Volume 6, Issue 5, May 2016 ISSN: 2277 128X
International Journal of Advanced Research in Computer Science and Software Engineering
Research Paper
Available online at: www.ijarcsse.com

Smart Driving System

Manoj S. More, Krutika P. Thakur, Sonali K. Gaikwad, Nikita B. Chabukswar
Department of Computer Engineering, SKN-Sinhgad Institute of Technology and Science, Lonavala, Pune, Maharashtra, India

Abstract: Drunk driving, or officially driving under the Influence (DUI) of alcohol, is a major cause of traffic accidents throughout the world. Crashes due to drunk driving are serious danger not only to the drivers themselves but also to the public present on the road. Drivers under the influence of alcohol show a marked decline of perception, recognition, and controlling of vehicle, so they tend to make any types of harmful moves. We propose a highly capable system aimed at early detection and alert of dangerous vehicle maneuvers typically related to drunk driving. A program installed on the mobile phone computes accelerations based on sensor readings, and compares them with ideal drunk driving patterns extracted from real driving tests. Once any proof of drunk driving is present, the server will automatically alert the driver or call the police for help well before accident actually happens.

Index Terms-Alcohol Detection, Pollution Control, GPS, Android, Web Server, Wi-Fi.

I. INTRODUCTION

Drunk driving, or officially driving under the Influence (DUI) of alcohol, is a major cause of traffic accidents throughout the world. A report of Ministry of Road Transport Highways, Government of India says during the year 2011, there were around 4.98 lack road accidents, which killed 1.42 lack people and injured more than 5 lack persons, many of them are disabled for rest of their lives. Crashes due to drunk driving are serious harm not only to the drivers themselves but also to the public present on the road. Drivers under the influence of alcohol show a marked refuse of exclusive, recognition, and controlling of vehicle, so they tend to make any types of harmful moves.

We propose a highly capable system aimed at early detection and alert of harmful vehicle maneuvers typically related to drunk driving. A program installed on the mobile phone computes accelerations based on sensor readings, and compares them with ideal drunk driving patterns extracted from real driving tests. Once any proof of drunk driving is present, the server will automatically alert the driver or call the police for help well before accident actually happens.

Here, three-axis accelerometers are used to measure the acceleration difference of vehicle body in X, Y and Z-axis. The presented system detects the harmful driving behavior presented in this paper are from the recognition of driving states. Current driving states including lane-departure, turning, acceleration, braking, and bumping are derived from the measurements. The researchers have found that there are some patterns of driving behaviors for these drivers who are under influence of alcohol.

Based on this research we can conclude that there are some categories related to drunken driving behaviors. All these driving behaviors are related to the vehicle movement. Also depends on the drivers alertness decision. The hints to solve this problem can be classified as follows:

1. Clues related to alertness problem and decision:

Example: such as poor response to traffic signal, Failure in identifying alley markers and driving without headlights at dark and drive on wrong side of road

2. Hints related to maintaining Speed issues:

Example: coincidental acceleration or deceleration and breaking improper and stopping casual.

3. Stimulus related to lane location maintenance problem:Example: Driving with compress and turns, swerving, transport, forbidding turning or taking a slim radius turn

II. LITERATURE SURVEY

Some researches have already done in the region of driving monitoring tools. Some of them are knows as driver alertness monitoring. It works on detecting and preventing sweat of the driver. Other researchers focus on real-time driving pattern recognition. In detail, they worked with various methodologies and techniques mentioned as follows: Gradient orientation method is employed to describe and invention seat belts After the image pre-processing, the front window position and the human face detecting, this feature is ultimately extracted in the selected field and the conclusion is given by counting the seat belt feature in the sector which close to the right side of the detected human face sector[4].

Model predictive control method is used to the better the traffic flow. here used the OVM for a traffic-flow model as it simply Describes traffic dynamics using a differential equation. The OVM describes individualize properties of traffic congestion[1].This paper presents the three-axis accelerometer of an Android-based smartphone to record and analyze various driver behaviors and external road conditions that could potentially be nasty to the health of the driver, the neighboring public, and the automobile[2].It has a smart electronic system which continuously monitors the alcohol

content in the air surrounding by the body of the protagonist. Speed of the vehicle varies on the content of alcohol invented. for invention it uses GPS to find out the location[3].

These methods all required one or more cameras to be installed in the vehicle and just in front of the driver. It will cause some potential safety issues to the driver. Besides visible methods, the interaction at the vehicle-human interface also gives clues to driving information monitoring. It is assumed that the time derivative of compulsion exerted by the driver at the vehicle-human interface, such as pressure on the accelerator pedal, can help to decide the level of alertness of the driver. Practically, a force sensor on the accelerator pedal to capture the exerted force to predict driver sweat used [7]. Saab, automobile manufacturer has designed an experimental productAlcoKey, which used the breath sample of drivers. It collects the breath sample before they start the vehicle. Then the AlcoKey's radio transmitter sends a signal to the vehicle's electronic control unit.

Now the control unit will determine weather the vehicle to be started or not based on the level of alcohol present in the breath sample. These researches worked based on the interactions between human and vehicle to decide drunk driving. It also required that the vehicle need to be tightly coupled with the auxiliary add-ons, so their compatibility have been compromised most of the time [6].

