

## Enhance the Driver Drowsiness Detection System Using EDAMAS and Region Prop Techniques

Taranpreet Kaur, Sanjay Kumar Singh

### ABSTRACT

Safe driving is a major concern of societies all over the world. Thousands of people are killed or seriously injured due to drivers falling asleep at the wheels each year. Hence driver drowsiness is the major issue behind accidents. To solve this issue many techniques are used. In our paper, we are going to use the region prop with EDAMAS. In Driver drowsiness detection system region prop will helps to detect the size of eyes, whereas EDAMAS is use to detect the swelling of soft tissues.

**KEYWORDS:** Driver Drowsiness, Region prop, Accident, EDAMAS.

### I. INTRODUCTION:

Image Processing forms core research area within engineering and computer science disciplines too. Image processing basically includes the following three steps.

- Importing the image with optical scanner or by digital photography.
- Analyzing and manipulating the image which includes data compression and image enhancement and spotting patterns that are not to human eyes like satellite photographs.
- Output is the last stage in which result can be altered image or report that is based on image analysis.

#### Driver Drowsiness System:

Driver drowsiness system is used to detect the drowsiness. Drowsiness is the main reasons of accident. Safe driving is a major concern of societies all over the world. Thousands of people are killed or seriously injured due to drivers falling asleep at the wheels each year. It is essential to develop a real time safety system for drowsiness related road accident prevention. There are many methods for detecting the driver drowsiness. Driver fatigue is a significant factor in a large number of vehicle accidents.

It includes the measurements of physiological features like EEG, heart rate, pulse rate, eyelid movement, gaze, head movement and behaviors of the vehicle, lane deviations and steering movements. After long hours of driving or in absent of alert mental state, the eyelids of driver will become heavy due to fatigue. The attention of driver starts to lose focus and that creates risks for accidents. [1] These are typical reactions of fatigue, which is very dangerous. Recent statistics estimate that annually 1,200 deaths and 76,000 injuries can be attributed to fatigue related crashes.

These accidents can be controlled by development of technologies for detecting or preventing drowsiness. The drowsiness detection fatigue is involves sequence of images of a face. The analysis of face images is a popular research area with applications such as face recognition, virtual tools, and human identification security systems.

The requirements for an effective drowsy driver detection system are as follows:

- A non intrusive monitoring system that will not distract the driver.
- A real time monitoring system, to insure accuracy in detecting drowsiness.
- A system that will work in both daytime and nighttime conditions.

#### Techniques for Detecting Drowsy Drivers

The techniques for driver drowsiness can be classified into different categories. [2] As,

- Sensing of physiological characteristics
- Sensing of driver operation
- Sensing of vehicle response
- Monitoring the response of driver.

Now days, there are many road accidents occur. Driver drowsiness detection is a car safety technology which prevents accidents when the driver is getting drowsy. There are many reasons of the road accidents. The reasons of the road accidents are

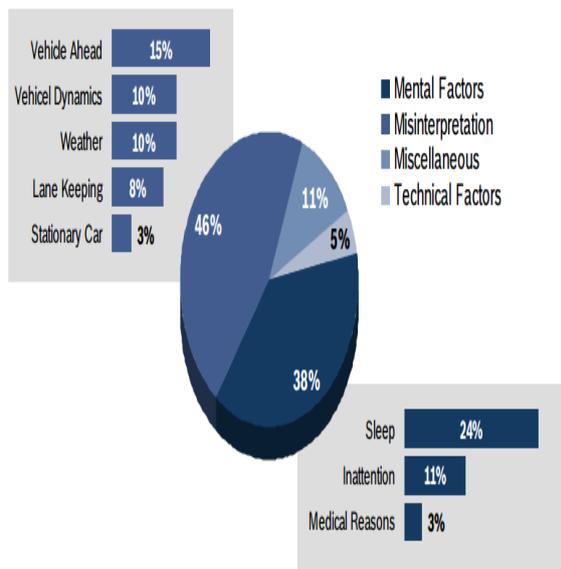


Figure 1: Reasons of drowsiness [3]

There are many functions that can use in the driver drowsiness.

