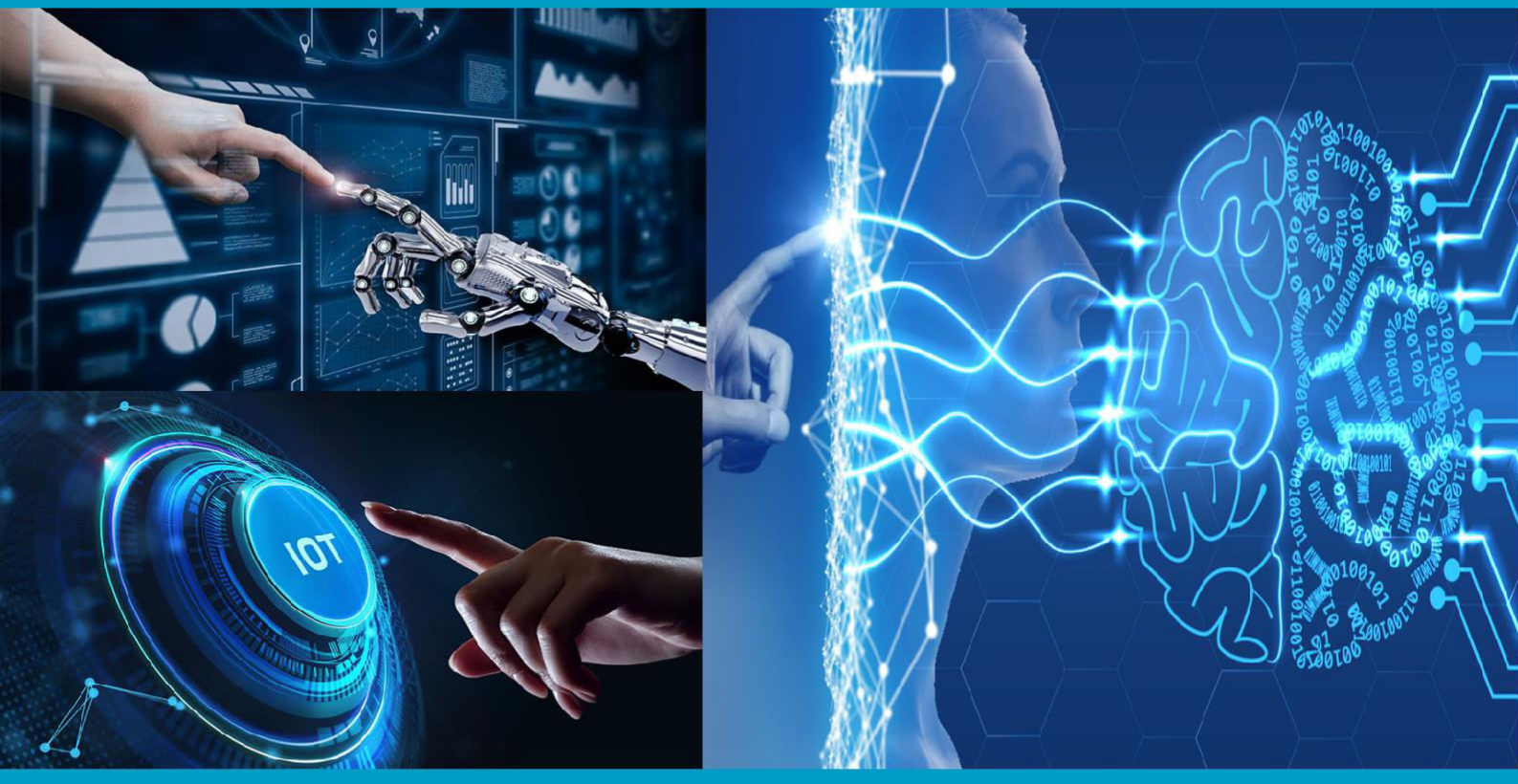
IJMRSETM

e-ISSN: 2395 - 7639



INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING, TECHNOLOGY AND MANAGEMENT

