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Smartphone Based Sensing Driver Behavior Modeling

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Abstract: *The project aim is to study and discover the main causes of accidents and then provide risk assessments. Tracking dangerous driving behavior can help raise drivers awareness of their driving habits and associated risks, thus, helping reduce careless driving and enforce safe driving practices. Showing determination behavior and energetic pursuit of your ends is presently a causal agent of traffic in a urban centre. Awareness and encourage driver safety are the measures that are added, we are intend to propose a good arrangement that uses detection system and control of the vehicle. For the most part, drivers are not aware that they give disposition to behave aggressively activity found in the ordinary course of events. Among the factors involved in driving, namely the driver, the vehicle, and the environment, the human factor is the most relevant and most difficult to characterize. This project is not only useful for the driver's behavior detection but also provide reconstruction and investigation of accidents and in this way to reduce the risks and dangers for the driver.*

Keywords: *ARM-7,Driver-behaviour,safety,Reckless behavior.*

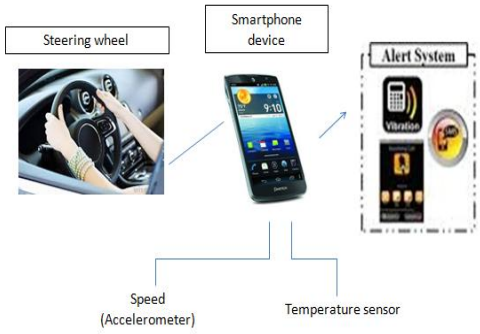
I. Introduction

The problem of aggressive driving appears to be increasing in seriousness. Aggressive Driver behavior shows reckless driving statutes which add notion of a customary way of demeanor happen to complete in a short period and/or intention. Mostly, drivers are incognizant that they give potentially-aggressive activity everyday. As an anticipated outcome that is intented is hard to turn up province with codified necessitate the criterion of connotation be met frequently aggressive driving accuse as rash impulsive. Potentially-aggressive driver behavior is presently a leading cause of traffic in a city area. Driving behavior let in the definition of rough or aggressive driving could result from aggression, selfishness, or competition. As Consequently of this people are go through the road as an more and more life-threatening area. The most deadly factor is human error. This includes unawareness of traffic rules and roadway condition; lack of driving skills; poor judgment; and most importantly, aggressive driving. The main objective of this study is to identify aggressive driving behaviors and underline their effect on traffic safety.

II. Driver Behavior Evaluation

A. Motivation and Objectives

Aggressiveness is modelled as a linear filter over the driving signals, causing a scaling transformation. Once we have empirically demonstrated that aggressiveness causes a modification on the driving signals, we can use this fact to detect aggressive behaviour from those signals. The overall objective is detecting aggressiveness by means of nonintrusive methods to reduce the risk of road accidents. Employing Smartphone in order to collect GPS data, process them, and provide information about risk levels. The provision of information relating to the level of risk the driver is experiencing could alert the driver and make them modify their behaviour, thus increasing road safety.



B. Vehicle Dynamics Control System

Driving is a conceptual whole made up of complicated and related tasks, requiring full concentration and a calm attitude. Bearing a accent and strong feeling, whether they result from the controlling and steering the movement of a vehicle task itself or causal related matters, impact a drivers abilities. For example search has shown that furious drivers are more desirable to take risks such as speeding, rapidly switching lanes, driving dangerously close behind another vehicle and jumping red lights. Several states have to set down in an orderly way particular traffic offenses, usually in some compounding as exhibit purpose and gumptious chase of your ends. Withal, safety without put an address on other route users. Futhermore, practicing certainly knowing the interrelatedness between the automobilist and the driving environment. The target is to step in a way the one permanently get rid of aggressive-driving behaviors. The way of education and manner of acting adjustment are needed which render capable of commonly used offender to learn in what state to conjure self-disciplines, or make experience of imminent exterior infliction of approve. The individual may operate the vehicle fast only doe merely on route with minimum overcrowding thus non causation fuss towards other people. Suppose misdemeanor track record were utilised, it almost finished with a categorization scheme that could recognise between aggressive and non-aggressive misdemeanor.

III. Block Diagram

Fig 1: System design.

The complete system diagram showing the interconnection of Aggressiveness detection system in figure 1. The hardware system consists of GPS module, GSM Module, Accelerometer, Heart Beat sensor, Alarm and LCD which plays important role for Aggressiveness detection system. All these sensors and module are interface to a ARM7 TDMI core processor. USB interface provides a communication path between this received signals and the handheld devices like laptops, palmtops etc.

