

A Review on Driver Distraction Detection Techniques

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ABSTRACT: Driver distraction of drowsiness is one of the key reasons for a large number of fatalities that happen on the road every single day. These casualties can be mitigated to reduce the loss of life which has been identified as mostly young individuals that could be the future of the country dying on the streets. This is an undesirable outcome that can be effectively mitigated through the use of current technologies and approaches considerably. There have been a number of researchers that have been identified for the detection of drowsiness or distraction in a driver but most of them have been highly intrusive or have large time complexity is which cannot be tolerated in a time critical implementation. Therefore, related works on the topic of driver distraction detection has been analysed and outlined in this research paper for the effective generation of our approach for the same. Our methodology that utilizes image processing techniques convolutional neural network and decision tree will be elaborated further in the upcoming edition of this article.

KEYWORDS: Convolutional Neural Networks, Decision Tree.

I. INTRODUCTION

With the technological advancements that have been going on since the dawn of mankind on this planet there has been an increased number of inventions that have been significant in improving the quality of life of individuals. When the large number of individuals and human started migrating to different places there was a need for transporting goods and people across large distances efficiently. This led to various improvements in the transportation approach the most significant of which was the invention of the wheel. The wheel allowed various draught animals to pull the load behind them by the act of rolling rather than dragging which reduce the friction coefficient and allowed for a smoother movement with least amount of effort.

Earlier vehicles powered by animals and other organic beings for a large part of human presence on this planet. This was before humans identified fossil fuels and then utilize them effectively gain displacement which could be used to propel vehicles over distances and carry load.

This led to invention of large-scale vehicles and other equipment that could allow for efficient and safe transportation of goods and individuals over large distances. This also led to words a change in the paradigm which are allowed for effective and useful implementations that could allow larger speed to be sustained for transportation reducing the time taken to make the journey.

Nowadays we have extensive network of roads highways and other express ways that have been designed to facilitate efficient transport between two destinations. There are vehicles that can take a lot of load and transport over large distances and with high speeds to reach the destination faster and provide the goods sometimes perishable items within the time frame. But this has also resulted in a large number of fatalities on the road as the vehicles get into collision with large amount of loads and high speeds which leads to catastrophic situations. There is large scale destruction and loss of life in such a collision or an accident happens and they have been getting more frequent in the recent years.

Therefore there is a need to reduce these conditions and measure apps as it could reduce the amount of lives that are lost on the road significantly as most of them are young individuals in the casualties. Effective statistical analysis of the approaches have led to the fact that most of the accidents happen due to driver drowsiness or distraction. Once the driver is drowsy it cannot function at the same level and react to situations and respond in a quick manner. This leads to the driver committing an error which can be highly fatal for everyone involved in the accident. Therefore there is a need to identify drowsiness or distraction in a driver to effectively mitigate the effects of an accident.

There have been a large number of researchers that have been performed to detect driver distraction effectively but most of them are highly in true safe or have very low accuracy or a large time complexity which can be problematic in a life or death situation that is time driven. Therefore a collection of researchers have been analyzed in this survey paper to achieve our methodology for an effective driver distraction protection which will be elaborated in the future editions of this research.

This literature survey paper segregates the section 2 for the evaluation of the past work in the configuration of a literature survey, and finally, section 3 provides the conclusion and the future work.

