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A review on Drowsiness and Alcohol Detection for car assisted driver System

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Abstract— This paper provides an overview of existing system of real time detection of car driver drowsiness and alcoholic intoxication. Now a day, there are large numbers of road accidents are takes places due to Drowsiness or alcohol drinking of driver and there are lot of technologies are available to prevent and control the accidents using different methods. Different sensors are used to detect drowsiness and alcoholic. Existing methods are explained in the existing work section of this paper and provide overview on it.

Keywords— Drowsiness, Intoxication, Sensor.

I. INTRODUCTION

It is found that most of the road accident is happened due to the driver drowsiness and alcoholic intoxication and It is difficult to correctly tell the exact number of sleep and alcohol drinking related accidents. But traffic survey shows that driver fatigue may be a contributory factor in up to 20% and due to alcohol drinking it is about 31% of all road accidents [1]. 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. Aim of the project is to develop a prototype and prevent accidents. The alcohol consumption is increasing, so the accidents are also increasing day by day. Driver consumes alcohol and then they do rash driving as of that they do not have control on themselves [5]. These papers provide overview on existing system and are explained in the existing work section of this paper.

II. EXISTING WORK

Dwipjoy Sarkar and Atanu Chowdhury [1], provides a real time embedded system application. This system is useful for driver drowsiness and alcoholic intoxication detection. Fig. 1 shows the block diagram of the proposed system. This proposed system is combination of Computer vision and alcohol gas sensor application to an embedded system. The proposed system contained an open source 5 megapixel digital camera supported embedded system board Raspberry-pi loaded with Raspbian-OS, and Python-IDLE with Open-CV installed.

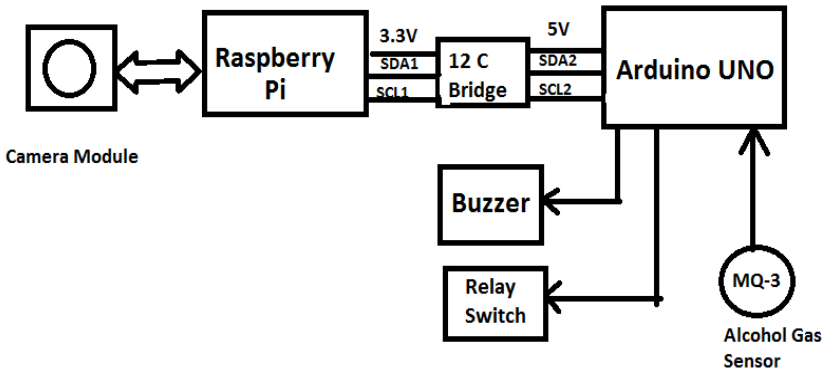

Fig. 1 Block diagram of the proposed system [1].

As shown in the fig. 1, the Raspberry-pi system board is serially interfaced with another open source embedded system board

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Arduino Uno with I2C protocol. This Arduino Uno will perform some task like issuing the alarm notification and switching off the car power source to stop the car upon receiving the positive detection message from Raspberry-pi. Drowsiness detection is very typical task and can be done in several ways like remotely measuring the heart rate or facial expression of the person to be tested. Drowsiness detection is done by detecting face and eye region and also eye closing rate. The MQ-3 is an alcohol gas sensor for measuring alcohol content present in the volume of breathe in mg/L (milligrams per liter) also known as BrAC (breath air content), to determine whether a person is drunk or not. Maria Rimini-Doering et al. [2], described in this paper is to develop reproducible and flexible methods for studying the relationships between physiological driver states and human-factor issues in a driving environment. This proposed system is conducted on about 60 healthy male subjects aged 22 to 28 under carefully controlled conditions. Basically this system contains two parts such as Driving Simulator and the Sensors and Measurements. The first one is driving simulator, for the safety and reproducibility, a laboratory-based driving simulator is being used for the project experiments. This simulator generates car noise as a function of engine speed and ground speed, and also no dynamic force or vibration feedback is given to the driver. And in the second module Sensors contains Physiological sensors (It is used both in laboratory-based simulators and in actual mobile (car) environments), Movement sensors (it is a grayscale video camera records the driver's face to monitor eye and eyelid movements at 25 frames per second and two ordinary video cameras for recording head movements of the subject) and the Environment sensors (it is used to calculate room temperature, air humidity, CO2 and O2 concentrations in the air, etc). M. Sharmila and M. Bhuvaneswari [3], developed a system containing to prevent accident by using sensor detection. Proposed system contains different sensor and overall mechanism is controlled by CAN protocol. Proposed system contains Sensor such as heartbeat monitoring, eye blink monitoring, alcohol monitoring and enhance the usage of hand brake system. This Proposed system presents Intellectual Vehicle for refuge by using different sensors. The drowsiness of driver is identified by Eye blink rate i.e., the eye is fully closed or half closed or fully opened and also drowsiness HP i.e. Nodding, Shaking happens usually. These Head movements of driver can be detected by MEMS. Fig 2 shows the block diagram for overall process [3].