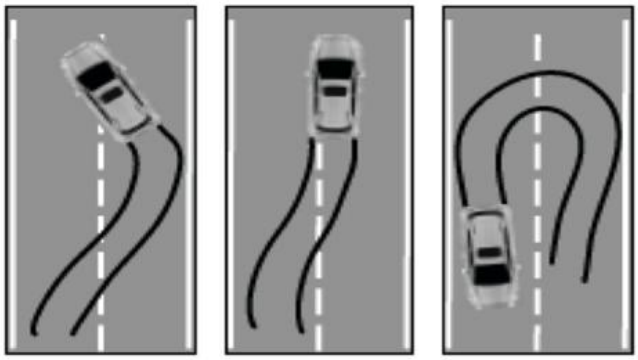
Two types of bio medical sensors are used here. They are

1. Heart beat sensor
2. Temperature sensor

Heart Beat Sensor:

The pulse sensing element offers to survey the heart's function. This sensing element supervise the stream of blood and impart away waste material through the bodypart. As the heart influence blood through the vessel in which blood circulates in the human ear lobe, the quantity of blood in the ear alteration with time. The detector reflect a light lobe through the ear and how much there is or how many there are transmitted light. The clip is used on the tip of a finger or on the web of cutis 'tween fore finger and thumb. In the box the signal is magnify, reverse and lastly separate out. By visual representation to the degree of signal, the heart rate or pulse can be find out. Heart rate varies between individuals. At rest, an grownup or adult have norm pulse of 72 per min. A person trained to compete in sports ordinarily have a deject pulse than less active people. Children have a higher heart rate merely show large variations. The pulse go up while workout and come back easy to rest frequency after the workout. The pulse that come back to regular or normal can be used as an indicant of fitness.

Accelerometer:



Roads are designed in accordance with design guidelines with the objective to modify to achieve maximum efficiency and safety while minify price and environmental damage. The actual time that it takes a process to occur unnatural implusive doings or behavior trying to better safety driving. Existing works on driving behaviors monitoring using smart phones only provide a coarse-grained result, i.e. distinguishing abnormal driving behaviors from normal ones. To improve drivers' awareness of their driving habits so as to prevent potential car accidents, we need to consider a fine-grained abnormal driving behaviors monitoring approach, which can not only detect abnormal driving behaviors but also identify specific types of abnormal driving behaviors, i.e. Weaving, Swerving, Sideslipping, Fast U-turn, Turning with a wide radius and Sudden braking.

The reckless behaviour of driver can be determined by the accelerometer. Overtaking of vehicle is takes place during reckless driving. Vehicle is moving positive and negative x-axis in minimum time which may shows reckless. After detection the necessary steps can be taken. The vehicle can be identified and stopped at anywhere.

GPS:

The GPS smart receiving system characteristic the 16 channels, extremist less power Global Positioning System architectural product. This concluded enabled GPS receiving system furnish eminent place, speed and accurate time execution and in addition eminent sensitiveness and trailing potentiality. Extremist low power CMOS technology, the GPS receiving system is paragon for many portable practical applications like PDA, Tab PC, a mobile phone with more advanced features etc. The GPS receiver provides latitude and longitude information which provides location of vehicle. The profit to exploiter is that its a ultra low power consumption, easy and fast to put in , low cost with high performance.

GSM:

In (electronics) GSM is Group Special Mobile and (telecommunications) Global System for Mobile communications.

Figure 2: GSM model

The GSM is used to send information via a wireless channel through air. The information which is collected by ARM processor send wirelessly through GSM.

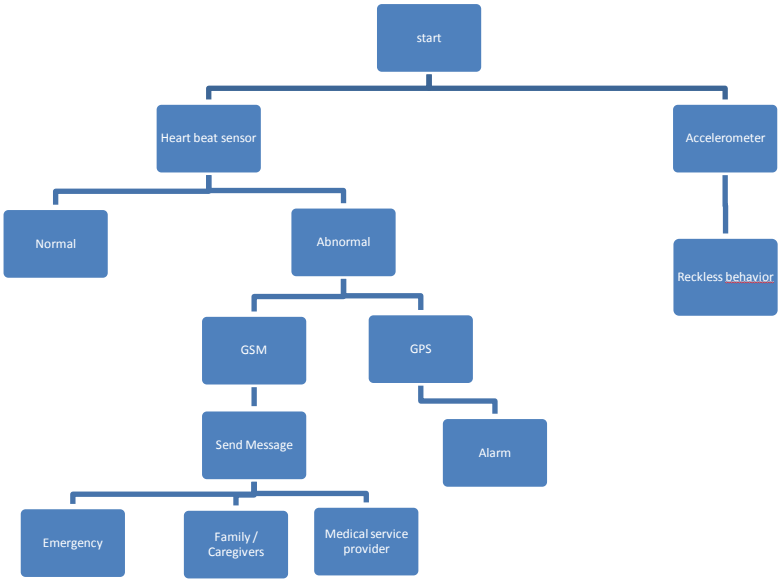


Fig 2: Detection system flow chart

IV. Conclusion

The Driver behavior can be monitor by knowing their heartbeat and reckless driving by accelerometer. Our objective is to combine this information detect aggressiveness behavior and reckless driving and send those information via GSM. These systems are not only useful for the driver's behavior detection but also render the reconstruction and probe of collision storing driving related Conduction and in that manner cut down peril for the operator of the vehicle. SMS based service is used to make Monitoring and detecting the behavior of drivers is vital to ensuring road safety by alerting the driver and other vehicles on the road in cases of abnormal driving behaviors. Driver behavior is affected by many factors that are related to the vehicle and the environment and over the course of driving a driver will be found to be in a particular state and the state for a period of time or shift to another state. Hence, it is important to capture the static and the dynamic aspects of behavior and take into account the contextual information that relates to driver behavior.

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