II. RELATED WORK

GM. Z. Jafari Yazdi [1] explains that there is an increasing number of accidents on the road and most of them have been highly fatal in recent years. Most of these accidents are caused due to distracted or drowsy drivers that can lead to a high number of fatalities which can be the result of fatigue or lack of awareness by the driver. This is a highly problematic scenario that needs to be addressed to effectively reduce the number of deaths on the road significantly. To provide a solution for this problem the authors have proposed an effective approach that utilizes an active control module through the use of death information for yawn detection and drowsiness of the driver. C. Yu [2] elaborate on the various statistical data that has been compiled over the past few years for the purpose of assessing the number of road accidents and their causes. Most of these data points out that the majority of fatal accidents have been the result of driver drowsiness and distraction which can play a large role in increasing the number of fatalities on the roads. There is a requirement for an effective technique that can detect drowsiness or distraction and a driver and effectively alert them before any mishap. For this purpose authors, a proposed an effective approach that utilizes a convolutional neural network in a mobile application for the detection of drowsiness in a driver. H. Xu [3] expresses interest in the detection of obstacles and providing effective navigation through polarization skylight for drivers on the road to reduce fatalities and other distractions. These navigation techniques are highly useful and have been utilized by a number of animals and other insects for accurate and error-free navigation. The author's intent to get this navigation system for the navigation of diverse and also implement accurate obstacle detection to reduce the number of fatalities significantly. This is highly useful as notice by the simulation results were found by the authors achieving highly accurate obstacle detection. Y. Zhou [4] discusses the paradigm of detection of obstacles that can be a problem for the driver as it can get distracted with the obstacle and could lead to a catastrophic accident. A distracted driver can be a problem as it can lead to the driver not concentrating on the task at hand which will lead to a collision that can be fatal in nature. Therefore there is a need for an effective technique that can detect an obstacle and it won the driver beforehand so as to reduce the incidence of distraction which will lead to a fatal accident. The four authors proposed an autonomous scheme for the detection of obstacles on a run with which is based on vision. K. R. Dhakate [5] introduces the concept of distracted driving as it is one of the main reasons for accidents and crashes. Most of these accidents and crashes lead to a lot of death and loss of property which can be extremely debilitating for the victim. Therefore there is a requirement to eliminate distracted driving behavior which can lead to such scenarios which can be problematic for everyone involved. Therefore the authors in this approach proposed the utilization of a stacking and simple approach that utilizes convolutional neural networks and feature vectors for achieving effective detection of a distracted driver and a distracted drivers' posture. A. A. Assefa [6] narrates that in the recent studies that have been published a large number of individual's especially young people have been dying in road accidents. These accidents are preventable and can be effectively reduced to achieve the preservation of the life of these young individuals that can be useful to society and lead their life. To provide a solution to this problem the authors and proposed an effective technique that utilizes convolution neural networks along with a biomechanical driver distraction detection. The approach utilizes autoencoders along with facial localizers for the purpose of achieving the biomechanical driver distraction detection accurately. C. Huang [7] explains that the roads and routes are highly complex and the increasing traffic on the roads has been highly confusing for a lot of individuals which has led to a significant number of deaths on the road in recent years. 20 road fatalities count as a large number of individuals mostly youngsters that are victims of these accidents which are eroding the youth of our generation. It has been noticed that the extensive fatalities have had one common problem that is the distracted driver which has led to all of these problems and fatalities. Therefore to reduce the fatalities the authors have proposed the implementation of various approaches and algorithms such as exception inception resnet50 and a hybrid convolutional neural network algorithm for effective classification of driver distraction. B. Alshaqqaqi [8] elaborate that one of the main causes of road accidents is fatigue and drowsiness of the driver. The drowsiness driver can be highly problematic as it can be e the cause of fatal injuries and a large number of deaths that have been statistically proven. There is a lack of effective techniques that can be utilized for the purpose of detecting driver distraction with a high amount of accuracy. For this purpose, the authors have proposed an advanced driver assistance system that detects drowsiness in the driver through the utilization of image processing approaches and machine learning implementation. The authors have utilized eye-tracking and facial recognition for the purpose of

drowsiness identification of the drivers. M. Yauri-Machaca [9] expresses that if a driver has not registered properly and is drowsy this can lead to the driver being sleepy while operating heavy machinery such as a car. In this sleepiness, the driver can make fatal errors that can lead to road accidents which can be the cause of a large scale death and destruction. They have not been effective techniques that can be utilized to measure the drowsiness or the sleepiness of the driver and alerting the driver of the same. Such an implementation would significantly reduce the number of accidents and fatalities on the road which can make it safe for a large number of individuals. For this purpose, the author is a proposed utilization of driver drowsiness detection through facial image capturing and processing through the utilization of Matlab. A. Riztiane [10] discusses that there has been an increase in the number of deaths resulting from collisions on the road. Most of these collisions have been understood to have occurred due to the destruction of the drowsiness driver which is lead to a large number of casualties. The four daughters have proposed the limitation of image processing approaches to be implemented for drowsiness detection on an Android device using visual information of the driver's face. The author's utilized open-source implementation of open CV to achieve effective and accurate results. D. Artanto [11] introduces the concept of driver drowsiness detection as a major concern that has led to large-scale fatalities or casualties on the roads. There has been an increasing number of casualties on the road that has been directly linked to the distracted or drowsy driver. The Trojan introduces the focus of the driver which leads to a collision that can be fatal for the victims. Therefore to reduce these occurrences of others are proposed utilization of an affordable electroencephalography machine and implementation of facial recognition through eyelid closure, eye blinking, and eye movements to measure the drowsiness of the driver in a real-time implementation.

III. CONCLUSION AND FUTURE SCOPE

The methodology for effective detection of driver distraction has been elaborated in this survey article. Driver distraction is one of the key components of a lot of major accidents that happen on the streets and highways. This is due to the fact that a distracted driver can be highly dangerous as it cannot react to the changing conditions on the road in time. This can lead to a lot of mishaps and road accidents which have been evident statistically. Therefore there have been a number of researchers to reduce this occurrence but most of them have been highly intrusive or have large time complexities which is an acceptable in such an implementation. Therefore a number of related works have been analyzed in detail to achieve our methodology which performs unobtrusive driver distraction detection through image processing by the implementation of convolutional neural network and decision tree. This approach will be further expanded in the future editions of this research.

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