DESIGN AND IMPLEMENTATION OF A REAL-TIME DRIVER FATIGUE AND MOBILE USE DETECTION SYSTEM USING RNN ALGORITHM

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ABSTRACT

Nowadays, accidents such as driver fatigue, serious vehicle accidents are more frequent during travel, and the number of patients is increasing day by day. It is known that there are many situations caused by driver fatigue and sometimes thoughtlessness, and this method largely focuses only on determining the driver's fatigue status, that is, the driver's actual driving condition. Tired drivers are looking for systems designed to reduce these conditions. The project introduces technology that will detect drunk drivers, detect phone usage, whether the driver is drunk or not. It provides fast driving and calling using an RNN algorithm that takes into account different drivers. The RNN classifier is designed to detect facial regions and detect cells, eliminating the problem of false positives caused by manual extraction. Use the RNN algorithm to find the driver's previous expression and the logo of the mobile phone in the image. The RNN algorithm will be used to control fatigue, the py synthesizer will give a voice warning, and the state of the cabin will be put into slow mode using PWM (Pulse Width Modulation), reducing the changes. Since the driver fatigue state occurs gradually, the preparation of the study to evaluate the driver's fatigue and the difference between fatigue and mobile phone use, including mobile phone use, is introduced. It is also possible to slow down the car without losing too much weight with the help of load cells. The MQ2 sensor will detect whether the driver is drunk or not, and the vehicle will not start. By comparing the experiments, we demonstrate the superiority of the algorithm in finding the correct and fast route according to the driver's current fatigue. In this project, we will develop an RNN algorithm with hardware models for fast driving, mobile phone detection, overloading and alcohol ban.

I. INTRODUCTION

The number of car accidents, especially during travel, continues to increase, and situations that require attention such as driving fatigue, overloading, reckless driving, etc. are becoming more common. These problems lead to serious accidents due to the driver being tired and not wanting to take the necessary responsibility. The project plan reduces these risks by developing advanced drivers that can detect and respond to multiple vulnerabilities in real time: mobile phone use, excessive driving, and alcohol consumption. The system also includes a pulse width modulation (PWM) sensor that reduces the risk of collision by controlling the speed and deceleration of the vehicle when it detects fatigue or mobile phone use.

II. OBJECTIVE

Save the life of someone who died because of a careless driver. Check for fatigue, talking on the phone while driving, yawning, trucking, etc. and check the speed of the car. and store its behavior over time in an Excel spreadsheet.

III.LITERATURE SURVEY

According to research, more than 50% of car accidents each year are caused by driver fatigue. Using technology to detect drowsy drivers is an interesting feature that can help prevent accidents. Previous literature includes several studies on driver fatigue. He only saw Zhuzi's face. However, according to the program, if closed eyes are seen for two consecutive seconds, the number in the frame value means that the driver is asleep and the alarm is high [3]. However, if the eyes are not closed, blinks are reported. Zhang Hehua uses facial fatigue reconstruction based on local binary model (LBP) features and support vector machine (SVM) to estimate driver fatigue, but the complexity of this method is higher than our algorithm. [4] The system attempts to wake up by blinking and opening the mouth, but poor lighting affects accuracy. (On, half-on or off).

IV.EXISTING & PROPOSED SYSTEM

1.EXISTING SYSTEM

The current work does not provide an end-to-end IoT-based solution for detecting and assessing driver fatigue (thanks to the drivers) to improve safety. Detect a negligent driver by detecting a drowsy driver. Less time management and maintenance in the end**.**

1.1 DISADVANTAGES

It may work poorly due to poor quality. After the test is done, nothing can be done to prevent a major disaster**.**

2.PROPOSED SYSTEM

We propose a computer vision method to evaluate driver fatigue and mobile phone usage through a camera system focused on the windshield of the vehicle. ¤68 - Face details Predefined face details can help to accurately estimate the image of various aspects of the face, such as eyebrows, eyes, mouth, etc. The algorithm automatically extracts the eyes and checks whether the eyes are tired according to the visual status. Control the car speed according to yawning and sleep detection. The car is slowing down. · The MQ2 sensor will check if the driver has consumed alcohol, if the driver has consumed alcohol, the car will not start. will reduce.

2.1 ADVANTAGES

Automatic operation can be effectively controlled and injuries can be prevented as speed control is provided without the need for manual intervention.

