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DESIGN AND IMPLEMENTATION OF DRIVER DROWSINESS DETECTION USING IOT

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Abstract: This model proposes a region-based automated vehicle system. We have developed a novel approach to automotive safety and security utilizing open CV software, which incorporates IOT and autonomous drowsiness detection. Drunk driving-related accidents have become a regular problem; therefore, a driver situation-based local environment recognition-based artificial intelligence system has been developed to address this issue. Because safety is of utmost importance when traveling, one must always be on guard.One of the main reason of accidents to occur is drowsiness or fatigue of the driver due to which both the driver and passengers are impacted and are prone is not responsible for providing any feedback to the system i.e., the buzzer alert to accidents, so here is a device which detects the drowsiness of the driver by detecting his eyes movement and warnings will be generate . Camera is fixed in a place where it can capture photos clearly. The real time images of eye are taken and matched, if the driver is not in the state of driving due to drowsiness at the first stage buzzer will be generate at next stage music will be generate which will be very irritating and helps the driver to wake up and if the driver will not able to react for these two stages next stage will be automatic break will be done slowly.

Keywords: Open CV,Robot Car,Drowsiness Detection,Operating system,Accidents

I. INTRODUCTION

The rise in car crashes brought on by fatigued drivers in recent years has highlighted the urgent need for creative safety solutions in the transportation industry. Our region-based automated vehicle system incorporates state-of-the-art technology to identify and manage driver drowsiness in order to tackle this urgent problem. Through the utilization of Open CV's real-time eye movement analysis capabilities and IOT connectivity to facilitate smooth communication, our solution guarantees timely identification and intervention in the event that a driver's awareness declines. Our method's key component is the placement of a camera next to the steering wheel, which records crisp pictures of the driver's face to aid in precise sleepiness identification. The device continuously tracks the driver's eye movements using advanced AI algorithms, which allows it to recognize exhaustion or drowsiness in the driver.

As soon as something is detected, the motorist is immediately alerted, first with a bothersome warning that uses buzzers. Audible alerts in the form of buzzer noises are triggered when the motorist ignores the initial warnings, forcing them to pay attention once more. But in the event that the driver doesn't respond to these attempts, the system will automatically start slowing down the car, putting safety first.

Most importantly, our technology is carefully engineered to function well in a variety of environmental settings, regardless of changes in the surrounding environment, the color or texture of the face, or both.This guarantees its dependability and effectiveness in protecting drivers and passengers from the potentially disastrous effects of driving while intoxicated. To put it briefly, our area-specific automated vehicle system is a ground-breaking development in automotive security and safety, providing a complete solution to reduce the risks related to fatigued driving. By placing a high priority on constant driver awareness, we hope to drastically lower the number of traffic accidents, saving lives and causing the least amount of property damage.

A person will feel sleepy while driving if they are sufficiently exhausted, which raises the risk of a traffic accident. One of the biggest challenges in the field of accident avoidance systems is the development of technology for identifying or preventing sleepiness while driving. Techniques to mitigate the effects of drowsiness on drivers must be developed because of the danger it poses on the road. The creation of a sleepiness detection system simulation is the goal of this project. The primary emphasis will be on developing a system that can precisely track whether the driver's eyes are open or closed. It is thought that by keeping an eye on the eyes, sleepiness signs in drivers can be identified early enough to prevent a collision.\

II.LITERATURE SURVEY

Rizul Sharma, Pratyush Agarwal et al [1]. [2019] This paper addresses the need in Computer Engineering for a Driver Drowsiness Detection system to mitigate accidents caused by driver fatigue. It proposes solutions and results for implementing various techniques to address this issue. Whereas the implementation of the project give the real world idea of how the system works and what changes can be done in order to improve the utility ofthe overall system.

Authors:Harshit Verma, Amit Kumar ,Shankar Gouri, Gouri Sankar Mishra et al [2].[2023] In this paper All around the world there are many road accidents every hour, some are due to drink and driving, lack of sleep, lack of attention on the wheel and many more reasons, which can be risky for the passenger as well as people on roads. The driver drowsiness detection system efficiently identifies drowsiness by monitoring the driver's eye blink rate and eyeball size through a camera, crucial for preventing accidents caused by lack of sleep and the program attached to it. Driver drowsiness detection system is based o n CNN-machine learning algorithm which is implemented completely offline and can alert with the help of alarm if the driver is feeling drowsy.