- The driver drowsiness can be detect by analyzing the driving behavior
- Warns the driver if the risk is high of falling asleep

Sleepiness and driving is a dangerous combination. Most people are aware of the dangers of drinking and driving. The people don't realize that drowsy driving can be just as fatal, for example: alcohol, sleepiness slows reaction time, decreases awareness, impairs judgment and increases your risk of crashing. There are many underlying causes of sleepiness, fatigue and drowsy driving. It includes the sleep loss from the restriction, interruption or fragmented sleep; chronic sleep debt; circadian factors associated with driving patterns or work schedules; undiagnosed or untreated sleep disorders; time spent on a task; the use of sedating medications; and the consumption of alcohol when already tired. These factors have cumulative effects and a combination of any of these can greatly increase one's risk for a fatigue-related crash.

### Signs Of Drowsy Driving

There are many signs of the driver's drowsiness:

- Driver may be yawn frequently.
- Driver is unable to keep eyes open.
- Driver catches him nodding off and has trouble keeping head up.
- The thoughts of the person wander and take focus off from the road.
- The driver can't remember driving the last few miles.

- Driver is impatient, in a hurry, and grouchy.
- The person ends up too close to cars in front of you.
- The person misses road signs or drive past your turn.
- Drift into the other lane or onto the shoulder of the road.

## II. LITERATURE SURVEY

**A Dedicated System for Monitoring of Driver's Fatigue K.Subhashini Spurjeon, Yogesh Bahindwar, (2012):** describe about the road accidents. The road accidents happen due to the lack of attention of the driver. In this paper author describes a real time system for analyzing video sequences of a driver and determining the level of attention. For this purpose, author uses the computation of percent of eyelid closure. The eye closure acts as an indicator to detect drowsiness. Driver's fatigue and drowsiness are the major causes of traffic accidents on road. It is very necessary to monitor the driver's vigilance level and to issuing an alert when he/she is not paying enough attention to the road is a promising way to reduce the accidents caused by driver factors. The fatigue monitoring can be starts with extracting visual parameters. This can be done via a computer vision system. In the purposed work, author purpose a real time robust methods for eye tracking under variable lighting conditions and facial orientations. In this paper the latest technologies in pattern classification recognition and in object tracking are employed for eye detection. [4] The tracking is based on the eye appearance. Visual information is acquired using a specially designed solution combining a CCD video camera with an IR illumination system. The system is fully automatic and detects eye position and eye closure and recovers the gaze of eyes. Experimental results using real images demonstrate the accuracy and robustness of the proposed solution. This could become an important part in the development of the advanced safety vehicle.

**Drowsiness Warning System Using Artificial Intelligence, Nidhi Sharma, V. K. Banga, [2010]:** in this paper author discuss about the various artificial intelligence methods for detecting the drowsiness of system. Driver's drowsiness is an important factor in motoring of vehicle from accidents. The driving performance deteriorates with increased drowsiness with resulting crashes constituting more vehicle accidents. In recent years, there has been growing interest in intelligent vehicles. [5] The ongoing intelligent vehicle research will revolutionize the way vehicles and drivers interact in the future. The detection mechanism into vehicles may help prevent many accidents. There are

various techniques used for analyzing driver exhaustion. Most of the published research on computer vision approaches to detection of fatigue has focused on the analysis of blinks and head movements. After long hours of driving or in absence of mental alert state, the attention of driver starts to loose and that creates risks of accidents. These are the typical reactions of fatigue, which are very dangerous. In image fatigue detection, correct and real time decision is very important. In this paper, author discusses the various artificial detection.

### A Yawning Measurement Method to Detect Driver Drowsiness, Behnoosh Hariri, et.al:

Describe that the drowsy is the major issue behind the road accidents. The use of assistive systems that monitor a driver's level of vigilance and alert the driver in case of drowsiness can be significant in the prevention of accidents. In this paper author purposed a new approach towards detection of drives drowsiness based on yawning measurement. [6] This involves several steps including the real time detection and tracking of driver's face, detection and tracking of the mouth contour and the detection of yawning based on measuring both the rate and the amount of changes in the mouth contour area. In this paper several techniques are used, that are applied several techniques to ensure the robust detection of yawning expression in the presence of variable lighting conditions and facial occlusions. Test results demonstrate that the proposed system can efficiently measure the aforementioned parameters and detect the yawning state as a sign of driver's drowsiness.

