Driver Drowsiness Detection System in Automotive Vehicles

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***Abstract*— Road accidents are usually caused by driver carelessness. The major carelessness exhibited by the driver are drunken behavior and negligence. The driver drowsiness detection system in automotive vehicle focuses on abnormal behavior exhibited by the driver using a microcontroller, the Raspberry pi single board computer. In the proposed system a non-intrusive driver drowsiness monitoring system has been developed using computer vision techniques. Irrespective of driver wearing spectacles and darkness level inside the vehicle, the system is able to detect the drowsiness. The system will detect drowsiness within the time duration of about two to three seconds. The driver is alerted through alarms in real time.**

Keywords—Rasberry Pi ,Digital Singal Processing .

I INTRODUCTION

Automotive population is increasing exponentially in the country. The biggest problem regarding the increased traffic is raising number of road accidents. Driver sleepiness, alcoholism and carelessness are key players in accident scenario. Taking into account of these factors the driver behaviour state is major challenge for designing advanced driver assistants systems. Driver drowsiness detection is a car safety technology which prevents accidents when driver is getting drowsy. Driver inattention is might be the result of lack of alertness when driving due to drowsiness and distraction. The system alerts driver through alarm in real time.

II DRIVER DROWSINESS DETECTION SYSTEM

This paper focuses on a driver drowsiness detection system in automotive vehicles. The driver behaviour is noticed in many conditions such as wearing spectacles and also in the dark condition inside the vehicle. The proposed system will be continuously monitoring the retina of the driver and all the monitored signals are sent to the microcontroller. The system is capable of detecting the drowsiness condition within the duration of more than two seconds. After the detection of abnormal behaviour it is alerted to the driver through alarms and the parking lights will be on that will stop the vehicle which reduces the accidents due to drowsiness of the driver.

III EXISTING SYSTEM

The existing system of driver drowsiness detection system has following disadvantages. Mainly, using of two cameras in the system one for monitoring the head movement and the other one for facial expressions[2]. The other disadvantage is aging of sensors and all these sensors are attached to the driver's body which may affect the driver. So to overcome all these disadvantages we designed a system in which a live camera is used for monitoring the driver drowsiness condition and alert the driver which reduces the road accidents.

IV ARCHITECTURE OF THE SYSTEM

The block diagram of the proposed system has been shown in the above Fig 3. The camera captures the image and sends to the raspberry pi which is a 64 bit single board computer and acts as a mini pc. This is connected to the monitor and it consists of 32 bit memory card installed with open CV which helps in image processing. The encoder encodes the data. The encoded signal is decoded back in the decoder. Arm used is the LPC2148 which is the microcontroller. If the decoded signal crosses threshold of 2-3 sec, it will automatically makes the alarm beep and the parking light will be on in order to alert the driver, otherwise that signal is rejected and next signal is processed[3].

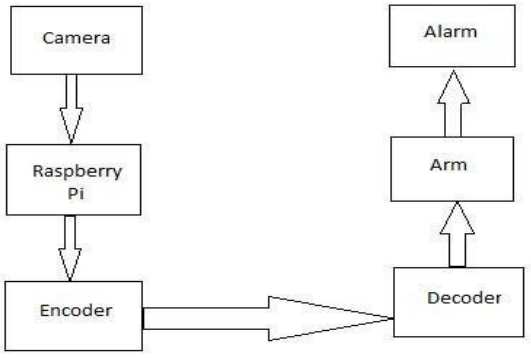

Fig 3. System Architecture

V ADVANTAGES

- The detected abnormal behavior is corrected through alarms in real time.
- Component establishes interface with other drivers very easily.
- Life of the driver can be saved by alerting him using the alarm system.
- Speed of the vehicle can be controlled.
- Traffic management can be maintained by reducing accidents.
- Practically applicable

VI APPLICATIONS

- This system can be used in factories to alert the workers.
- If found drowsy, the alarm system gets activated and the driver is alerted.
- If there is any obstacles it is alerted to the driver.
- This system can also be used for railway drivers.

VI CONCLUSION

The drowsiness detection system is capable of detecting drowsiness in quickly. The system which can differentiate normal eye blink and drowsiness can prevent the driver from entering the state of sleepiness while driving. The system works well irrespective of driver wearing spectacles and under low light conditions also. During the monitoring, the system is able to decide if the eyes are closed or opened. When the eyes have been closed for too long a warning signal is issued.

The ultimate goal of the system is to check the drowsiness condition of the driver. Based on the eye movements of the driver, the drowsiness is detected and according o eye blink, the alarm will be generated to alert the driver and to reduce the speed of the vehicle along with the indication of parking light. By doing this, many accidents will be reduced and provides safety to the driver and vehicle. A system that is driver safety and car security is presented only in luxurious costly cars. Using eye detection, driver security and safety can be implemented din normal car also.

VI FUTURE WORK

The future works may focus on the utilization of outer factors such as vehicle states, sleeping hours, weather conditions, mechanical data, etc. for fatigue measurement. Driver drowsiness poses a major problem to highway safety.

24 hours operations, high annual mileage, exposure to the challenging environmental condition, and demanding work schedules all contribute to the serious safety issue. Monitoring the driver's state of drowsiness and vigilance and providing feedback on their condition so that they can take appropriate action is one crucial step in a series of preventive measure to necessary to address this problem. Currently there is no adjustment in zoom or direction of the camera during operation. Future work may be automatically zoom in on eyes once they are localized. This would avoid trade-off between having wide field of view in order to locate the eyes, and narrow view in order to detect fatigue.

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