Anil Kumar Biswal, Debabrata Singh, Binod Kumar Pattanayak et al.[3] [2021] In this paper The aim of this study was to construct a smart alert technique for building intelligent vehicles that can automatically avoid drowsy driver impairment. The proposed paper presents a drowsy driver alert system utilizing Video Stream Processing (VSP) to analyze eye blinks via Eye Aspect Ratio (EAR) and Euclidean distance, supplemented by face landmark detection for precise eye tracking. Upon detecting fatigue, an IoT module issues a voice warning message including collision impact and location details for timely alerting.speaking through the RaspberryPi monitoring system.

F.Faraji, F.Lotfi, J.Khorramdel, A.Najafi, A.Ghaffari et al [5] .[2021] In this research YOLOv3 CNN is applied as a pretrained network, which is proved to be utilized as a powerful means for object detection. LSTM (Long-Short Term Memory) is used in the project. One of the main factors of the temporal behavior is that the driver becomes gradually diverted from the road and road traffic. Hence detection is not always accurate.

FHikmat Ullah KhanIn et al[6] .[2020] this paper The detection system includes the processes of face image extraction, yawning tendency, blink of eyes detection, eye area extraction etc. The percentage ofthe eyelid closure ofthe algorithms over the pupil over time is relatively very low.

Muhammad Faique Shakeel and Nabita Bajwa et al.[7] [2019]In this article, they propose a novel deep learning methodology based on Convolutional Neural Networks (CNN) to tackle the Project. In the trained model, we only use 250 low-light images.

Authors:Harshit Verma, Amit Kumar ,Shankar Gouri, Gouri Sankar Mishra ,Ujjwal Deep ,Pradeep Kumar Mishra, Parma Nand [8] 2023In this paper All around the world there are many road accidents every hour, some are due to habits like drinking, lack of sleep, not paying attention in drive.
A.Milan Hussain,Bhanu Sankar Ravi,Josaiah W. Lyngdoh) [9] Driver fatigue is one of the major causes of accidents in the world. if we make sure that driver is not slleping it may help in reducing accidents. In this project we aim to develop machine which detects drowsiness .

Badiuzaman Bin Baharu[10] Department of Electrical & Electronic Engineering University Technology PETRONAS in partial fulfilment of the requirement for the Bachelor of Engineering (Hons) (Electrical & Electronic Engineering This project describes on how eyes and mouth are moved and they are considered as the data by MIROS (Malaysian Institute of Road Safety).

III.EXISTING SYSTEM

The advancement of technology has revolutionized various aspects of our lives, including transportation safety measures. One critical area of concern in this regard is addressing driver drowsiness, which poses a significant risk on roads worldwide. Traditional methods for detecting and mitigating drowsiness have primarily relied on basic alert mechanisms activated by simple sensors. These alerts, typically in the form of auditory alarms or vibration alerts, were designed to notify the driver upon detecting signs of drowsiness. However, these conventional systems often fell short in terms of sophistication and adaptability, leading to limitations in their accuracy and responsiveness.

To overcome these limitations, researchers and engineers have delved into exploring more advanced approaches to drowsiness detection. A notable direction in this research has been the utilization of physiological signals, such as heart rate variability or eyelid movements, to infer the driver's state of alertness. By analyzing these physiological indicators, researchers aimed to develop more nuanced and accurate drowsiness detection systems. Some studies have further explored the integration of machine learning algorithms to analyze these signals and predict drowsiness levels with greater precision.

However, despite the potential promise of these physiological-based approaches, they often encountered challenges related to practical implementation. One significant hurdle was the requirement for specialized hardware or sensors to capture and monitor physiological signals effectively. This need for specialized equipment made these approaches less feasible for widespread adoption, particularly in commercial vehicles or everyday passenger cars.

