Dizziness Detector in Cars

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Abstract – The objective of this project is to develop a safety system which consists of systems that are breath alcohol detector, ignition switch controller, pinhole camera setup, Arduino setup, GPS module, car's infotainment system and an alarm. The existing systems uses an in-car augmented reality system which can predict the collision if it's about to happen. There also exists a breath detector in which a person has to blow to check if the person has consumed alcohol. We propose to develop a safety system which will consist of a breath analyzer which will be connected to the ignition system of the car and if the alcohol limit exceeds the ignition system is automatically turned off. The cars will also have a camera installed which uses artificial intelligence to check driver's condition and turn on the alarm if the driver is dizzy. The car will automatically send the location of the car to the important contacts. The hardware modules include the PIC16F877A microcontroller, alcohol sensor, LCD panel and ignition switch circuitry. Programming of the PIC microcontroller will also be required. After installation the circuit will be able to detect alcohol concentration and check if the driver is sleepy. Then, accordingly the system decides to enable or disable the ignition system and alarm. Therefor this system will be very useful to control accidents happening because of dizziness.
Keywords: breathalyzer, blood alcohol concentration, ignition, alcohol, drunk.

1. INTRODUCTION

The breath alcohol detector is a device which is used to check blood alcohol level by blowing air into the funnel fixed in the device and shows the level on the display fixed in the device. Initially, the breath alcohol detector's usages were quite limited and only being utilized in purpose to detect and display blood alcohol concentration only.

In this project, a breath alcohol detector which controls the ignition using microcontroller will be developed along with an AI integrated camera which will learn driver's gestures, detect if he is dizzy and start an alarm instantly if detected. The infotainment system of the car will be conned to driver's mobile device using android auto or apple car play and it will automatically send real time location of the driver to the emergency contacts.

The alcohol detector will be connected to a PIC microcontroller which will be programmed in such a way that it will automatically turn off the ignition switch and send a signal to the infotainment system to send driver's location to emergency contacts so that help could be sent to the driver.

The camera installed in the car will use artificial intelligence and will keep learning driver's normal behavior, when it detects that the driver seems dizzy it automatically turns on the alarm in the vehicle to wake the driver and turns the hazard lights on to warn nearby vehicles.

2. EXISTING TECHNOLOGY

The existing technologies includes detection of alcohol presence in the vehicle by using laser. Thissystem measures the difference in wavelength of the laser due to presence of compounds such as alcohol or ethanol in the cabin of the car. Other systems which exists include a breath detector with electric suction fan which sucks in the air from around to detect breath alcohol level The other system can detect the gas leakage and alcohol detector .Both systems are mounted on the same PCB board and a switch to switch between the devices.

3. PROPOSED SYSTEM

i. BREATH CONTROLLED IGNITION SWITCH

A breath controlled ignition switch is a mechanism which is installed in a vehicle's dashboard. The driver must breathe into the device before turning on the vehicle. If the analyzed result exceeds programmed permitted blood and alcohol concentration, the vehicle will not start.

These devices are calibrated before installing into the dashboard of the vehicle. The breath detector sends the values to a PIC microcontroller which is programmed with governmental alcohol limits. The PIC microcontroller is then connected to the ignition switch of the vehicle. If the detected alcohol limit is within the permitted level it allows the ignition switch to work and if the level is above the ignition switch is disconnected and the vehicle does not turn on.

To get help to the driver we will be using the car's infotainment system. The system will be connected to the internet by using the mobile device of the user. Android auto or Apple car play will be used to connect to the infotainment system and the real time location of the driver will be sent to the decided contacts.

ii. ARTIFICIAL INTELLIGENT CAMERA SETUP

Artificial intelligent camera is a camera which is connected to the a system and it keeps sending real time videos converted into binary algorithms to an API which is linked to a database.

API(Application Programmable Interface) is the intermediate between the database and the real-time data obtained from the camera setup in the vehicle.

The camera is installed in the vehicle in front of the driver. It keeps recording the videos and sending it to the API using the infotainment system which uses the internet on the mobile device of the driver. API converts all the data into binary form and stores it into the database simultaneously it keeps matching the data from both the camera and the database, if the data does not match it sends a signal which turns on the alarm in the vehicle.

4. REQUIREMENTS

1. Breathalyzer:

A breathalyzer is a device which is used to measure amount of alcohol in one's blood. Breath analyzers do not directly measure blood alcohol content or concentration, which requires the analysis of a blood sample. Instead, they estimate BAC indirectly by measuring the amount of alcohol in one's breath.