V.BLOCK DIAGRAM

1.Software Block diagram

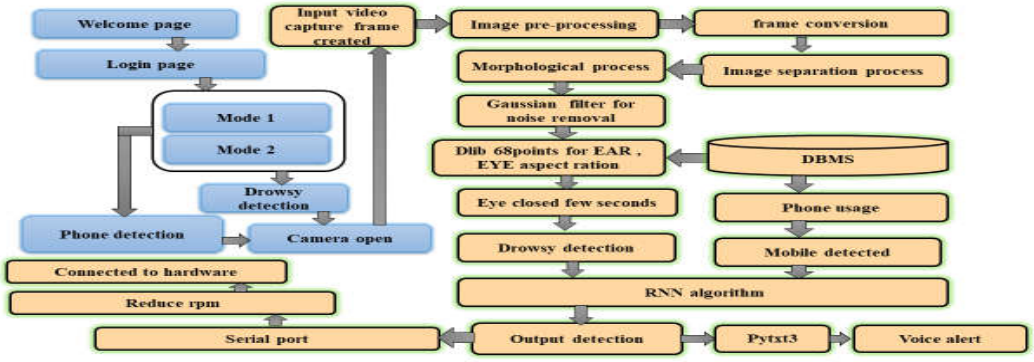

Fig No:1. Software Block Diagram

2.Hardware Block Diagram

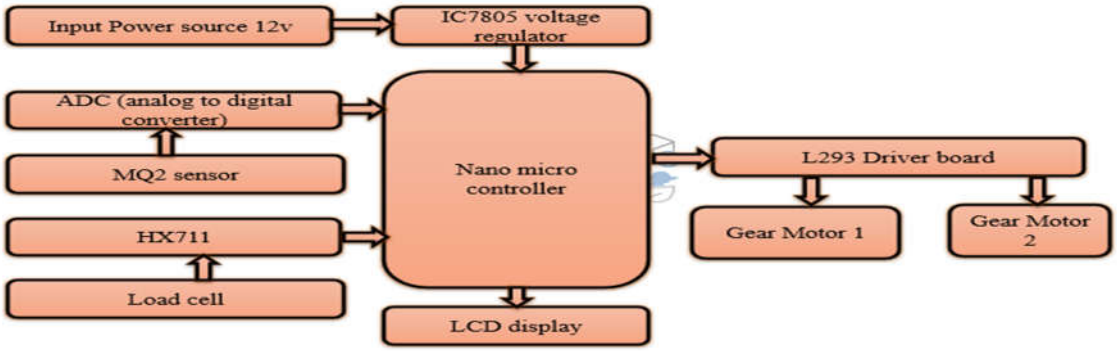

Fig No:2. Hardware Block Diagram

VI.SOFTWARE REQUIREMENTS

1.Recurrent Neural Network(RNN)

Recurrent Neural Network (RNN) is a neural network in which the output of the previous step becomes the input of the current step. In a normal neural network, all inputs and outputs are independent of each other but when you need to predict the next word of a sentence you need the previous word, yes, so you need to remember the previous word. It solves this problem with the help of hidden methods. The most important and significant part of RNN is the hidden state which remembers some information about the system. A neural network is similar to a network where the connections between the nodes form a picture that may or may not be visible over time. RNNs are derived from feedforward neural networks that use their internal state (memory) to perform transformations. This algorithm is based on the computation of gradient vectors and is called the backpropagation algorithm over time, or BPTT for short. Since the gradient is small, it cannot be adjusted, which means that there is no real learning.

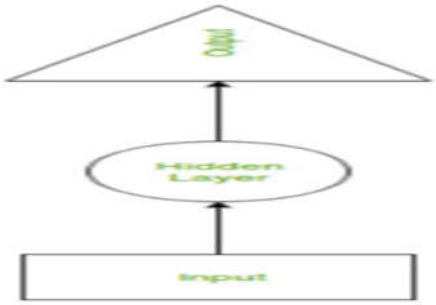

Fig No .3 Recurrent Neural Network Algorithm (RNN)

2.DLIB 68 POINTS FACIAL LANDMARK DETECTOR

This function uses the face preset from the dlib function library to estimate the 68(x,y) value of the face. The part of the iBUG 300-W dataset where dlib face landmark estimation is studied. Point mode. Friends are calculated based on the number of times the driver blinks during sleep. The standard eye aspect ratio (EAR) introduced in the previous work can be used to measure blur. For example, a blinking driver usually indicates that the driver is sleepy. Therefore, the blinking frequency needs to be found accurately. EAR is used to estimate the position of the eye opening relative to the face. Identify the characters that appear in each movie. The eye aspect ratio can be described by the following equation. Position. p2, p3, p5 and p6 are used to measure the height while p1 and p4 are used to measure the eye width in meters (m) as shown in figure (a) below. EAR = x > 0; eye open EAR=0; eye closed The above equation shows that EAR gives more results with eyes open and eyes closed. With eyes

closed, EAR is approximately 0; with eyes open, EAR can be greater than x 0. EAR is calculated as the sum of all consecutive videos, and the EAR threshold is set in the rule. As can be seen from this test, it is not possible to get a zero EAR value when your eyes are closed. However, according to the EAR formula, if the EAR value is low, it can be considered driving with eyes closed. Therefore, when blinking or eye closing symptoms occur, the average EAR value decreases from 0.339 to 0.141. price. . The time is 0.039 seconds.