Volume 11, Issue 4, April 2024

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.802

International Journal of Multidisciplinary Research in Science, Engineering, Technology & Management (IJMRSETM)

| ISSN: 2395-7639 | www.ijmrsetm.com | Impact Factor: 7.802 | A Monthly Double-Blind Peer Reviewed Journal |

| Volume 11, Issue 4, April 2024 |

Vision based Drowsiness Detector for Real Driving Conditions

Mr B S Patl, Dr L S Patil

Department of Instrumentation Engineering, AISSMS Polytechnic, Pune, India

Department of Electrical Engineering, PVPIT, Budhgaon, Maharashtra, India

ABSTRACT: The objective of this project is to design an Accident Prevention System which supports in preventing or avoiding accidents. The driver is more disposed to to accidents due to drowsiness and the disturbing intruders. Driver fatigue is one of the supreme common reasons for deadly road accidents around the world. This shows that in the transportation industry especially, where a driver of a heavy vehicle is often exposed to hours of monotonous driving which causes fatigue without frequent rest period. Driver inattention is one of the main causes of traffic accidents. Under this project we will develop a system using Python and Machine Learning that can monitor the alertness of drivers in order to prevent people from falling asleep at the wheel System creatively reduces accidents due to drivers' fatigue by focusing on treating the driver later than fatigue has been detect to achieve decline in accident.

KEYWORD: Drowsiness, Python, Machine Learning, Pre-processing, Image Processing

I. INTRODUCTION

Sleepiness during driving has been proven to be one of the main causes of traffic accidents. Specifically, Klauer et al. has shown that driving when the user is sleepy increases the risk of having an accident between four and six times, compared to driving when the user is awake. Furthermore, the risk of suffering an accident is higher at night or in situations with sleep deprivation. In fact, at least 15-20% of all vehicle accidents have been estimated to be sleepiness related. Therefore, it is convenient to develop a system which monitors the physical and mental state of the driver. It should alert at the critical moment when the driver is getting fatigued, preventing accidents. In the last decade, diverse techniques have been developed for monitoring drivers.

II. PROBLEM STATEMENT

Driver drowsiness detection is a car safety technology which prevents accidents when the driver is getting drowsy. Various studies have suggested that around 20% of all road accidents are fatigue-related, up to 50% on certain roads. Driver fatigue is a significant factor in a large number of vehicle accidents. Recent statistics estimate that annually 1,200 deaths and 76,000 injuries can be attributed to fatigue related crashes. 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. Driver inattention might be the result of a lack of alertness when driving due to driver drowsiness and distraction.Driver distraction occurs when an object or event draws a person's attention away from the driving task. Unlike driver distraction, driver drowsiness involves no triggering event but, instead, is characterized by a progressive withdrawal of attention from the road and traffic demands. Both driver drowsiness and distraction, however, might have the same effects, i.e., decreased driving performance, longer reaction time, and an increased risk of crash involvement. Based on Acquisition of video from the camera that is in front of driver perform real- time processing of an incoming video stream in order to infer the driver's level of fatigue if the drowsiness is Estimated then the output is send to the alarm system and alarm is activated.

The objective of paper [1] is to design an Accident Prevention System which supports in preventing or avoiding accidents. The driver is more disposed to to accidents due to drowsiness and the disturbing intruders. Driver fatigue is one of the supreme common reasons for deadly road accidents around the world. This shows that in the transportation industry especially, where a driver of a heavy vehicle is often exposed to hours of monotonous driving which causes fatigue without frequent rest period. Driver inattention is one of the main causes of traffic accidents. There are lots of approaches and among them computer vision has the potential of monitoring the person behind the wheel without interfering with his driving. The computer vision system for driving monitoring uses face location and tracking as the first processing stage. In the next stage the different facial features are extracted and tracked for monitoring the driver's vigilance. Under this project we will develop a system that can monitor the alertness of drivers in order to prevent people from falling asleep at the wheel System creatively reduces accidents due to drivers' fatigue by focusing on

| ISSN: 2395-7639 | www.ijmrsetm.com | Impact Factor: 7.802 | A Monthly Double-Blind Peer Reviewed Journal |