**DEVELOPMENT OF A DROWSINESS WARNING SYSTEM USING NEURAL NETWORK, Itenderpal singh1, Prof. V.K.Banga, (2013):** describe the facial image analysis. As due to the increase in the amount of automobile the problems created by accidents have become more complex. The transportation system is no longer sufficient. Hence the research upon the safety of the vehicles is the recent topic nowadays. In this paper author discuss about the safety warning systems. This system is active warning systems for preventing traffic accidents have been attracting much public attention. Safe driving is a major concern of today's societies. There are thousands of accidents are happen in a day. [7] Due to which many people get injured and many out of them got die. The aim of this paper is to develop a prototype drowsiness detection system. The main focus is on designing a system that are used for accurately monitor the open or closed state of the driver's eyes in real time. By monitoring the eyes, it is believed that the symptoms of driver fatigue can be detected early enough to avoid a car

accident. The author purposed a vehicle driver drowsiness warning system using image processing technique with neural network. it is based on facial images analysis for warning the driver of drowsiness or inattention to prevent traffic accidents. The facial images of driver are taken by the video camera that is installed on the dashboard in front of the driver. A Neural network based algorithm is proposed to determine the level of fatigue. It measures by the eye opening and closing, and warns the driver accordingly.

### III. PURPOSED WORK

The various methods available to determine the drowsiness state of a driver. But because of the various definitions and the reasons behind them were discussed there is no universally accepted definition for drowsiness, all works discuses about the various ways in which drowsiness can be manipulated in a simulated environment. The various measures used to detect drowsiness include the subjective, vehicle-based, physiological and behavioral measures. The accuracy rate of using physiological measures to detect the drowsiness is high. These measures are highly intrusive. The intrusive nature can be resolved by using contactless electrode placement.

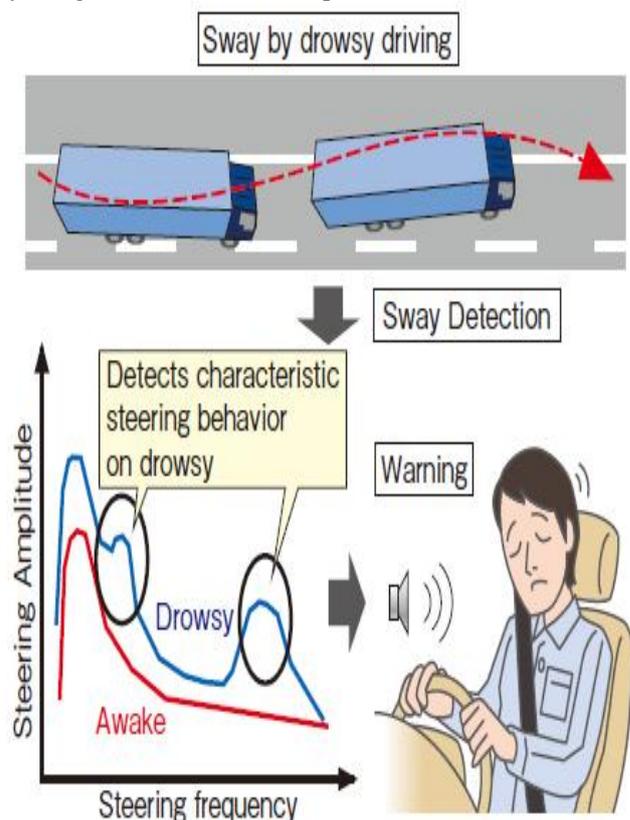


Figure 2: drowsiness of driver

The development of technologies for detecting or preventing drowsiness at the wheel is a

major challenge in the field of accident avoidance systems. Because of the hazard that drowsiness presents on the road, methods need to be developed for counteracting its affects. To overcome these researchers developed lots of techniques like a prototype drowsiness detection system. The focus was placed on designing of system that was accurately monitoring the open or closed state of the driver's eyes in real-time. The symptoms of driver fatigue can be detected by monitoring the eye movement. It helps to avoid the accidents. Detection of fatigue involves the sequences of images of a face. It also observes the eye movements and blink patterns.

**3.2 Objectives:**

For the proposed work our objectives are:

- Introduce the novel approach for preventing driver drowsiness.
- Accurately measure are the symptoms of drowsiness like:
- Case when the driver's head is tilted.
- Finding the top of the head correctly.
- Finding bounds of the functions.
- Implement the novel approach in simulation environment.