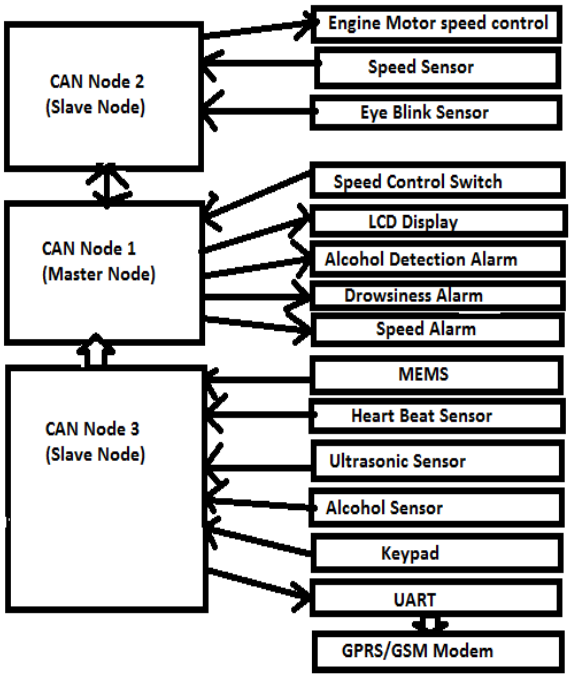

Fig. 2 Block Diagram for Overall Process [3]

This system contains CAN protocol, SENSOR MODULES and Handbrake system. CAN is a protocol works like a master-slave. The Sensor modules contains micro-electromechanical system (MEMS), Eye Blink Sensor (9008), Alcohol Sensor (MQ-3), Heartbeat Sensor (1157), Speed Sensor (T852f098) and Ultrasonic Sensor (UM30) to sense the Eye blink, alcohol, heartbeat, ultrasonic, speed and MEMS etc. The eye blink sensor (9008) is used to measures the blinking rate of the driver's eye continuously. MEMS sensor is used to monitor the head pose like Nodding, Shaking of the driver head. The MQ-3 sensor i.e. alcohol sensor will

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detect the alcohol depends on human breath. HR sensor measures the number of heartbeats per unit of time. Speed sensor is used to detect the speed of the vehicle and system will display it on LCD. Ultrasonic Sensor will give the distance between the present vehicle and the vehicle which is coming in the opposite and rear direction. D.Sowmya, I.Suneetha and N.Pushpalatha [4], developed a driver behavior monitoring and tracking the accident location system. Fig. 3 shows block diagram of Embedded System or proposed system. This system consist of MEMS-Micro electro mechanical system, GSM-global subscriber module, GPS-global position system, alcohol detector, eye blink detector, gas leak detector, fire detector. The proposed system contains nine modules. Namely MEMS-Based accelerometers, can be divided into two important micro system architectures: piezo resistive and capacitive, which possess internal proof masses, Alcohol sensor is a MQ303A provides fast response to alcohol, very good sensitivity and it is suitable for portable alcohol detector, Gas sensor detect leaks of hazardous gas, Eye blink sensor is used to predict whether the eye is in closed position or in open position, Liquid Crystal Display (LCD) is used to display result, MAX 232 is a dual RS232 transmitter / receiver which satisfy all RS232 specifications, Global Positioning System (GPS) is used to determine the exact location, time, velocity, GSM allows the transmission of basic data services such as SMS, and ARM LPC2148 is used in portable devices due to reasonable performance and low power consumption.

