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Driver Drowsiness Detection System Using Esp 32 Cam

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ABSTRACT: Rapid advancements in automotive technology have raised concerns about providing comfort, safety, and safeguards for the driver and passenger, which is a crucial component of a motor vehicle since the industrial revolution and the huge improvements in industrial technology of today. A successful method that is applied both internationally and domestically is to boost efficiency while making vehicle safety the main priority. By concentrating on the safety components, there will be a decrease in road fatalities, which will result in a decrease in the number of accidents globally. This includes safety measures to prevent road fatalities and limit injuries in the event of a crash. Because of this, the design of motor vehicles now places a high focus on the comfort and safety of the driver and passengers.

Keywords: Driver Drowsiness, ESP-CAM, Driver safety, Detection, Recognition

I. INTRODUCTION

Driver fatigue and sleepiness are two of the most common causes of accidents. Every year, more individuals die as a consequence of these incidents throughout the world. The goal of this research is to minimise the amount of accidents caused by driver fatigue and sleepiness. As a result, traffic safety will increase. Accidents can be averted and drivers' lives saved by using driver drowsiness monitoring equipment as they are starting to nod off. CAM 32 is employed in this investigation to detect sleepy driving.

Transportation alternatives have progressed as a result of the continual growth and uniqueness of technology. Our reliance on it is rapidly increasing. It has had a big influence on our lives in a variety of ways.

There are several laws that every automobile driver must follow.

II. LITERATURE SURVEY

We take what we can from the results of numerous research articles and aim to improve the current system, leading to the creation of our suggested system We can develop a more effective fatigue detection system by using the driver drowsiness detection methods that are currently in use.. The many observations obtained from various papers that were useful for our literature review are listed below. The authors Bhargava Reddy, Sojung Yun, ChanwonSeo, and Junik Jang have created a system employing deep neural networks in their paper Real-time Driver Drowsiness Detection. It is extremely realistic since they built a high baseline model on a thin board[1].

Another existing technology continually analyses the driver's eyelid movements and automatically warns him by blasting an alarm with an arbitrary text anytime sleepiness is detected. The web software uses internet connectivity to send the report to the automobile owner automatically[2]. With success, the driver's alertness is measured by combining facial and ocular symptoms using a fuzzy logic controller. Experimental findings using fuzzy-logic simulation in Matlab[3] show that the given approach performs well in terms of robustness and dependability. After determining the temporal detection window and examining the steering behaviour under fatigue conditions, the steering wheel's angular velocity data series is selected as the detection feature. [4]

The first suggestion is to compile a dataset of sleepy facial expressions since they can be used to evaluate exhaustion and drowsiness. A second concept for improving detection is to blend visual, non-visual, and vehicular features into one. The final one is developing detection system without causing any interruptions to driver while driving that is simple to use, like a smartwatch for drowsiness detection[5]. The proposed system calculates the landmarks in the driver's face region and finds the driver's face in the image. Here the

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facial detection and recognition of drivers eyes mouth nose are all detected and recognised and the accurate result is given.

III. EXISTING SYSTEM

By using a non intrusive machine vision based concepts, drowsiness of the driver detected system is developed. Existing systems require a blink sensor ie, IR sensor which is installed in glass and wear by the driver. It points straight towards the eye of the driver and monitors the driver's eyes in order to identify the drowsiness.

For large vehicle such as heavy trucks and buses this arrangement is not pertinent. Bus and large trucks are used for long distance travelling. If we use a eye blink sensor mounted on using eye glass, the blocks the frontal view of driver so it is not practical. If the sensor is placed on the frame which is just about the window, or other possible ways then the sensor is unable to detain the anterior view of the face of the driver correctly. This results that there is no eye detection.