(a) (b)

Fig.no.4: **(a) Open and (b) Close eye with landmarks**

3.GAUSSIAN FILTER

In electronics and signal processing, a Gaussian filter is a filter whose impulse response is a Gaussian function (or an approximation thereof, since a true Gaussian response would have a parameterized response). ... is considered the best time-domain filter, just as it is the best frequency-domain filter. The search results are based on an edge-detection algorithm. This method is often called Gaussian Laplace or logarithmic filtering. The best filter for this task is the Window Sinc filter. The Gaussian filter weights pixels with a bell-shaped curve around the pixel location. This means that more pixels have more weight. A Gaussian filter is a spatial filter that works by convolving the input image with a kernel. This technique weights the neighborhood of the current pixel, with distant pixels receiving more weight than the central pixel. The tool is based on the area of the modified object shown by copying and pasting, making the modified image more accurate. Such classic linear filters (like the Gaussian filter) can reduce noise but cause blurring. The program is quite limited. When the size and time of the standard deviation are selected, the deviation limit will be 1% or less from the mean. However, the median filter is a type of nonlinear filter. It removes noise while preserving the edges. In some cases, denoising autoencoders are better but require more time compared to Gaussian and Median filters. The Gaussian filter has better performance in the frequency range. The median filter is the most efficient of the low filter. Ideally it should block high frequencies and pass only low frequencies. In fact it passes more often and blocks less often. It replaces each element of the input signal with a weighted average of its neighbors. This causes a blurring in time/space, which is the same as attenuation of the frequency component across the frequency range.

Fig no 5. Gaussian filter in image

4.DROWSY DETECTION

Drowsy driving is a dangerous combination of driving while sleepy. It usually occurs when the driver is asleep, but it can also be caused by inadequate sleep or shift work. Prescription and over-the-counter medications can cause fatigue, and alcohol can interfere with sleep and sleepiness. Falling asleep while driving is dangerous, but falling asleep can affect your ability to drive safely, even if you are not drowsy. Drowsiness: makes you unable to listen. make decisions. The system will detect early signs of fatigue before the driver becomes completely depressed and will warn the driver that he/she can no longer drive safely. However, this device does not guarantee that the driver is completely asleep and has avoided an accident. It is only a tool to increase driver safety, usually targeting long-distance drivers, night drivers, solo long-distance drivers or people who are sleep deprived.

Fig no.6 drowsy detection in image

VII RESULT

The image above shows the output. Our technology successfully detected human sleepiness, which is crucial in determining driver fatigue. Eye Response Ratio (EAR) calculations have been completed, and these calculations form the backbone of the research process.

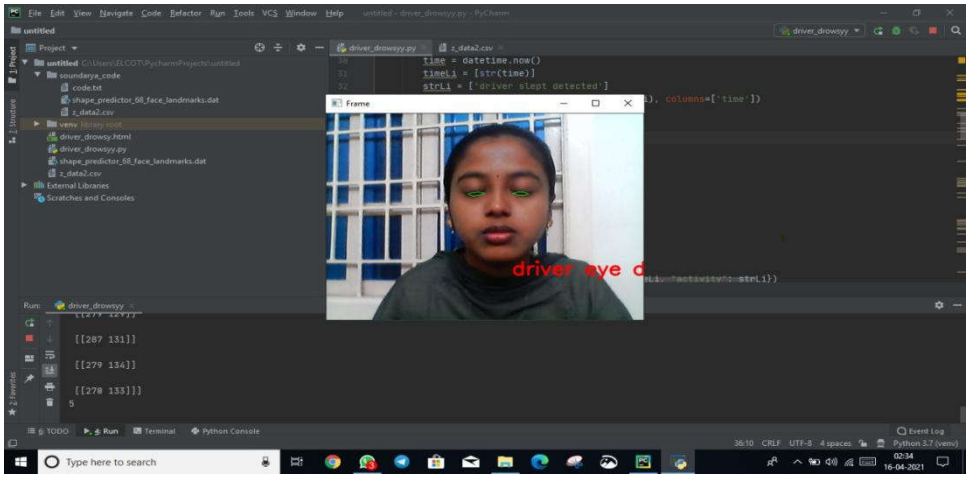

Fig No:7. Result

VIII CONCLUSION

Fatigue and mobile phone calling have become common practices because most cases occur because of this. Most accidents are caused by overloading the vehicle and drunk drivers. Traditional methods are not accurate because they cannot detect sleep and call quality based on nonlinear data obtained from face, steering wheel and line. Recently, recurrent neural networks have become popular. Fatigue awareness can be controlled by mobile phone calling, overloading the car and drinking plenty of water.

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