Disadvantages:

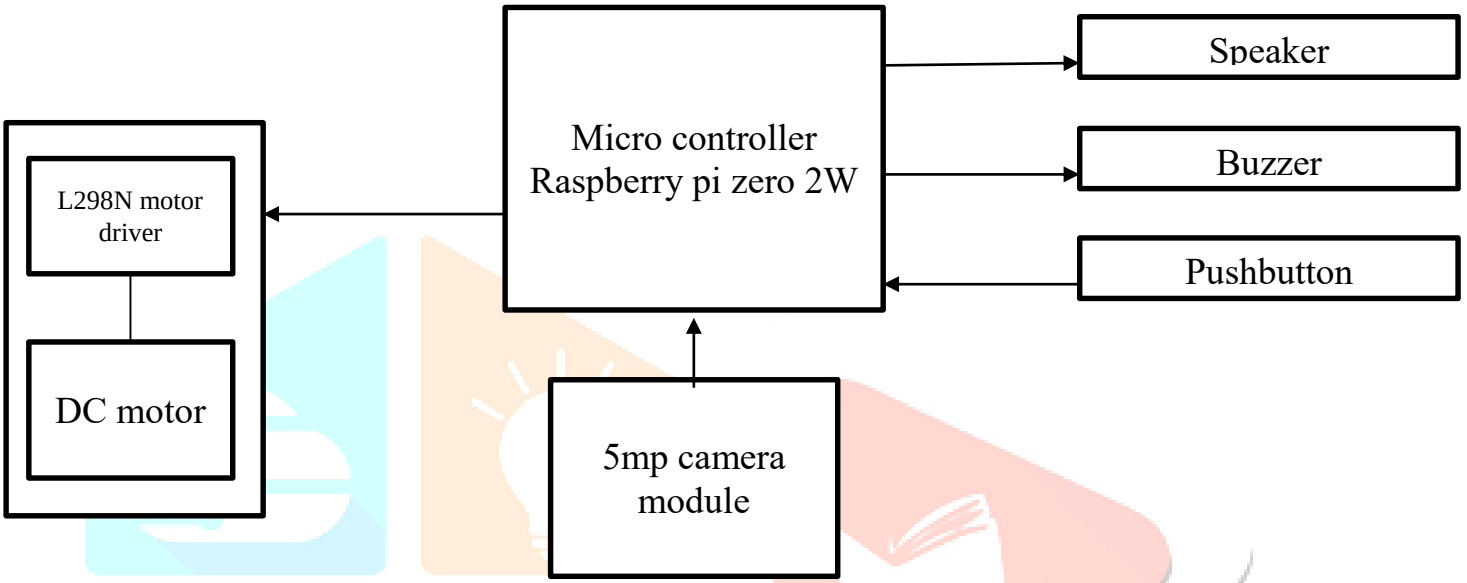
Complexity and Cost

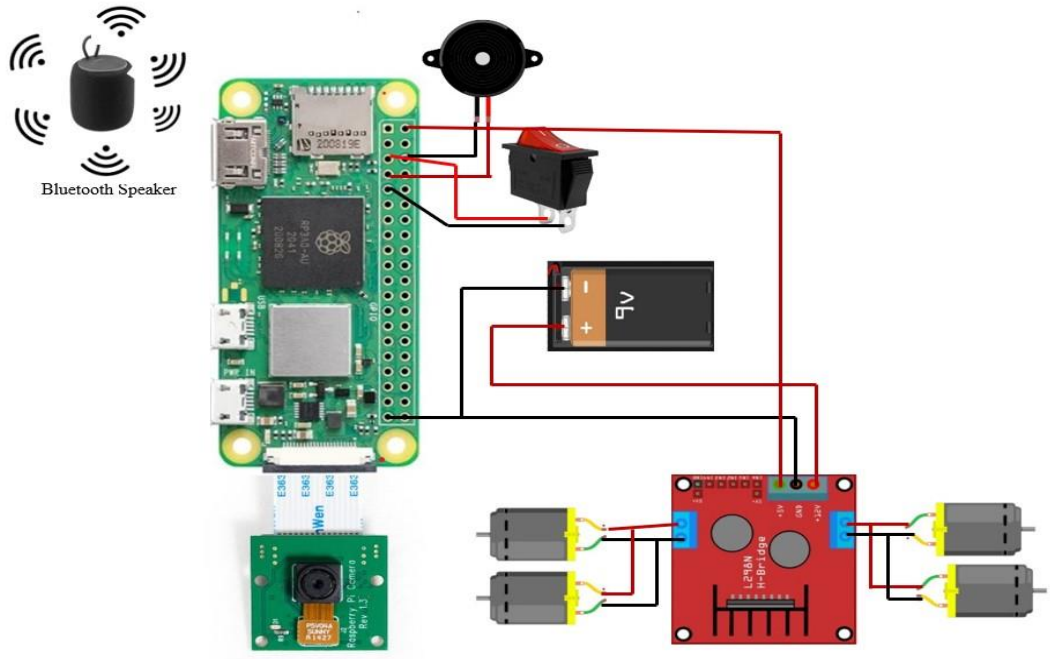
Maintenance and Calibration

IV.PROPOSED SYSTEM:

