Proactive Accident Avoidance System Using IoT

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Abstract— Lots of Accidents are happening due to the Drivers mistake. The main causes of vehicle accident are related to Alcohol Consumption, Drowsiness and distracted vision. The aim of the proposed system is to help in analyzing these factors and develop accident avoidance systems. Here we Detect Driver Drowsiness by using a camera attached to the steering. The image of the driver's face captured by the camera is analyzed using Mat Lab tool and is alerted incase if the drowsiness is detected. Apart from that we also include Alcohol sensing and collision monitoring. Alcohol sensor is used to identify the drunk drivers and SMS is sent to the police in case of drunk & Drive. Ultrasonic sensor is used to measure distance in front of cars and incase of any risk of collision vehicle is stopped or slowed down.

Key words: TSOP Sensor, Alcohol Sensor, Ultrasonic Sensor, Microcontroller, Gaze Detection, Eye wink sensor, Kitajima scale

I. Introduction

Driver drowsiness is a common reason of deadly traffic accidents. The countrywide motorway visitor's protection administration pronounced that drowsy riding turned into worried in 2.2–2.6% of the full fatal crashes annually throughout the duration 2005–2009. Numerous research have reported that many sleep-associated vehicle injuries arise during the intervals of round 2:00–6:00 A.M. and 14:00–16:00 P.M and it is regularly pointed out that night shifts make drivers mainly inclined. The automation superior driver assistance structures (ADAS) can be labelled into 4 training:

1) Improving belief;
2) Arousing attention to capability dangers;
3) Putting off a caution; and
4) Acting safety manage.

For this reason, ADAS are designed to supplement driver capabilities for notion, cognition, action selection, and movement implementation in dynamic surroundings. One way to lessen the range of sleep-associated accidents can be to expand proactive safety technologies that detect motive force drowsiness and provide the drivers with appropriate assistance. Motive force monitoring structures can be labelled into agencies, particularly, structures that display drivers by means of direct driver-related measurements, and those that screen drivers by means of indirect riding-related measurements. Direct driver associated measurements can be categorised into physiological measurements such as measurements of heart price and behaviours, which includes driving force frame motion based totally on pressure distribution sensors, eye blinks and facial expressions based totally on digicam sensors. Oblique driving related measurements consist of measurements of pedal and steerage activities and reactions to particular activities. The coronary heart rate and the pulse wave had been claimed to be effective physiological measures for evaluating driver drowsiness. Itoh et al. claimed that driving force body movement measurements with stress distribution sensors may be used to locate motive force drowsiness. Whilst a driving force will become drowsy, he/she performs a few sports a good way to lessen his/her drowsiness. Measurements of eyelid sports inclusive of eye blinks, length of closing eyelid, and eyelid final speed are regularly used to assess driver drowsiness. The Karolinska sleepiness scale is frequently used for subjective self-evaluation. Kitajima et al. proposed a sleepiness score scale primarily based at the facial expressions of the motive force for outside assessment; this scale is often used for outside assessment in Japan. Ohsuga et al modified the Kitajima scale by thinking about the driving force's resistance to sleepiness. Ishida et al. recommended the use of facial muscular sports corresponding to a drowsy facial expression to estimate motive force drowsiness robotically in actual time. While thinking about the pedal and guidance sports to evaluate driving force drowsiness, steering postpones the lateral fluctuation of the car and popular deviation of the space to a lead car is frequently used. However, maximum of those techniques tend to be unreliable. With physiological measures, making sure accurate judgment is hard due to character differences in physiological residences. Programs in the actual global can also be impractical if they require restraints or invasive motive force-monitoring device. Further, the evaluation of behavioural measures which include eye blinks and driver frame movement is tormented by character differences. It is not clean to calibrate a decision criterion for driving force drowsiness that is applicable to all drivers. Schemes based on drowsy facial expressions may not work successfully or nicely if a driver wears a flu mask or shades. The evaluation of guidance activity for lane-retaining performance is suffering from disturbances consisting of move winds and road surroundings. Consequently, many researchers have tried to increase a reliable method for tracking driving force drowsiness based on a combination of direct driving force-related and oblique riding-associated measures.

II. Existing System

Some of the existing approaches are

1) Rear view cameras for assisting in parking.
2) Adaptive headlights that assist during night travel.
3) Tire pressure monitoring that is used to alert driver in case of any fault in tires.
4) Lane departure warning systems that alerts the driver when the vehicle automatically moves into other lane without driver's knowledge.

All these systems concentrate on a particular problem and are not proactive enough to prevent accident occurrence.