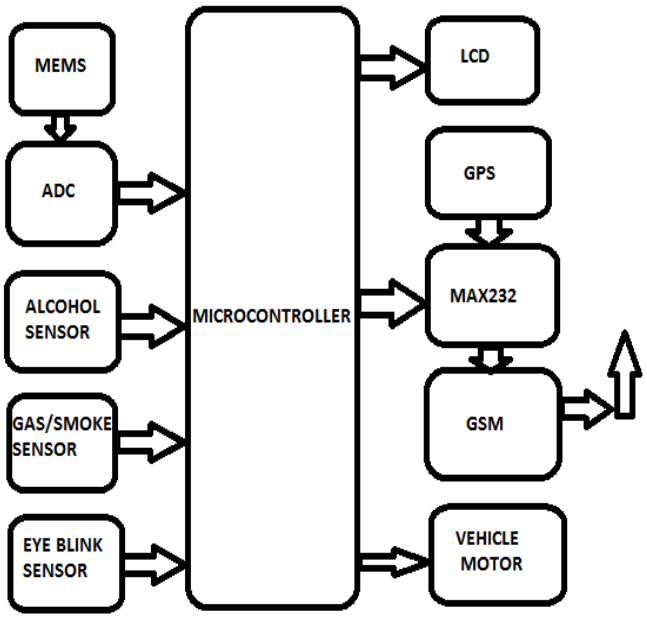

Fig 3 Embedded System Design [4].

Rachita Shettar et al. [5], develop an accident prevention and control system. In this proposed system, there are two parts, one is accelerometer circuit and second is alcohol sensor circuit. These two subsystems are used for detection of drowsiness and detection and control of a vehicle due to alcohol consumption respectively. Fig 4 shows the block diagram of system. The proposed system is designed and developed to detect the alcohol consumption and drowsiness of a person and also break failure in a vehicle. Proposed system consists of MEMS sensor (it is an Accelerometer and this sensor will activate which work on tilt motion that is nothing but head movement), Alcohol sensor (MQ3 sensor will detect the smell of alcohol), Driver circuit, Relays, LCD display, Power supply, PIC Microcontroller, Brake failure detect. Software part contains MPLAB IDE (that runs on a PC to develop applications for Microchip Microcontrollers and digital signal Controllers and it is also known as Integrated Development Environment (IDE), because it provides a single integrated environment to develop code for embedded microcontrollers) and PICkit3 (it allows debugging and programming of PIC microcontrollers Using powerful graphical user interface of the MPLAB IDE). Here MEMS sensor accelerometer can detect and control the accident due to drowsiness and also system will indicate the brake failure in LCD as a precaution to driver.

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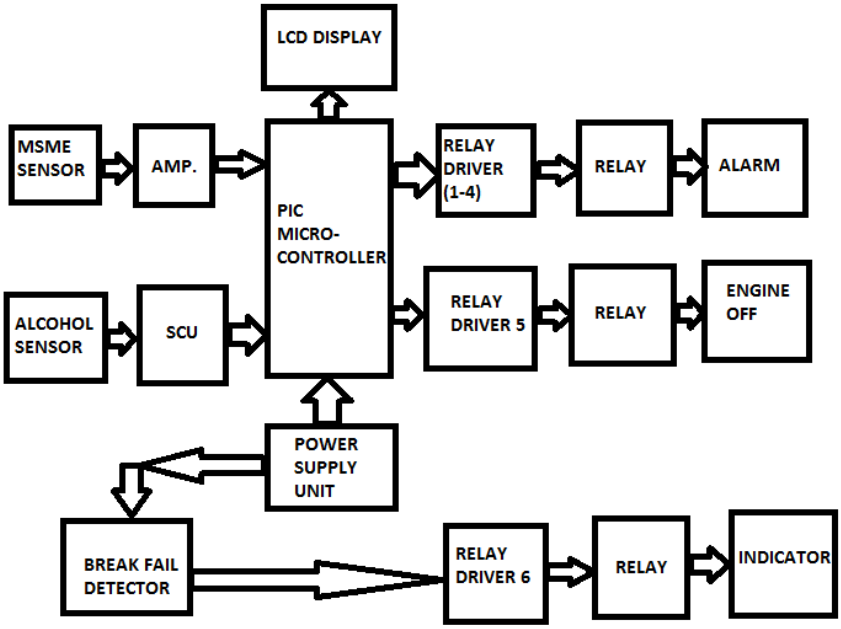

Fig. 4 System block diagram [5]

III. CONCLUSIONS

The aim of this paper to provide overview on safety measures from road accidents which occur due to drowsiness, alcohol consumption and brake failure. Existing systems are explained in the existing work section of this paper and provide overview on it.