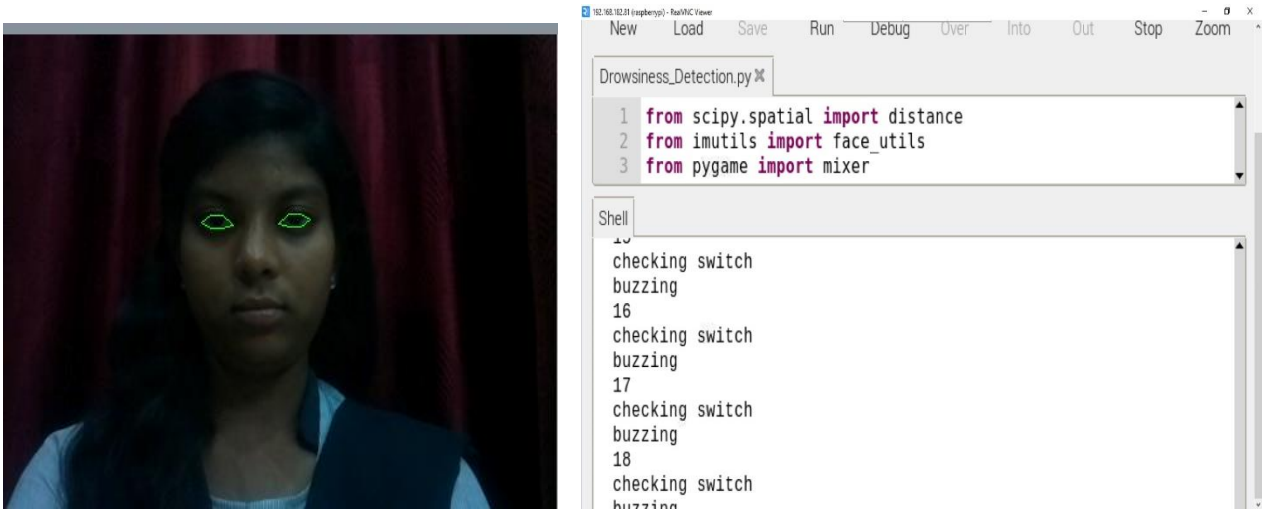
The proposed system for addressing driver drowsiness represents a transformative leap in automotive safety and security. By harnessing the power of Open CV software, meticulously designed to analyze real-time images of the driver's face, our system delivers unparalleled capabilities in autonomously detecting signs of drowsiness. Through precise monitoring of the driver's eye movements, even the subtlest indications of fatigue are swiftly identified. Upon detection, the system initiates a multi-layered approach to alert the driver, starting the first stage buzzer will be generated compelling the driver to regain alertness. However, should the driver remain unresponsive, the system dynamically escalates its response, activating audible alerts such as music sounds to further alert the driver. In instances where the driver fails to heed these warnings, the system autonomously intervenes to ensure safety, slowing down and halting the vehicle if necessary to alert potential accidents. Moreover, the system's In essence, our proposed system represents a comprehensive solution poised to revolutionize transportation safety, safeguarding the lives of drivers and passengers alike against the perils of drowsy driving.