III. PROPOSED SYSTEM

The proposed system consists of a microcontroller, an alcohol sensor, and ultrasonic sensor, camera, TSOP sensor, break failure sensor, LCD and a buzzer connected together

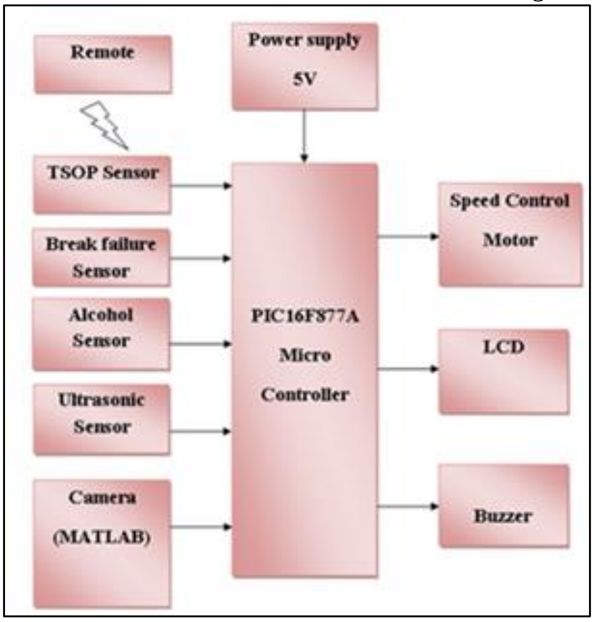

Fig. 1: Block Diagram of Proactive Accident Avoidance System

The ultra-sonic and break failure sensors are used to prevent collision of the vehicle that might occur due to driver's carelessness. Ultrasonic sensor also employed to detect the distance between the front and the rear vehicles. If the distance seems to be very less, then an alert will be given to the driver to slow down the vehicle. If the speed is not reduced by the driver then an automatic braking will be activated to stop the vehicle. Alcohol sensor which is fixed at the steering section detects the alcoholic consumption of the driver and also automatically sends SMS to police.

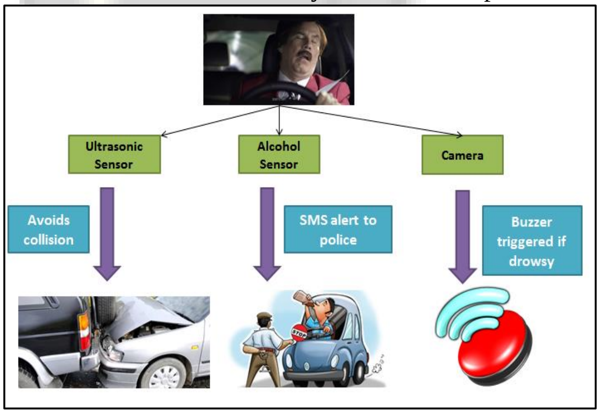

Fig. 2: Architecture of Proactive Accident Avoidance System

The camera attached to the steering captures driver's face at regular intervals and is analyzed using Mat Lab software. In Mat Lab image processing tool is mainly focused to detect the gaze detection. The Algorithm is developed to detect the driver drowsiness and to alert the driver and also to intimate to hardware to stop the car.

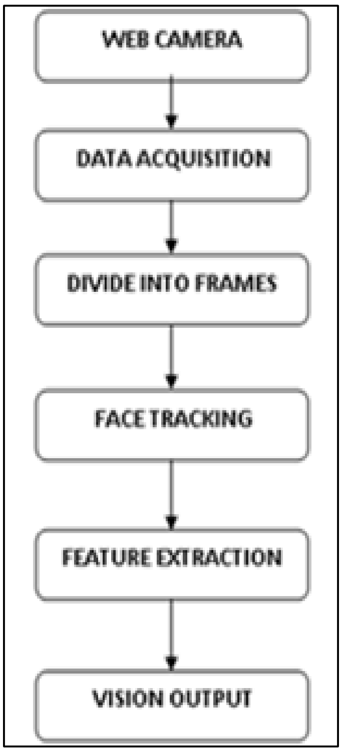

Fig. 3: MatLab Processing Diagram of Proactive Accident Avoidance System

IV. SYSTEM MODULES

A. *User/Driver*

If the User/ Driver have to communicate with the server and avoid the accident, they have to create an account with the server. To create an account with the server, the user has to provide their details like username, password, date of birth, mobile number, and other vehicle information. All this information is stored in the server for future purpose.

B. *Server*

A server is a computer program running to serve the requests of other programs, the "clients". Thus, the "server" performs some computational task on behalf of "clients". The clients either run on the same computer or connect through the network. Here the server will store the entire user's information in the database. In the server, the detection sensors are connected, so that they can control the vehicles. Also the server will monitor all the user access. The server will also store the user access details in the database.

C. *Over Speed Control*

Conventional elevator safety equipment includes an over speed governor for impeding elevator car movement when a predetermined speed is exceeded. An over speed controller is an elevator device which acts as a stop device in case the elevator runs beyond the rated speed. When the vehicle is going in the road, the speed detection sensor will monitor that vehicle. If that Vehicle goes above the specified limit, a signal will be passed to the server via Speed detection sensor, so that the administrator in the server will reduce and control the vehicle's speed. So that we can avoid the over speed of the vehicles.