III. PROPOSED SYSTEM

The causes of accidents on the highway in any countries come from vehicle conditions, human error and highway physical conditions. The major cause of highway traffic accidents is from driving behavior such as best speeding, improper following, irregular lane changing and making improper turns, which is approximately 75% of total accidents. Because of these reasons, we would like to develop a system by which the drivers behavior should get recorded in the real time and which can be monitor remotely by police/relatives.

Our algorithm can detect 8 events which are brake, acceleration, turn left, turn right, lane change left, lane change right, Alcohol usage and Seat belt. figure 1. show the Architecture of Smart Driving System using Model Predictive Control.

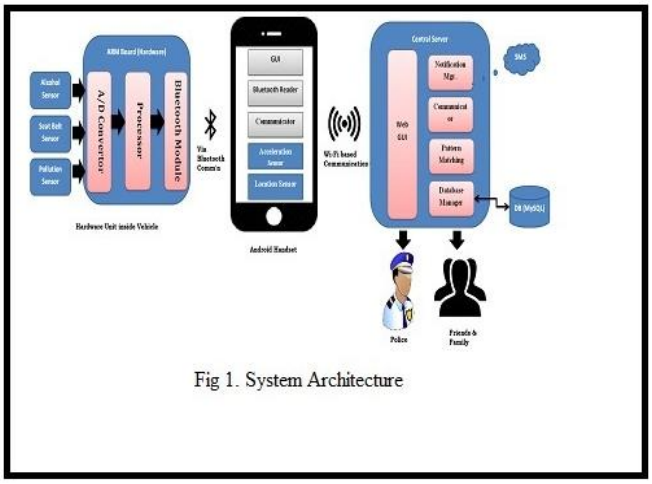

Fig 1. System Architecture

We will need total 5 sensors, out of which 3 are taken via hardware input and 2 are taken from smart phone.

- Hardware Sensors are:

1. Alcohol sensor Alcohol sensor is suitable for detecting alcohol concentration on your breath
2. Seat belt Sensor A seat belt sensor will triggers a warning light or send a notification
3. Pollution/Smoke Sensor Smoke sensor will tell there is a smoke available in a car

The smart phones have built-in sensors such as GPS and accelerometer.

4. Accelerometer sensor It is a sensor that measures the acceleration of a smart phone when there is a movement on the device such as a shake or a tilt
5. GPS sensor To detect longitudinal and lateral movement from location, speed and heading by analyzing the difference in data values.

- On server side:

1. Communication Manager:-Communication Manager will handlethe communication between client side and server side.
2. Database Manager:- Database manager manages the database of the system.
3. SMS notification manager SMS notification manager will handle SMS notifications. SMS will be send to emergency contacts.
4. Web GUI:- It means that the majority of the logic runs on the server side.
5. Pattern matching:-Pattern matching module will match the pattern, which will recognize the reason of rash driving.

- Working:

First hardware (ARM Processor) will detect alcohol sensor, seat belt sensor and smoke sensor. The values of these three sensors will be sends to mobile application via Bluetooth. Android application will detect remaining two sensors i.e. location sensor and accelerometer sensor. The values of all the sensors will be sends to server for recognising purpose by using Wi-Fi. Server will match the pattern using pattern matching module. If the server is satisfies to detect driver is drunk the system will send a notification (SMS) to family and friends and also to police.

IV. CONCLUSION

The outcome concludes that:

1. These driving patterns produce clear idea about driving under the influence of alcohol.
2. The pattern related to maintaining lane position speed control is the prime categories for good enough to conclude drunken drive identification.
3. If we focus on these hints we can implement the identification system for drunk driving or rush driving.

REFERENCES

[1] Md. AbdusSamad Kamal, Member, IEEE, Jun-ichiImura, Member, IEEE,Tomohisa Hayakawa, Member, IEEE, Akira Ohata, and Kazuyuki Aihara ”Smart Driving of a Vehicle Using Model Predictive Control for Improving Traffic Flow” IEEE Transaction On Intelligent Transactional Systems, vol. 15, no. 2, April 2014

[2] Mohamed Fazeen, Brandon Gozick, Ram Dantu,MoizBhukhiya, and Marta C. Gonzlez ”Safe Driving Using Mobile Phones” IEEE Transaction On Intelligent Transactional Systems, vol. 13, no. 3, september 2012.

[3] Devashish Das, Shiyu Zhou, and John D. Lee ”Differentiating Alcohol-Induced Driving Behavior Using Steering Wheel Signals” IEEE Transaction On Intelligent Transactional Systems, vol. 13, no.3, september 2012

[4] Dian Yu1, Hong Zheng2, Cao Liu3 School of Electronic Information Wuhan University Wuhan China Drivers Seat Belt Detection in Crossroad Based on Gradient Orientation 2013 International Conference on Information Science and Cloud Computing Companion.

[5] Ashraf Tahat, Ahmad Said, WaleedQadamani Communications Engineering Department Princess Sumaya University for Technology, ”Android-Based Universal Vehicle Diagnostic and Tracking System” IEEE 16th International Symposium, May 2013.

[6] Dhivya M and Kathiravan S Dept. of ECE, KalaignarKarunanidhi Institute of Technology / Coimbatore, Tamil Nadu, India- 641 402 / dhivyamuthu12, kathiravan.sss@gmail.com Corresponding Author: Kathiravan S. ”Driver Authentication and Accident Avoidance System for Vehicles” Received November 5, 2014; Revised December 30, 2014; Accepted January 20, 2015; Published February 28, 2015.

