International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 5, May 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1105323 |

Survey on Road Accident Detection and Alert System

Priya Chate,Vedanti Bhosikar, Sandhyarani Madanepati.

UG Student, Department of Information Technology, Sinhgad Institute of Technology and Science, Narhe, Pune, India

Bharti Durgade

Professor, Department of Information Technology, Sinhgad Institute of Technology and Science, Narhe, Pune, India

ABSTRACT: Drowsiness is one of the underlying causes of driving accidents, which contribute to many road fatalities annually. The number of fatal and disabling road accidents are increasing day by day and is a real public health challenge. Many times, in the road accidents, human lives will be lost due to driver driwsiness. Drowsiness is one of the underlying causes of driving accidents, which contribute to many road fatalities annually. This paper focuses on designing IOT based accident detection. Now-a-days accidents happen frequently, due to poor emergency facilities there are loss of human lives. The proposed system provides a solution to this drawback. An accelerometer sensor monitors the acceleration of the vehicle. A threshold value is fixed. If there is any change in vehicle's tilt position, orientation and if it is acceleration value is above the threshold value. The report proposed the results and solutions on the limited implementation of the various techniques that are introduced in the project.

KEYWORDS: Drowsiness, eye detection, blink pattern

I.INTRODUCTION

The development of technology allows us to introduce more advanced solutions in standard of living. As Per the info provided by NHTSA each year about 100,000 crashes get reported involving drowsy driving. The exact figure would be far more. Facial expressions can offer deep insights into many physiological conditions of the body. There are innumerable number of algorithms and techniques available for face detection which is the fundamental commencement within the process. Drowsiness in humans is characterized by some very specific movements and facial expressions- e.g.- the eyes begin to shut. To encounter this worldwide problem, an answer is tracking eyes to detect drowsiness and classify a driver drowsy. For real time application of the model, the input video is acquired bymounting a camera on the dashboard of the car and capturing the driver's face. The Dlib model is trained to spot 68 facial landmarks, from which the drowsiness features are extracted, and the driver is alerted if drowsiness is detected.

II.BACKGROUND

In the twentieth century, the number of vehicles exponentially increases due to growth in the automobile industry. As the number of vehicles increases, the accident also increases. The reason of most of the road accidents are heterogeneous traffic and lack of traffic separation. According to World Health Organization (WHO), India is the leading country in the road accident deaths. In India, 13 million peoples were dead in road accident in the year of 2014-15. These statistics are reported accidental records but there are numbers of accident, which are unreported. Hence, the numbers of actual accident are more than the statistic of World Health Organization (WHO).

Drowsiness and drunk driver is one of the underlying causes of driving accidents, which contribute, to many road fatalities annually. Although numerous methods have been developed to detect the level of drowsiness, techniques based on image processing are quicker and more accurate in comparison with the other methods. We propose system to detect

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 5, May 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1105323 |

drowsiness using image processing, which will avoid accidents. We also detect accident and will send sms alert in case of accident.

Every day more than 500 people die every day due to road accidents .The main cause of accidents is drunk driver and drowsy driver .If we provide timely service to accidental vehicle we can save some lives. This system is IOT based accident detection and avoidance system which detects an accident using image processing and inform the location of accident via text SMS.

III.SYSTEM ARCHITECTURE

IV.METHODOLOGY

The suggested method for detecting tiredness in drivers operates on two levels. The procedure begins with the camera recording live video frames, which are then transferred to a local server. The Dlib library is utilised on the server to identify facial landmarks, and a threshold value is used to determine whether or not the driver is sleepy. The EAR (Eye Aspect Ratio) is then computed using these face landmarks and given to the driver. The EAR value obtained at the application's end is compared to a threshold value of 0.25 in our system. The driver is regarded to be sleepy if the EAR value is less than the threshold value. An alarm would then sound, alerting the driver and passengers.

A. Components For drowsiness detection

we have used OpenCV and Python.The Dlib library is used to detect and isolate the facial landmarks using Dlib pre-trained facial landmark detector. In this approach, 68 facial landmarks have been used.

B. Facial landmark marking

Dlib library is imported and used for the extraction of facial landmarks. Dlib uses a pre-trained face detector, that is an improvement of the histogram of oriented gradients . It consists of two shape predictor models trained on the i-Bug 300-W dataset, that each localize 68 and 5 landmark points respectively within a face image [4]. In this approach, 68 facial landmarks have been used. In this method, frequencies of gradient direction of an image in localized regions are used to form histograms. It is especially suitable for face detection; it can describe contour and edge features exceptionally in various objects. For recording the Facial Landmarks ,the Facial Landmark Predictor was used by the system to calculate lengths for the EAR values.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 5, May 2023 ||