IV. PROPOSED SYSTEM

In this project, we build an ESP32 CAM Based Face & Eyes Recognition System.This method effortlessly captures the eyes and face through the input camera and uses Open CV codes that are uploaded into the ESP32 CAM this method wirelessly captures, recognises the users eyes and mouth. Here we have used the ESP32-CAM module, which is a small camera module with the ESP32-S chip. Besides the OV2640 camera and several GPIOs to connect peripherals, it also features a microSD card slot that can be useful to store images taken with the camera.

The major advantages of this method is, most of our algorithms that involve any processing on images are very heavy to implement on microcontrollers and require more processing, thus making the whole system slow. Instead, we can implement the difficult and high processing tasks on our computer such as Image processing or Artificial Neural network, etc. For the live stream of video to be visible on our computer we write a Python script that will enable us to retrieve the frames of the video. This technology can be placed in the drivers cockpit region as it is compact. Face recognition using computer vision is a powerful tool that can be used and applied in various systems to improve safety. Our prime aim is to reduce the risks of fatal disasters caused due to drivers drowsiness. This system solves the drawback of existing system which had issues such as blocking the view of the driver. Using an eye blink sensor mounted on using eye glass, this blocks the frontal view of driver so it is not practical. The sensor is unable to detain the anterior view of the face of the driver correctly. This results that there is no eye detection.

V. HARDWARE REQUIREMENTS

Here we used [1]ESP 32 CAM which captures the users face region, this hardware is powered by[2] 5v 2a adapter.[3]TheTTL Converter is used for connecting the cam module to be able to programme.

ESP 32 CAM- The board is powered by an ESP32-S SoC from Espressif, a powerful, programmable MCU with out-of-the-box WIFI and Bluetooth.

It's the cheapest (around $7) ESP32 dev board that offers an onboard camera module, MicroSD card support, and 4MB PSRAM at the same time.

The ESP 32 cam module has a Builtin Flash of- 32Mbit andRAM of 512KB internal + 4M PSRAM external. The available WiFi protocol is - IEEE 802.11 b/g/n/e/I With the Bluetooth specification of Bluetooth 4.2 BR/EDR and BLE. The WIFI with security of - WPA/WPA2/WPA2-Enterprise/WPS. The outputs are provide in the formats of JPEG (OV2640 support only), BMP, GRAYSCALE. The ESP 32 cam also supports external storage apart from live transmissions using TF card: up to 4G. The module consumes power supply of 5 voltage and 2 amp.

VI. SOFTWARE REQUIREMENTS

OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. OpenCV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products.

OpenCV-Python is a library of Python bindings designed to solve computer vision problems. Python is a general purpose programming language. It is simple and code readability. It enables the programmer to express ideas in fewer lines of code without reducing readability.