| Volume 11, Issue 4, April 2024 |

treating the driver later than fatigue has been detect to achieve decline in accident. Drowsiness Detection System has been developed, using a machine vision based concepts. The system [2] uses a small camera that points directly towards the driver's face and monitors the driver's eyes in order to detect fatigue or drowsiness. In a case if fatigue is detected, a warning signal or alarm signal is issued to alert the driver to wake up and come out of the drowsy state. First of all, the system detects the face and then the eyes, and then determines whether the eyes are open or closed. The system deals with using information obtained for the binary version of the image to find the edges of the face, which narrows the area of where the eyes may exist. Once the eyes are located, measuring the distances between the intensity changes in the eye area determine whether the eyes are open or closed. If the eyes are found closed for 5 or more consecutive frames, then the system finds the inactiveness of the driver and concludes that the driver is falling asleep and issues a warning signal or generate and alarm signal to wake him up Studies show that around one quarter of all serious motorway accidents is attributable to sleepy drivers in need of a rest, meaning that drowsiness causes more road accidents than drink-driving. Driver fatigue is a significant factor in a large number of vehicle accidents. The development of technologies for detecting 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. The main aim of this is to develop a drowsiness detection system by monitoring the eyes and mouth; it is believed that the symptoms of driver fatigue can be detected early enough to avoid a car accident. Detection of fatigue involves the observation of eye movements, blink patterns and mouth opening for yawning. The analysis of face images is a popular research area with applications such as face recognition, and human identification security systems. Paper [3] is focused on the localization of the eyes, which involves looking at the entire image of the eye, and determining the position of the eyes, by a self-developed image-processing algorithm. Index Terms— Drowsy, Accident, Algorithm, Image Processing. Paper [4] presents a non-intrusive approach for drowsiness detection, based on computer vision. It is installed in a car and it is able to work under real operation conditions. An IR camera is placed in front of the driver, in the dashboard, in order to detect his face and obtain drowsiness clues from their eyes closure. It works in a robust and automatic way, without prior calibration. The presented system is composed of 3 stages. The first one is pre-processing, which includes face and eye detection and normalization. The second stage performs pupil position detection and characterization, combining it with an adaptive lighting filtering to make the system capable of dealing with outdoor illumination conditions. The final stage computes PERCLOS from eyes closure information. In order to evaluate this system, an outdoor database was generated, consisting of several experiments carried out during more than 25 driving hours. A study about the performance of this proposal, showing results from this test bench, is presented. Paper [5] represents a way of developing an interface to detect driver drowsiness based on continuously monitoring eyes and DIP algorithms. Micro sleeps that are short period of sleeps lasting 2 to 3 seconds are good indicator of fatigue state. Thus by continuously monitoring the eyes of the driver by using camera one can detect the sleepy state of driver and timely warning is issued. Aim of the project is to develop the hardware which is very advanced product related to driver safety on the roads using controller and image processing. This product detects driver drowsiness and gives warning in form of alarm and as well as decreases the speed of vehicle. Along with the drowsiness detection process there is continuous monitoring of the distance done by the Ultrasonic sensor. The ultrasonic sensor detects the obstacle and accordingly warns the driver as well as decreases speed of vehicle. Paper [6] describes the steps involved in designing and implementing a driver drowsiness detection system based on visual input (driver's face and head). It combines off the-shelf software components for face detection, human skin color detection, and eye state (open vs. closed) classification in a novel way. Preliminary results show that the system is reliable and tolerant to many real-world constraints. As field of signal processing is widening in various security and surveillance applications, motivated the interest for implementing better application with less complications. A non-intrusive machine vision based concepts is used to simulate Drowsiness Detection System. The system [7] is consisting of web camera which placed in a way that it records driver's head movements in order to detect drowsiness. As drowsiness is detected, a signal is issued to alert the driver. The system deals with detecting face, eyes and mouth within the specific segment of the image. All the possible actions have been considered and output is generated accordingly. Drowsiness is determined by observing the eye blinking action of the driver. Other than drowsiness, driver's attention while driving is also considered. The proposed algorithm is developed to minimize the complexity level from existing system while efficiency has given prime importance which was a main objective of the paper. The system is implemented using cascade object identifier from vision toolbox of Python, which detects face, eyes, nose and mouth from the image which is captured from web camera. For this system Region of Interest is location of eyes and mouth which are determined and indicated by rectangle. Logic has been used here to identify whether eyes are open or closed unlike general methods. From mouth portion yawning is determined and considered. Project is simulated for on line and off line video with all possible situations of a driver. Results are formulated under different categories like normal driver, driver with glass under different light intensities. It is concluded that proposed system can also be utilized for other application. Results obtained from the proposed system provide efficient system analysis and overall good efficiency with some precautions by using simple flow of programming. Paper [8] describes method for detecting the early signs of fatigue in train drivers. As soon as the train driver is falling in symptoms of fatigue immediate message will be transfer to the control room indicating the status of the drivers. In addition of the advance technology of heart rate

| ISSN: 2395-7639 | www.ijmrsetm.com | Impact Factor: 7.802 | A Monthly Double-Blind Peer Reviewed Journal |