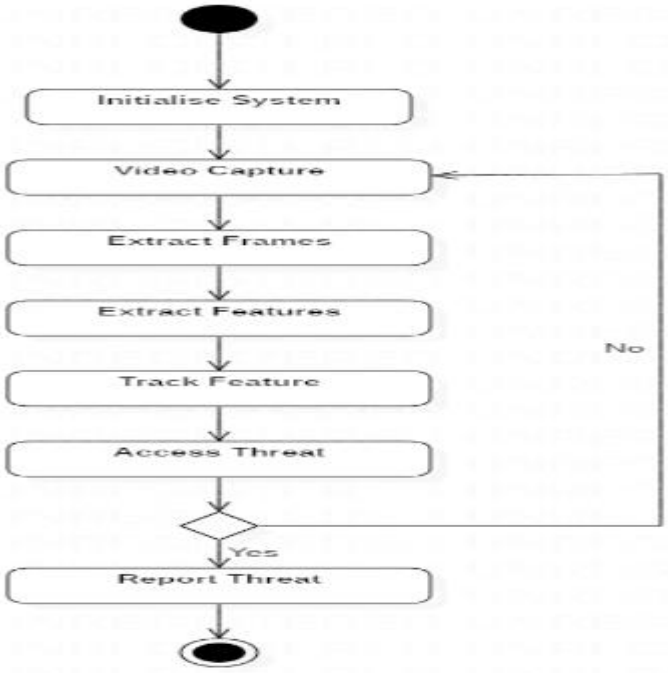
| DOI: 10.15680/IJIRCCE.2023.1105323 |

C. Algorithm

Here P1, P2, P3, P4, P5, P6 are the pupil coordinates EAR is generally a constant when eyes are open and is near about 0.25. When EAR is less than 0.25 It is concluded that Person is drowsy. Eye Aspect Ratio(EAR) is calculated for both the eyes, (|P2 − P6| + |P3 − P5|) 2(|P1 − P4|) −(1) The numerator determines the distance between the upper and lower eyelids using equation 1. The horizontal distance of the eye is represented by the denominator. EAR values are utilised to identify driver sleepiness in this framework. The average of the EAR values of the left and right eyes is obtained. The Eye Aspect Ratio is watched in our sleepiness detection system to see whether the value falls below the threshold value and does not climb over the threshold value in the following frame. The individual has closed their eyes and is sleepy, as indicated by the aforementioned circumstance. In contrast, if the EAR value rises again, it means that the person is simply blinking his eyes and is not drowsy. The block design of our suggested technique to identify driver sleepiness is shown in Figure 3(Block diagram).

D. Testing

At the point when the eyes are shut for more than certain measure of edges then we find that the driver is feeling tired. Henceforth these cases are distinguished is and a caution sounded



V. CONCLUSION

The library's pre-trained 68 facial landmark detector is employed in this Dlib technique. The face detector was constructed, which is based on the Histogram of Oriented Gradients (HOG).The quantitative metric used in the proposed algorithm was the Eye Aspect Ratio (EAR) to monitor the Driver Drowsiness. The average real-time test accuracies obtained using Dlib for Eye Detection Accuracy was found to be 80.17% and Drowsiness Accuracy as found to be 78.50%. The results of real-time detection are lower as the model currently works well under good lighting conditions.

REFERENCES

[1] L. Jin, M. Chen, Y. Jiang and H. Xia, "Multi-Traffic Scene Perception Based on Supervised Learning," in IEEE Access, vol. 6, pp. 4287-4296, 2018, doi: 10.1109/ACCESS.2018.2790407.
[2] U. Khalil, T. Javid and A. Nasir, "Automatic road accident detection techniques: A brief survey," 2017 International Symposium on Wireless Systems and Networks (ISWSN), 2017, pp. 1-6, doi: 10.1109/ISWSN.2017.8250025.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 5, May 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1105323 |

[3] A. J. Davison, I. D. Reid, N. D. Molton and O. Stasse, "MonoSLAM: Real-Time Single Camera SLAM," in IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 29, no. 6, pp. 1052-1067, June 2007, doi: 10.1109/TPAMI.2007.1049.

[4] S. Chandran, S. Chandrasekar and N. E. Elizabeth, "Konnect: An Internet of Things(IoT) based smart helmet for accident detection and notification," 2016 IEEE Annual India Conference (INDICON), 2016, pp. 1-4, doi: 10.1109/INDICON.2016.7839052.

[5] G. Marfia, M. Roccetti, A. Amoroso and G. Pau, "Safe Driving in LA: Report from the Greatest Intervehicular Accident Detection Test Ever," in IEEE Transactions on Vehicular Technology, vol. 62, no. 2, pp. 522-535, Feb. 2013, doi: 10.1109/TVT.2012.2226484.

[6] U. Alvi, M. A. K. Khattak, B. Shabir, A. W. Malik and S. R. Muhammad, "A Comprehensive Study on IoT Based Accident Detection Systems for Smart Vehicles," in IEEE Access, vol. 8, pp. 122480-122497, 2020, doi: 10.1109/ACCESS.2020.3006887.

[7] L. A. Ajao, B. O. Abisoye, I. Z. Jibril, U. M. Jonah and J. G. Kolo, "In-Vehicle Traffic Accident Detection and Alerting System Using Distance-Time Based Parameters and Radar Range Algorithm," 2020 IEEE PES/IAS PowerAfrica, 2020, pp. 1-5, doi: 10.1109/PowerAfrica49420.2020.9219812.

[8] M. S. Amin, M. A. S. Bhuiyan, M. Bin Ibne Reaz and S. S. Nasir, "GPS and Map matching based vehicle accident detection system," 2013 IEEE Student Conference on Research and Developement, 2013, pp. 520-523, doi: 10.1109/SCOReD.2013.7002645.

[9] T. -N. Le, S. Ono, A. Sugimoto and H. Kawasaki, "Attention R-CNN for Accident Detection," 2020 IEEE Intelligent Vehicles Symposium (IV), 2020, pp. 313-320, doi: 10.1109/IV47402.2020.9304730.

[10] Y. J. Heo, D. Kim, W. Lee, H. Kim, J. Park and W. K. Chung, "Collision Detection for Industrial Collaborative Robots: A Deep Learning Approach," in IEEE Robotics and Automation Letters, vol. 4, no. 2, pp. 740-746, April 2019, doi: 10.1109/LRA.2019.2893400.

[11] H. Kim, S. Park and J. Paik, "Pre-Activated 3D CNN and Feature Pyramid Network for Traffic Accident Detection," 2020 IEEE International Conference on Consumer Electronics (ICCE), 2020, pp. 1-3, doi: 10.1109/ICCE46568.2020.9043125.