V.BLOCK DIAGRAM AND CIRCUIT DIAGRAM

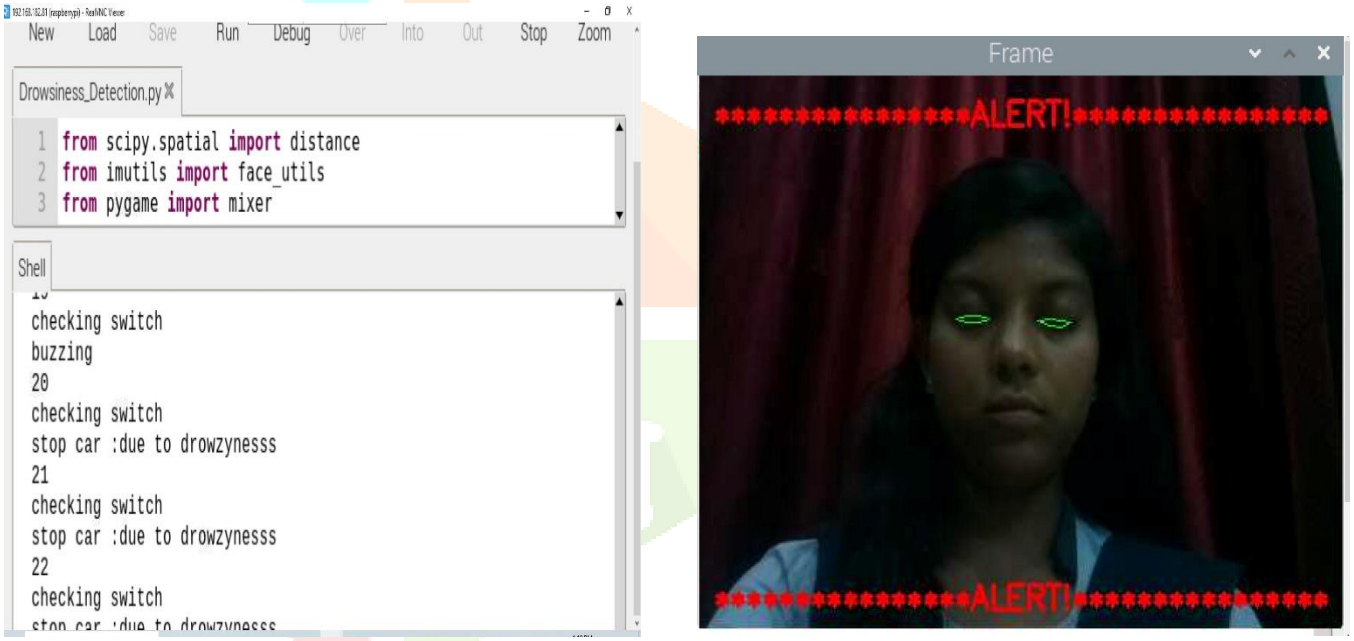




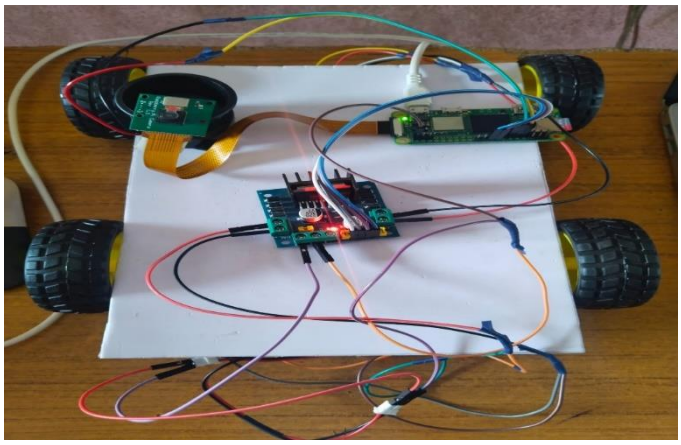
VI.RESULTS:



SLEEP DETECTION WITH RASPBERRY-PI ZERO CAMERA AND BUZZER RINGING



SLEEP DETECTION AND AUTOMATIC CAR BREAKDOWN



EXPERIMENTAL SETUP OF THE PROJECT

VII.FUTURE SCOPE:

Further integration with the vehicle's onboard systems can enhance the effectiveness of the drowsiness detection system. For example, linking the system with adaptive cruise control or lane-keeping assist systems can enable the vehicle to autonomously adjust its speed or steering to compensate for drowsy driving, providing an additional layer of safety. Incorporating additional sensors such as steering wheel sensors, heart rate monitors, or infrared cameras can provide a more comprehensive assessment of the driver's state and improve the accuracy of drowsiness detection. By combining data from multiple sensors, the system can better distinguish between genuine drowsiness and other factors that may affect driver behavior. Leveraging smart devices and wearables such as smartwatches or fitness trackers can extend the functionality of the drowsiness detection system beyond the vehicle. By syncing with these devices, the system can provide proactive alerts and recommendations to the driver even when they are not behind the wheel, helping to promote healthy sleep habits and prevent fatigue-related accidents.

VIII.CONCLUSION:

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