DESIGN AND FABRICATION OF INTEGRATED ELECTRONIC TRAFFIC MONITORING SYSTEM FOR COMMERCIAL VEHICLE

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Abstract--Mirrorless trucks are the experimental trucks that use the mirrors as a visual aid for safe driving and replacing them with camera and LCD screens, making them fully mirrorless. Such trucks without mirror projections would result in simple external aerodynamics thereby reducing considerable amount of drag and thus offering high potential for higher fuel economy while driving a truck. The present study is a trial to test whether such a mirrorless truck can create a better driving condition for the driver in terms of safety and comfortability. Thus the new modern technology is fused with car making it mirrorless with cameras replacing mirrors and the dashboard was updated to mounted the LCD screens on it.

Keywords: Mirrorless,safety, Blindspot, Ergonomics, Virtual Mirror, Night Vision

INTRODUCTION

Road accidents are general hazards in day-to-day life, which are not usually predictable and avoidable. The road accident issue is increasingly becoming more now-a-days a threat to human health and nation growth in most developing nations. Road accidents cause injuries, afflictions, pain, death and damage to goods. Statistics show that more people on the road accident lost their lives than from any other major diseases worldwide. More than 1 million people have died and every year around the world about 15 million people get injured due to road accidents. The world report on road accident prevention states that traffic accidents claim about 3000 fatalities daily around the world. Statistical projections illustrate that from the year 2000 to the year 2020, there will be a decrease of 30% fatalities associated to road accidents in the developed nations. The contradictory trend is predicted in developing part of the world, where the number of road accidents is predicted to increase rapidly in the forthcoming years. The injuries due to road accidents are the foremost causes of injuries, disabilities and deaths, the 10th prime cause of deaths and 9th leading cause of disease around the world. The number of death in the road accident has been estimated

approximately 8 million in the year 2020. In developing nations, the trend of road accidents is increasing in nature and also reached an alarming state. But very less attention is shown on that problem. Therefore, in order to save life and money, it is necessary to prevent accidents. Worldwide reports disclose that road accidents worldwide are projected that 70% of the accidents occurred in developing countries and claim a total of 20 million victims for a time period.

The number of road accidents per registered vehicles in developing countries is 10% to 20% higher as compared with the developed countries. The common reasons spelled by the researchers for the increases of road accidents in developing countries are given below:

- Rapid urbanization process in the developing countries
- Faster growth rates of traffic
- Technical problems
- Worst road conditions
- Careless driving
- Not following the traffic regulations

Number of road accidents increases in line with the raise of vehicles. Road accidents are massive public health concerns for anyone. In India, the accident death rates are relatively higher than any other developed countries. A case study performed in Calcutta city located in India, shows that there two factors such as human factors and seasonal factors are contributing to fatal road accidents. Behavior of drivers, cyclists and pedestrians are listed under human factors and weather and time are listed as seasonal factors. Road safety is classified as active road safety and passive road safety. Technology assistance to the accident prevention is called active road safety. Various components of the vehicle that help to improve the road safety are known as passive road safety. Road safety is concerned with ergonomic design of following components of vehicles:

- Head Lamps
- Reflectors
- Lights
- Signals
- Mirrors
- Road Lighting

LITERATURE SURVEY

1.MIRRORLESS CAR: A FEASIBILITY STUDY.

J.S. Mohamad ali and F. Fatinbazilah –2014

Volume -663(2014), pp.(649-65).

The mirrors which are used as a visual aid are replaced with cameras and LCD screen thus making it totally mirrorless. The new modern technology is incorporated into a model car allowing cameras as replacement mirrors and the dashboard has been updated to mount the LCD screen.

2.A METHOD TO INVESTIGATE DRIVERS' ACCEPTANCE OF BLIND SPOT DETECTION SYSTEM.

Giulio Francesco Piccininia, AnabelaSimoesb, Carlos Manuel Rodriguesc and Miguel Leitão(2012)

Volume -41(2012), pp.(4213-4217).

In order to improve road safety car manufacturers developed and commercialized some advanced driver assistance system which detects the blind spots on the sides of the vehicle could help drivers to overtake and change the lane.

3.BLIND-SPOT VEHICLE DETECTION USING MOTION AND STATIC FEATURES.

Din-Chang Tseng-2014

Volume -4(2014).

During a lane change to avoid an accident by implementing the cameras on the side mirrors it can be used to calculate the threshold values and avoiding the blind spot. This statistical analysis can be taken in 14 different environmental conditions.

4.QUANTIFICATION AND ANALYSIS OF BLINDSPOT FOR LIGHT MOTOR VEHICLES.

Aleena Mathew, E. S. Krishna Ram, Elizabeth Maria Alex, Gokul G. Kumar, Jeslin Elizabeth, M. Satyakumar-2018

Volume -8(2018), Issue- 4C, ISSN: 2249-8958(2018)

The lack of visual simulating due to blind spot both vehicular and external is often a leading contributor of road accident. With the blind spot data collected, an ultrasonic sensor system was developed which maps the physical environment around the car and transmits it back to the driver in real time.

5. NIGHT VISION TECHNIQUES AND THEIR APPLICATIONS.

Rupesh P.Raghatate, Swapnil S.Rajurkar, Manisha P.Waghmare,

Pooja V. Ambatkar-2013

Volume -3(2013), Issue- 2, ISSN:2249-6645(2013), pp-816-820

Night Vision is defined as technology that gives us good vision in total darkness and vision enhancement in low light conditions. Due to low light conditions, where night vision technology is used to solve various problems.

6.REAR VIEW CAMERA SYSTEM FOR CAR DRIVING ASSISTANCE.