D. Alcohol Detection

When the driver is driving the vehicle with alcohol consumption, alcohol sensor will sensor and passes the signal to the server. So that the server can control the vehicle and they will not be allowed to drive the vehicle above the certain speed. So that we can avoid the drunk and drive accidents. The main unit of this project is an "Alcohol sensor". If the person inside car has consumed alcohol then it is detected by the sensor. Sensor gives this signal to a comparator IC. The output of comparator is connected to the microcontroller. Microcontroller is the heart of this project. It is the CPU of the complete circuit. Microcontroller gives alert to the server. Main advantage of this Alcohol Detection System in Cars provides an automatic safety system for cars and other vehicles as well.

E. Eye Wink Sensor

This module involves controlling accident due to unconscious through Eye blink. Here one eye wink sensor is fixed in vehicle where if anybody loses conscious means it indicates to the server.

F. SMS Generation

If any of the above mentioned detections are activated means the information is sent to the server. Then the server will check the driver's relation and friend number from the database and sent the SMS alert to the mobile numbers.

V. SCREENSHOTS

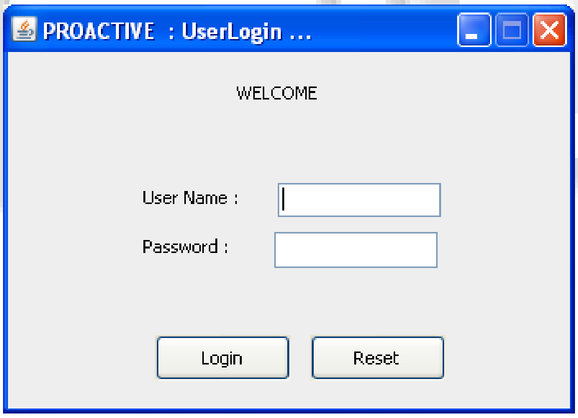

Fig. 4: Users or Driver Login

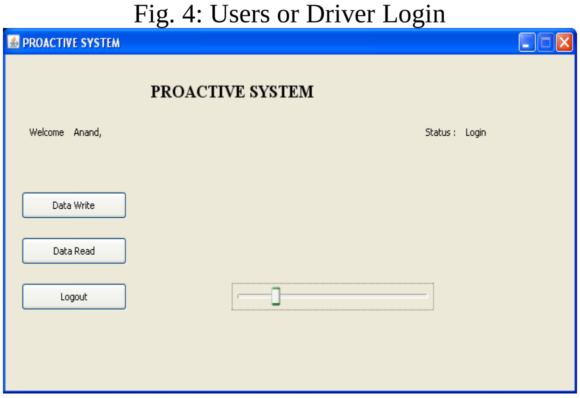

Fig. 5: Proactive Accident Avoidance System Interface

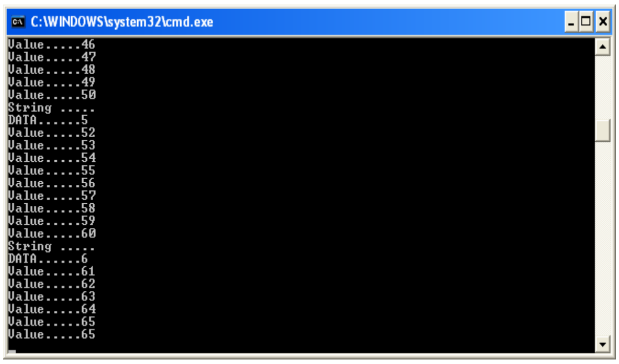

Fig. 6: Speed Sensor values

Fig. 7: Over Speed Alert

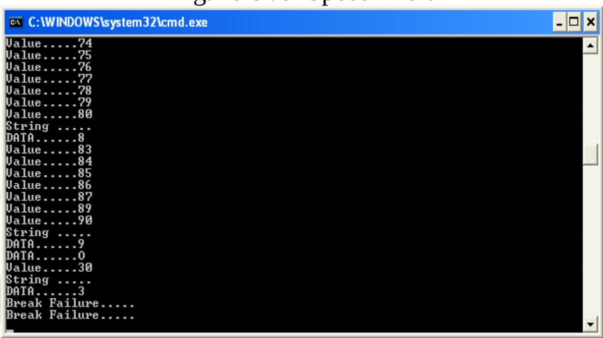

Fig. 8: Brake Sensor Values

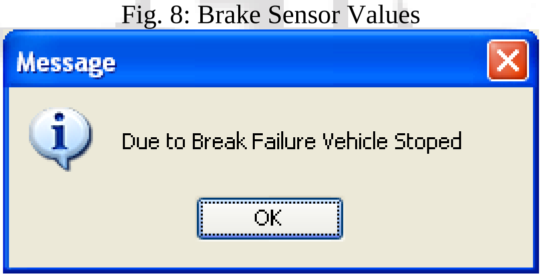

Fig. 9: Brake Failure Detection

VI. CONCLUSION

The proactive system judges the motive force's country in a multi-layered manner thru the interaction between the driving force and the gadget further to executing the first- and 2nd-stage controls to keep safety. This paper has discussed various proactive structures which are effective for preventing of sleep-associated vehicle accidents with the aid of listing out their benefits and disadvantages.

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