| Volume 11, Issue 4, April 2024 |

sensors is also added in the system for correct detection of status of driver if in either case driver is falling to fatigue due to any sever medical problems .The fatigue is detected in the system by the image processing method of comparing the image (frames) in the video and by using the human features we are able to estimate the indirect way of detecting fatigue. The technique also focuses on modes of person when driving the train i.e. awake, drowsy state or sleepy and sleep state. The system is very efficient to detect the fatigue and control the train also train can be controlled if it crosses any such signal by which the train may collide on another train. Driver Fatigue is one of the major reasons causing most fatal road accidents around the world. This shows that in the transportation industry specially, where a heavy vehicle driver is often open to hours of monotonous driving which causes fatigue without frequent rest period. Due to the frequent driver fatigue occurrence, this has become an area of great socio economic concern. Consequently, it is very essential to design a road accidents prevention system by detecting driver's drowsiness, which determines the level of driver inattention and give a warning when an impending hazard exists. In this paper the aim is to design a prototype system which detects driver's drowsiness based on eye blinking and yawning to prevent road accidents. The system [9] includes a video camera either externally attached or inbuilt camera in Laptop which extracts video which detects facial features and finally eye closure and open mouth are detected simultaneously followed by alert. The system so designed is a non intrusive real time monitoring system. The programming for this is done in Python. Today, number of accidents happen during drowsy driving on roads and are increasing day by day. It is a known fact that many accidents occur due to driver's fatigue and sometimes due to inattention factor. Research [10] mainly engages on maximizing the effort in identifying the drowsiness state of driver in real driving conditions. The goal of driver drowsiness detection systems is an attempt to contribute in reducing these road accidents. The secondary data collected focuses on past research on drowsiness detection systems and various methods have been used earlier for detection of drowsiness or inattention while driving. However, in this paper, a real time vision-based method is proposed to monitor driver fatigue. This research approach adopts the Viola-Jones classifier to detect the driver's facial features. Firstly, the face is located by a Haar like feature based object detection algorithm. The face area is detected using the functions in the OpenCV library with C#.net. Secondly, eye is detected. Also the eye areas are detected by using the functions in the OpenCV library and tracking by using a template matching method. Then, the open/close state of eyes is determined, and then fatigue is determined based on the series state of eyes. The correlation coefficient template matching method is applied to derive the state of each feature on a frame by frame basis. Vision- based driver fatigue detection method is a natural, non-intrusive and convenient technique to monitor driver's vigilance.

III. ARCHITECTURAL DESIGN

Drowsiness of a person can be measured by the extended period of time for which his/her eyes are in closed state. In our system, primary attention is given to the faster detection and processing of data. The number of frames for which eyes are closed is monitored. If the number of frames exceeds a certain value, then a warning message is generated on the display showing that the driver is feeling drowsy. For detecting the face, since the camera is focused on the automobile driver, we can avoid processing the image at the corners thus reducing a significant amount of processing required. Once the region of interest is defined face has been detected, the region of interest is now the face, as the next step involves detecting eyes. To detect the eyes, instead of processing the entire face region, we mark a region of interest within the face region which further helps in achieving the primary goal of the proposed system. Detect the eyes by processing only the region of interest. Once the eyes have been detected, the next step is to determine whether the eyes are in open/closed state, which is achieved by extracting and examining the pixel values from the eye region.

| ISSN: 2395-7639 | www.ijmrsetm.com | Impact Factor: 7.802 | A Monthly Double-Blind Peer Reviewed Journal |