Z. Stamenkovic, K. Tittelbach-Helmrich, J. Domke, C. Lörchner-Gerdaus, J. Anders,

V. Sark, M. Eric, and N. Sira-2012

A device-on-chip (SOC) provides the fast processing of video streams and wireless transmission for automotive applications. This camera system should be able to transmit the video signal within an estimated distance of 20 m.

7. LIQUID CRYSTAL DISPLAY: ENVIRONMENT & TECHNOLOGY.

Ankita Tyagi1, Dr. S. Chatterjee-2013

Vol. 1(2013), PP: 110-123, ISSN: 2326-3113

A system-on-chip (SOC) provides the fast processing of video streams and wireless communication for automotive applications.This camera system should be able to relay the video signal about 20 m away.

8.RASPBERRY ANALYSIS IN THE TEACHING OF COMPUTER SCIENCES.

Johnny Paul Novillo Vicuna, Fausto Fabian Redrovan Castillo, Freddy Leonardo Espinoza Urgiles, Jimmy Rolando Molina Ríos-2017

Vol. 12(2017), PP: 1182-1189, ISSN: 0973-4562

The strengths and limitations of each Raspberry Pi version, and were the basis for determining which version is best for teaching computer science technology implementation.

9.VELOCITY CALCULATON BY AUTOMATIC CAMERA CALIBRATION BASED ON HOMOGENOUS FOG WEATHER CONDITION.

Hong-Jun Song1 Yang-Zhou Chen1 Yuan-Yuan Gao2

10(2), April 2013, 143-156 DOI: 10.1007/s11633-013-0707-z

Developing intelligent traffic monitoring systems that can play an important role in highway surveillance and road management systems is becoming increasingly necessary.Their purpose is to provide real-time statistical data on traffic management and to detect potentially anomalous situations. Accurate measurement of the vehicle0s speed from road surveillance cameras is a desired goal for more than a decade.

10.VELOCITY MEASUREMENT OF MOVING OBJECT USING CAMERA.

Uday Pratap Dwiwedi1, Dr.Bhupal Singh2 M. Tech Student, Department of Automation & Robotics, AKGEC Ghaziabad, AKTU, Uttar Pradesh, India1 Professor, Department of EC, AKGEC Ghaziabad, AKTU, Uttar Pradesh, India2

Vol. 4, Issue 12, December 2016

Developing intelligent traffic monitoring systems that can play an important role in highway surveillance and road management systems is increasingly necessary.Below square, calculate the project's sub-objectives: to build a sleuthing speed net exploitation camera replacement approach and to live the speed of moving vehicles.

11.A SURVEY OF LIGHT EMITTING DIODE DISPLAY BOARD.

GowrishankarKasilingam*, Mritha Ramalingam and Chandra Sekar

Vol 7(2), 185–188, February 2014

Ideal for this task is a LED display screen.The LED display board is a very secure and cost-effective way for thousands of people to distribute advertisements without any personal contact or door-to-door sales. Lead is a source of solid state light with various attractive properties for display applications.It is chosen as the main component for displaying messages, as today LED is the most example of energy efficiency compared to incandescent light bulbs.

12.PEDESTRIAN DETECTION BY VIDEO PROCESSING USING THERMAL AND NIGHT VISION SYSTEM.

International Research Journal of Engineering and Technology (IRJET)

Prof. V. B. Raskar

Volume: 03 Issue: 12 | Dec -2016

The paper describes the use of thermal camera and IR night vision device to identify pedestrians and objects that could cause nighttime accidents. According to the report, most of the accidents are caused by poor night-time vision, which results in the most dangerous and higher number of night-time incidents relative to day-time.

13.ARTIFICIAL INTELLIGENCE AND ITS ROLE IN ITS FUTURE.

Jahanzaib Shabbir, and TariqueAnwer

Journal of latex class files, Vol. 14, no. 8, August 2015

AI technology has a long history which is changing and growing actively and constantly.It focuses on smart agents, which includes tools that perceive environment and are focused on which to take action to improve chances of achieving goals.In the context of the modern digitized world, Artificial Intelligence (AI) is the property of computers, computer programs and systems for performing a person's analytical and creative functions, finding ways to solve problems independently, drawing conclusions and taking decisions.

PROBLEM IDENTIFICATION

- In trucks the side mirrors have blind spots and this leads to accidents easily.
- when these mirrors are replaced with cameras and display on the dashboard, the accidents can be prevented.
- These cameras are provided with night vision system.

METHODOLOGY

Initially, a thorough market survey on the available cameras and LCD screens was made and a suitable specification (camera with 24 mega pixel resolution and LCD of 7 inch) was selected for this application. Then the location of the LCD screens on the dashboard was conceptually designed. The rear view mirror also was removed and a camera was installed on the back of the truck to obtain the rear view. The camera and LCD screen system was connected by wire directly to the battery of the truck such that the LCD screens automatically turns on whenever the truck is started. After completing the assembly of the mirrorless truck, a comprehensive test drive was carried out. During the night test the truck was driven and pictures of night vision showed in the LCD screens were also recorded. The results obtained were analysed to demonstrate the ability of the mirrorless truck on the road by comparing the results with the conventional truck.

CONCLUSION

Based on the comprehensive test drive it can be concluded that the mirrorless trucks are potentially feasible and compatible to be used on the road safely. In comparison to the conventional truck with mirror, it was proved that mirrorless truck with its cameras have wider views and therefore the blind spots can be totally eliminated thus leading to improved safety. More over the mirrorless truck has eliminated the repeated movements of the head of the driver, thus the mirrorless truck has better ergonomics than conventional mirror truck. Thus mirrorless truck shows great potential as modern future truck with enhanced driving conditions in terms of comfort, safety, ergonomics and fuel economy.

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