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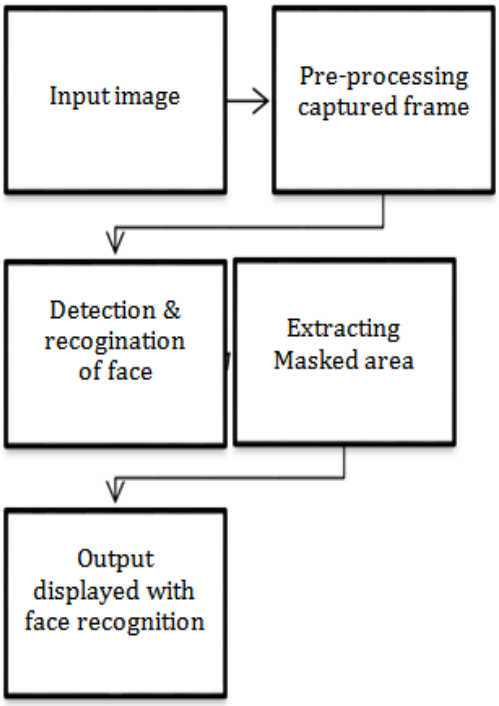
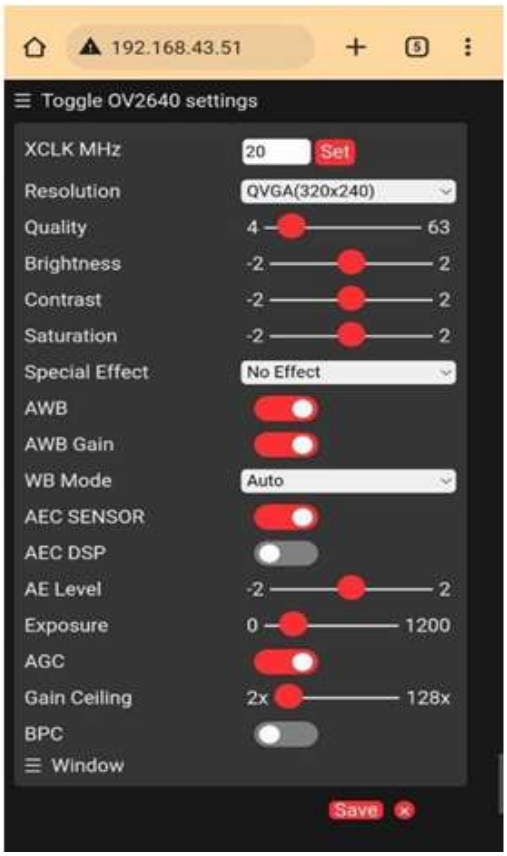
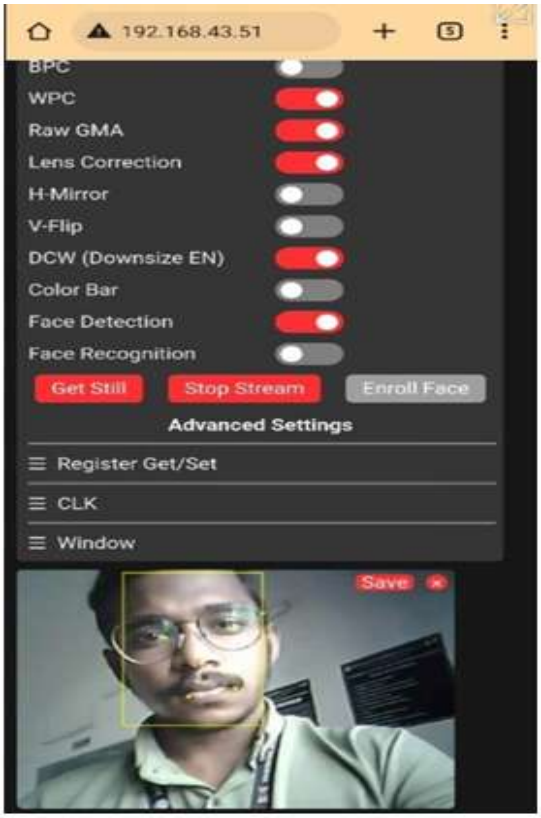
VII. WORKING



VIII. RESULTS





IX. CONLUSION

The driver drowsiness detection system's study and design are provided. The suggested approach is employed for driver security as well as to prevent numerous traffic mishaps brought on by fatigued driving. This project involves using eye blink timing to prevent accidents that render people unconscious. If the driver loses consciousness while the one eye blink counting is in place, the driver's drowsiness is identified to avoid an accident from occurring. The next big thing for the vehicle industry is going to be a thorough study of road safety. The sleepiness detection is used to quickly identify drowsiness. This technology stops the driver from becoming drowsy while operating a vehicle.If the driver's eyes are closed for a certain amount of time—which can be altered in the code—a buzzer warns them. The goal of this initiative is to protect drivers from fatigue-related accidents. It is applicable to all types of automobiles.

It was created a non-invasive method to locate the eyes and track weariness. A self-developed image processing technique is used to collect information on the position of the eyes. The monitoring system has the ability to determine if the eyes are open or closed. A warning signal is given when the eyes are closed for an extended

period of time. Additionally, the technology has the ability to instantly identify any eye localising mistakes that might have happened during monitoring.

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