| Volume 11, Issue 4, April 2024 |

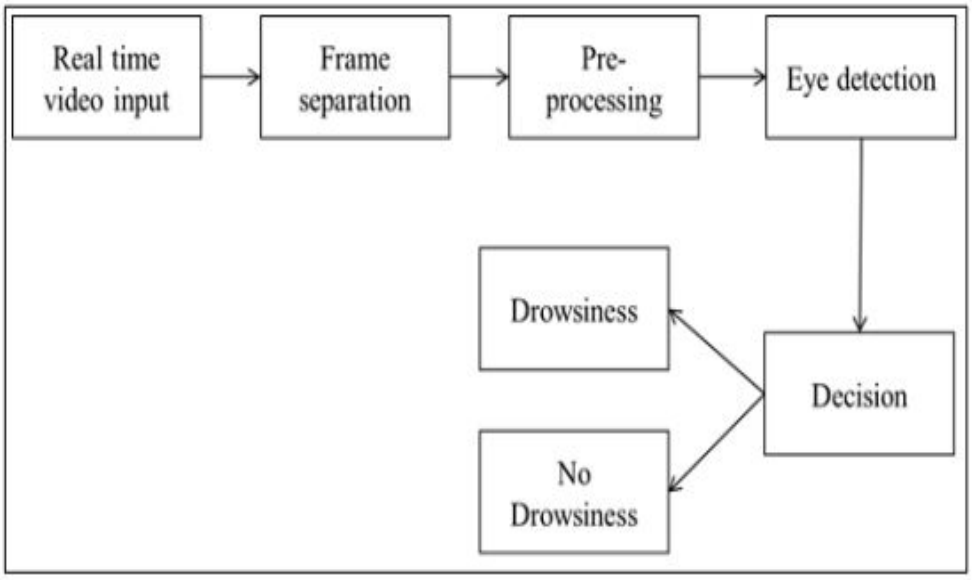


Figure 1: proposed system

If the eyes are detected to be open, no action is taken. But, if eyes are detected to be closed continuously for two seconds, that is a particular number of frames depending on the frame rate, then it means that the automobile driver is feeling drowsy and a warning signal is generated. However, if the closed states of the eyes are not continuous, then it is declared as a blink.

IV. CONCLUSION

The proposed system in this analysis provides accurate detection of driver fatigue. This paper tries to look at the developing technologies and determine the best methods in trying to prevent the number one cause of fatal vehicle crashes. Driver drowsiness detection systems have been precise advantageous in reducing day by day road accidents. This paper gives a review of driver drowsiness detection technique. The structure is able to recover and properly localize the eyes. Image processing achieves highly accurate and reliable detection of drowsiness. Image processing offers a noninvasive approach to detecting drowsiness.

REFERENCES

[1] International Journal of Advanced Research in Computer and Communication Engineering ISO 3297:2007 Certified Vol. 6, Issue 6, June 2017 Copyright to IJARCCE DOI10.17148/IJARCCE.2017.6658 331 Advance Car Alarming System for Fatigue Detection during Driving using MATLAB Mr. Shreyas Deshmukh1 , Mr. C.N. Bhoyar
[2] DROWSINESS DETECTION SYSTEM USING MATLAB Ms. Shalini Kashyap1 , Mr. V.K Sharma
[3] Volume 4 Issue IV, April 2016 IC Value: 13.98 ISSN: 2321-9653 International Journal for Research in Applied Science Engineering Technology (IJRASET) c IJRASET 2013: All Rights are Reserved 198 Drowsy Driver Identification Using MATLAB Video Processing Mrs.S. Dhanalakshmi1 , J.Jasmine Rosepet2 , G.Leema Rosy3 , M.Philomina
[4] International Journal of Infinite Innovations in Technology—ISSN:2278- 9057 IJIIT—Volume-IV—Issue-III—2015-2016 January—Paper-17 Reg. No.:20151217—DOI:V4I3P17 Vision-based drowsiness detector for Real Driving Conditions Kalpesh Topare , Tejaswi Pawar , Yogesh Pawar , Nikhil Dudhagawali
[5] International Journal of Technical Research and Applications e-ISSN: 2320- 8163, www.ijtra.com Volume 3, Issue 3 (May-June 2015), PP. 190-194 190 — P a g e EYE TRACKING BASED DRIVER DROWSINESS MONITORING AND WARNING SYSTEM Mitharwal Surendra Singh L., Ajgar Bhavana G., Shinde Pooja S., Maske Ashish M.
[6] Design and implementation of a driver drowsiness detection system: a practical approach Aleksandar Colic1 , Oge Marques2 and Borko Furht
[7] Raees Ahmad et al, / (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 6 (1) , 2015, 270-274 Drowsy Driver Identification Using Eye Blink detection