**3.3 Methodology:**

**Driver drowsiness detection system:** This is used for car safety. It is a technology which prevents accidents when the driver is getting drowsy during driving. This system detects driver's eyes, face or body moment and gives alarm to wake driver. Now days some of the Driver drowsiness detection systems learn driver patterns and can detects when a driver is becoming drowsy means basically this system is used for safety of driver.

Here to detect Driver drowsiness we are going to use a new scenario. In this proposed scenario we are going to use "region props" and "EDAMAS" techniques.

**Region props:** it is a detection technique. In Driver drowsiness detection system It will detect the size of eyes. As we know that during drowsiness size of our eyes gets small. So region props will check the size and if it will became small then it detects drowsiness and will gives alarm to user.



Eyes during drowsiness

**EDAMAS:** it's a technique use to detect the swelling of soft tissues. As we know that during drowsiness our eyes gets swelled. So here we are going to use EDAMAS technique so that it can detects that drowsiness swelling of eyes of driver and can gives alarm.

Here we will merge both techniques and develop a new Driver drowsiness detection system.

**Flow Chart:**

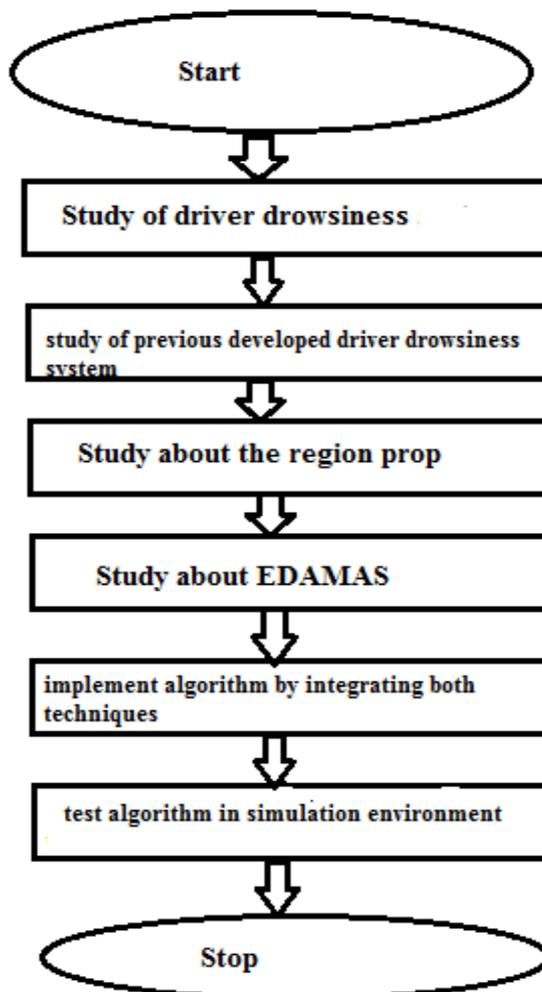


Figure 3: Driver drowsiness



Normal size of eyes

## REFERENCES

- [1] [http://umpir.ump.edu.my/1978/1/Ani\\_Syazana\\_Jasni\\_\(CD\\_5355\\_\).pdf](http://umpir.ump.edu.my/1978/1/Ani_Syazana_Jasni_(CD_5355_).pdf)
- [2] <http://www.ee.ryerson.ca/~phiscock/thesis/drowsy-detector/drowsy-detector.pdf>
- [3] <http://www.sae.org/events/gim/presentations/2012/sgambati.pdf>
- [4] K.Subhashini Spurjeon 1, Yogesh Bahindwar, A Dedicated System for Monitoring of Driver's Fatigue, International Journal of Innovative Research in Science, Engineering and Technology Vol. 1, Issue 2, December 2012 Copyright to IJRSET www.ijrset.com 256
- [5] Nidhi Sharma, V. K. Banga, Drowsiness Warning System Using Artificial Intelligence, World Academy of Science, Engineering and Technology 43 2010
- [6] Behnoosh Hariri, Shabnam Abtahi, Shervin Shirmohammadi, Luc Martel, A Yawning Measurement Method to Detect Driver Drowsiness.
- [7] Itenderpal singh, Prof. V.K.Banga ,DEVELOPMENT OF A DROWSINESS WARNING SYSTEM USING NEURAL NETWORK, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering (An ISO 3297: 2007 Certified Organization) Vol. 2, Issue 8, August 2013