the sensor detects from Transmitter-receiver. Such that the sensor drowsiness can be detected.
This detection method is very applicable to any kind of vehicles. It can be used for commercial vehicles. This system is very efficient for heavy vehicles, since the drivers have long driving periods. This system is very efficient for heavy vehicles. Since the drivers face the issue of long driving periods. This system helps to avoid vehicle crashes related to drowsiness.

5.5 Danger Zone Detection System
A Danger zone accident detection device for protection against automobile collisions, obstacles, and accident that leads to great loss of human lives. The area most commonly referred to as blind spots are the rear quarter blind spots, areas towards the rear of the vehicle on both sides. Vehicles in the adjacent lanes of the road may fall into these blind spots area, and a driver is not able to see them using only the car's mirrors. It gives an alert to the driver whenever the vehicle enters the danger zones / curves or even the accident zones.
Other areas that are sometimes called blind spots area are those that are too low to see behind and in front of a vehicle. In cases where side vision is hindered, left or right area can become blind spots.
The overall objective of DSDS is to develop a comprehensive framework, to analyze and detect the zones (entity) with high positive expected impact. In the first stage of danger spot accident prevention system, radio waves were transmitted and received at receiver-end of the sensors when an entity is detected. In the second stage, the radio waves that were received at receiver's end activate the circuit. The output from the device can be presented in the form of glowing LED`s and audible alarms.

Figure 9 Danger Zone Name plate

5.6 Emergency Help Switch
Panic buttons are a class of devices used to alert people in a potential emergency that is dangerous to the life or property. A panic button is placed at a suitably accessible place. The panic button is connected to the main monitoring device through an alarm or siren or bell to bring the attention of others about the situation, sometimes sending the user's whereabouts to family or friends. The panic button in a car is one that does a similar function. The panic button in your car can be located on the dashboard close to the driver. Or, areas close to the doors, or near the seats or any other convenient location. This is to make it easy for people in the car to access and use it in an emergency. If you have a panic button in your car, it helps you protect your family and friends in your car against untoward incidents. The use of the panic button in a car is absolutely easy you need just to trigger it when you sense an emergency.
No sooner did you trigger it, an alert would trigger to take immediate steps – calling an ambulance service calling the family and friends for help

Figure 10 Emergency Help switch

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VI. CIRCUIT DIAGRAM

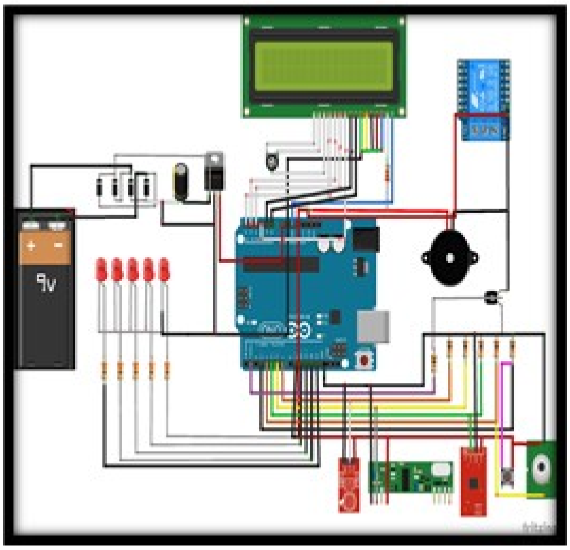

Figure 11 Circuit Diagram

VII. RESULTS

7.1 Results are shown for Drowsiness Detection system using IR sensor. Here IR based eye sensor is used to detect the eye blink of the driver

Figure12. Drowsiness Detection Message Display

7.2 Blind spot detection to analyse and detect the blind spot (entity) with high positive expected impact.

Figure 13. Blind Spot Detection Message Display

7.3 Results are shown for speed control to analyse and detect the obstacles (entity) with high positive expected impact, when obstacle comes the radar will detect and sends the information to the controller, then there will be a relay that slows down the vehicles speed by half of its original speed

Figure 14 Obstacle Detection Message Display

7.4 Results are shown for emergency switch alerts people in a potential emergency

Figure15. Emergency Help Message Display

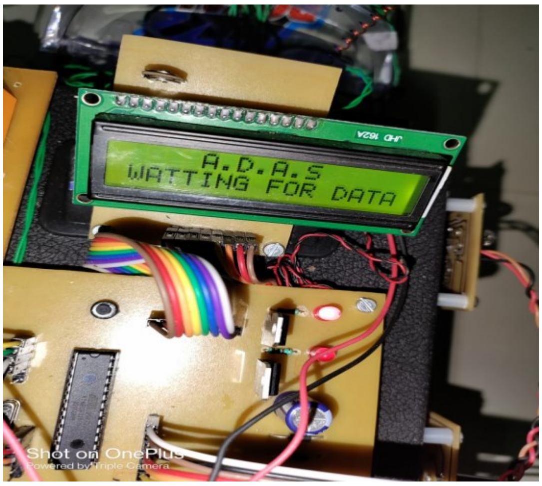

Figure16. ADAS waiting for the data

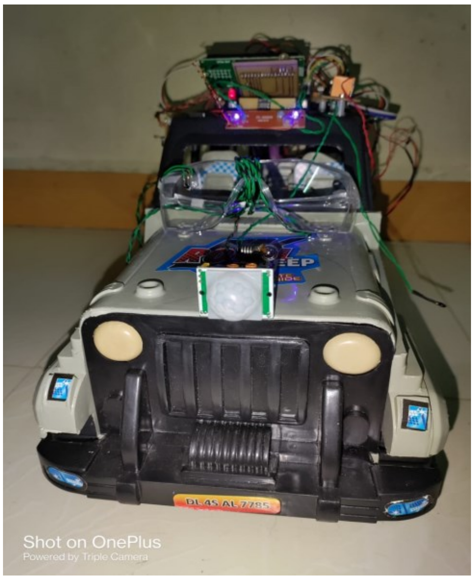

Figure 17. A Model of ADAS System

VIII. CONCLUSION

ADAS systems have tremendous potential to increase the safety, comfort, and effectiveness of our vehicles and transportation systems. By various means ADAS is seen as a stepping stone to fully autonomous vehicles.

As we have seen, more systems and more advanced systems, increase weight, seize, and complexity both on a systems level as well as on the overall vehicle architecture level.

ADAS systems have the embryonic to improve road safety across the globe. Today, ADAS is nearly conventional. Starting from the high-end models to the compact economy cars, they offer a wide array of facilities focusing on driver safety. With all the enhanced features and pleasure content that are available in a vehicle, the driver must still focus on driving. Sensor technology can help to keep a check on whether the driver is distracted or focused and sends the signal to the driver.

IX. FUTURE SCOPE

By 2025, Advanced driver-assistance systems (ADAS) will be a common characteristic of nearly every new vehicle retailed in the developed world. A study analyzed a total of 18 ADAS features that are either commercially available or assumed to be available by 2025. The global ADAS market size is projected to grow from usd 27.2 billion in 2021 to usd 74.9 billion by 2030, at a Compound Annual Growth Rate of 11.9%. Compliance with upcoming safety mandates and increasing demand for semi-autonomous driving systems will drive the market for ADAS.

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