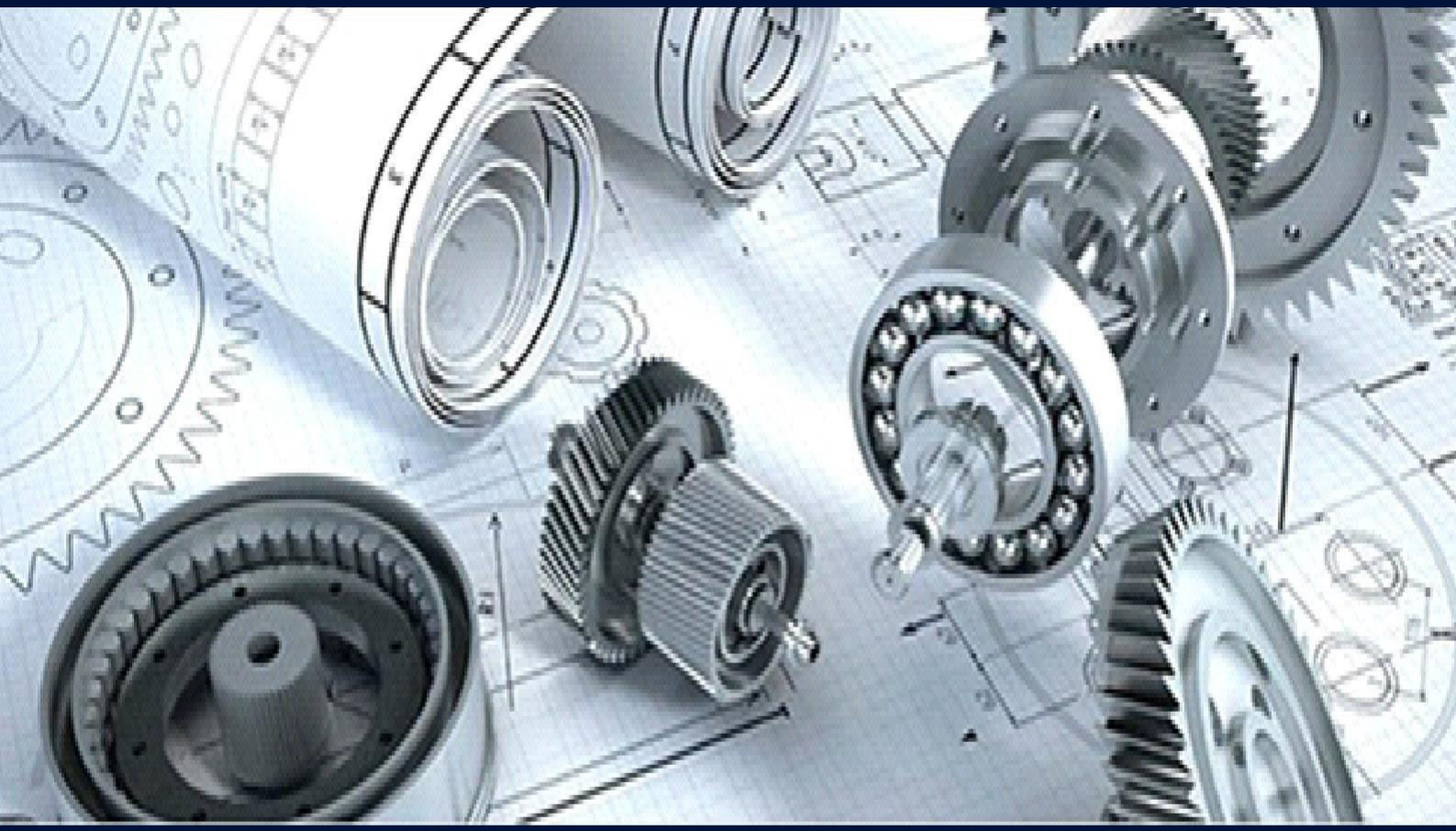
| ISSN: 2395-7639 | www.ijmrsetm.com | Impact Factor: 7.802 | A Monthly Double-Blind Peer Reviewed Journal |

| Volume 11, Issue 4, April 2024 |

[8] International Journal of Computer Science Information Technology (IJCSIT) Vol 6, No 3, June 2014 DOI:10.5121/ijcsit.2014.6307 87 INTELLIGENT FA TIGUE DETECTION AND AUTOMATIC VEHICLE CONTROL SYSTEM Miss. Monali Gulhane1 and Prof. P. S. Mohod2

[9] International Journal of Research (IJR) Vol-1, Issue-6, July 2014 ISSN 2348- 6848 Road Accident Prevention System Using Driver's Drowsiness Detection by Combining Eye Closure and Yawning Dr. Sheifali Gupta1 Er. Garima

[10] International Journal of Science and Research (IJSR) ISSN (Online): 2319- 7064 Index Copernicus Value (2013): 6.14 — Impact Factor (2013): 4.438 Volume 4 Issue 1, January 2015 www.ijsr.net Licensed Under Creative Commons Attribution CC BY Implementation of Real Time Driver Drowsiness Detection System Snehal S. Bharambe1 , P. M. Mahajan



INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING, TECHNOLOGY AND MANAGEMENT

+91 99405 72462 +91 63819 07438 ijmrsetm@gmail.com