2. PIC Microcntroller:

PIC microcontrollers are a family of specialized microcontroller chips produced by Microchip Technology in Chandler, Arizona. The acronym PIC stands for "peripheral interface controller," although that term is rarely used nowadays. A microcontroller is a compact microcomputer designed to govern the operation of embedded systems in motor vehicles, robots, office machines, medical devices, mobile radios, vending machines, home appliances, and various other devices. A typical microcontroller includes a processor, memory, and peripherals.

3. In-Vehicle Infotainment System:

Integrated infotainment systems in automobiles that deliver entertainment and information content. Each IVI system is different, typical tasks that can be performed with an in-vehicle infotainment system include managing and playing audio content, utilizing navigation for driving, delivering rear-seat entertainment such as movies, games, social networking, etc., listening to incoming and sending outgoing SMS text messages, making phone calls, and accessing Internet-enabled or smartphone-enabled content such as traffic conditions, sports scores and weather forecast.

4. Ignition Control Switch:

An ignition switch or starter switch is a switch in the control system of an internal combustion engine motor vehicle that activates the main electrical systems for the vehicle. Besides providing power to the starter solenoid and the ignition system components (including the engine control unit and ignition coil) it also usually switches on power to many "accessories" (radio, power windows, etc.). The ignition switch usually requires a key be inserted that works a lock built into the switch mechanism. It is frequently combined with the starter switch which activates the starter motor. The ignition locking system may be bypassed by disconnecting the wiring to the switch and manipulating it directly; this is known as hotwiring.

5. Artificial Intelligent Camera:

This is a normal camera such as a pin hole camera or go-pro cameras which uses machine learning capabilities to learn driver's normal behavior. It activates alarm when any abnormal behavior is matched.

5. SYSTEM TESTING AND CALIBRATION

The whole safety console need to be completely tested and calibrated before installation. The power supply is checked using led bulb as load. The breath analyzer is calibrated by trained technicians who install governmental blood alcohol concentration levels. The breath analyzer needs to be checked from time to time for optimum result.

The calibration of PIC microcontroller is performed by connecting the led bulb as load and is checked with the values from breath analyzer. The PIC microcontroller is also connected to a mobile device to check if the real time location is shared.

The artificial intelligent camera system is connected to the infotainment system. API is programmed in such a way that it converts the real-time data and stores it into the server. The API also keeps matching the received data and already entered data as dizzy and not dizzy. If the data doesn't match it considers as dizzy and turns on the alarm in the vehicle.

6. WORKING

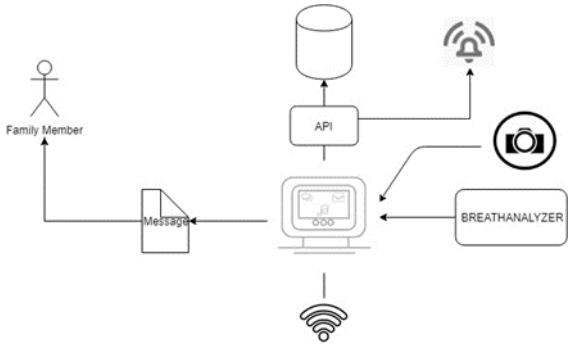

Fig 1, Architecture Diagram

The breath detector is installed in the car around the driver's seat. If the breath detector finds that the driver is not capable of driving and the blood alcohol level is high it sends the signal to PIC microcontroller which turns off the ignition switch

which doesn't allow the driver to turn on the car. The PIC microcontroller also send signal to the car's infotainment system which is connected to the user's mobile device using Android Auto or Apple Car Play. This sends real time location to selected contacts so that help can be reached. Apart from dizziness caused by alcohol accidents also happen when people fall asleep while driving long distances, to tackle this we have installed an artificially intelligent camera setup which is installed in front of the driver's seat. The camera keeps recording the behavior of the driver and sends it to API. The API converts the video into machine understandable format and stores it on the server. The machine learning concept is used to keep matching the coordinates sent by the API. If the match isn't found then the API signals the alarm to instantly turn on and this wakes up the driver in case he is sleepy.

7. CONCLUSION

The concept of blood alcohol detection and artificial intelligence is used to increase road safety and hence decrease accidents happening due to dizziness. Based on the driver's condition the vehicle is controlled automatically and this system ensures that the driver is taken care by sending real-time location of the driver to the selected contacts. Hence, this system will be a great leap in decreasing accidents and saving lives on the road.

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