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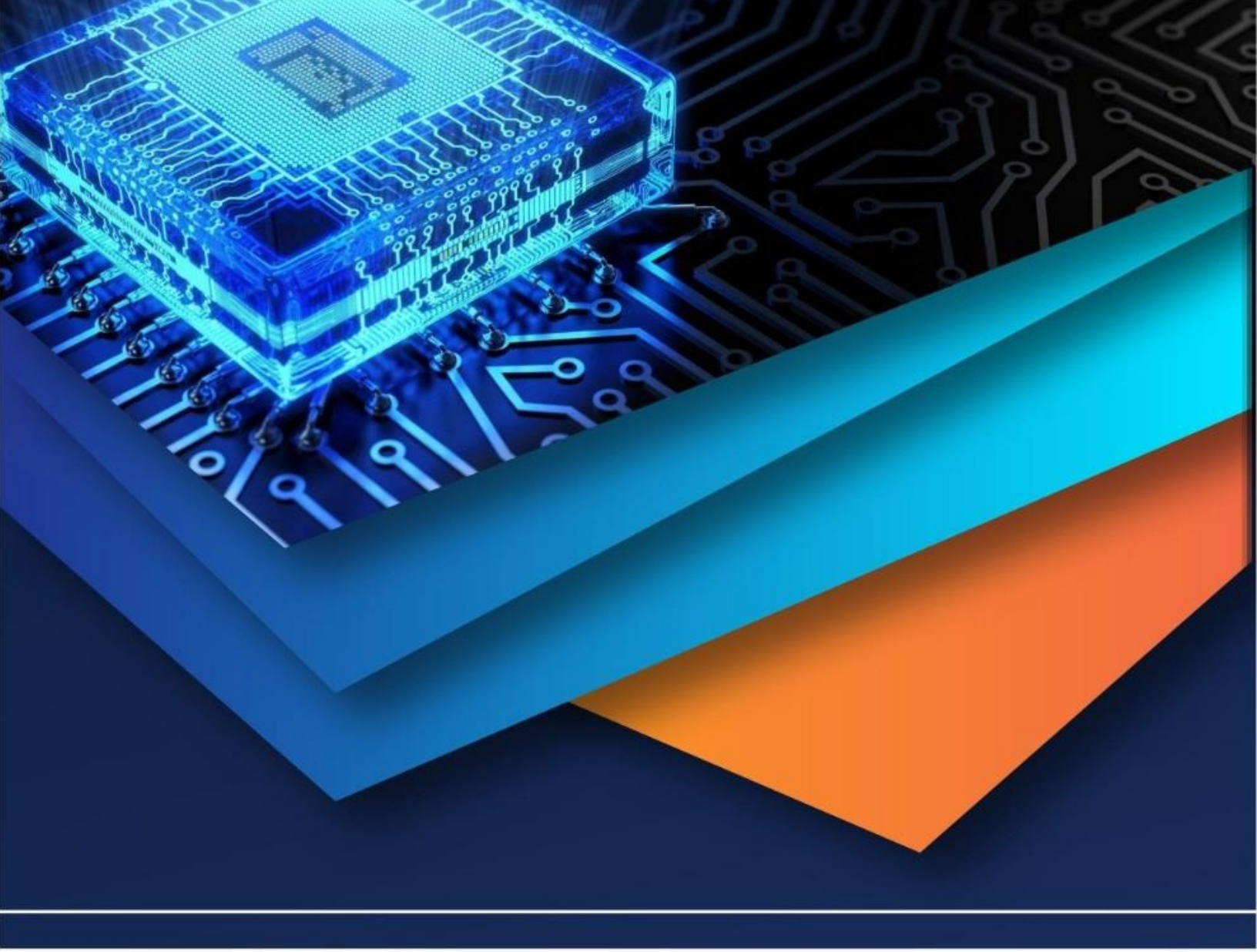

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