Development of an Intelligent Steering System for Reducing Accidents Due To Drowsy Driving & Fatigue

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Abstract: *The reasons that an accident happen is because the driver falls asleep whiledriving. The accident happened is unexpected think of routine people. In earlier days vehicles were equipped with the alarms which were using motion detector, image processing or by detection of sidelines of road. According to study on human behavioral changes while sleeping, loosening of hand grip(muscle relaxation) & pulse rate lowering takes earlier to the changes of face images or eyelid closing. So by considering this facts &researches, by using the distributed pressure sensor & pulse rate sensor we are trying to decrease response time of the system than earlier systems & give that output to driver's seat to awake the driver as early as possible to prevent accidents.the device is functioning when the signal is detect from human body of driver which has been falls asleep while driving , giving the warning to the driver that will get a sudden shock to give more concentration when driving. That will prevent the driver falling asleep with careful consideration of the consequences.*

Keywords:- *Intelligent steering system, Distributed gap sensor, fatigue, sleeps disorder, excessive sleepiness and accidents.*

I. INTRODUCTION

The main cause of road accidents happening daily is the driver falls asleep while driving.It is well recognized that driver fatigue is a contributing factor in a large number of road accidents. Thus, developing intelligent systems for driver's vigilancelevel is becoming a central issue in the field of active safetyresearch and Their hands will move less. Human body signal transmitted and detected in relation to the state of consciousness will be analyzed and correlated for the purpose of the system design and application.

However, a promising approach can be found in considering the data available at the interface between driver and vehicle.Particular, the grip force that a driver applies to the steering wheel has been used in driver's hypo vigilance detection systems. It is important to notice that the effectiveness of such systems can significantly be improved through the fusion of different kinds of data. The purpose of anti-sleep device for drivers via intelligent steering system is to givewarning to the driver from falling asleep while driving. The function of device is detecting human motion when falling asleep such as the relaxation of muscles, loosening of hand grip, slowing of brain activity, slowing of heartbeat or pulse rate closing of the eyes, head bending forward. When the system detects this signals from human body, it will interpret the driver is falling asleep and will trigger a signal to the receiver or detector. In the detector there is a vibrating mechanism to driver's seat &alarm in the form of buzzer being incorporated development. This innovative project is to be undertaken based on highly involved electronic engineering principles and application. The technology is based on the fact that when people drive and are reasonably alert, they're constantly applying pressure to the wheel andmoving their hands along it. If someone should fall asleep and have a heart attack or otherwise lose consciousness, that pressure will lessen and for passengers when the signal is detected from transmitter, the seat will vibrate to aware the driver &the buzzer will sound thus awaking other passengers also.

II. LITERATURE REVIEW:

NORNADIA BINTI JUREMI [Faculty of Computer and Electronics Engineering University of technical of Malaysia Melaka]
The project is about developing the anti-sleep device for any drivers via motionDetector that has using the principles of electronic.
Lyznicki, Doege, Davis and Williams, 1998the effects of sleepiness and fatigue are very much the same. Studies in the psychological literature have linked sleepiness and fatigue to decreases in vigilance, reaction time, memory, psychomotor coordination, information processing, and decision making.

III. STEERING WHEEL DISTRIBUTED SENSOR

Our main objective is to integrate a distributed sensor network into the steering wheel, as shown in Fig. 1. Each unit of the distributed

sensor network cosist of asmall microcontroller, which ismonitoring the actual sensing element and transmitting the local data over the sensor chain. Adopting a distributed sensor network approach, the wire a set of straps and fittings of the overall sensor and its combination into the steering wheel is dramatically simplified

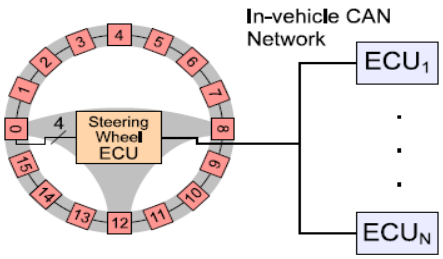

Fig.3.10 Steering wheel distributed sensor.

Fig. shows a proposed application scenario of the distributed sensor network, in which 16 units are spilled all over it, so that a good spatial resolution is obtained. In the consideredscenario, the first element of the sensor chain is connected tothe Steering Wheel ECU. Sharing ofdata relevant to driver's fatigue detection, which can be performedby either the Steering Wheel ECU, or another ECU specifically devoted to active safety. As far as the sensor network management is concerned, each unit owns a unique address, which is assigned to it during the configuration phase. The Steering Wheel ECU can retrieve thedata related to a given unit by providing the reading commandtogether with the unit address.

It is also possible to broadcast a command, which does not require a reply, using a general address so that the command is handled by all the units at thesame time. This is useful for activating the acquisition of the sensing elements by all the units simultaneously. In this work we focused our efforts on the measuring of thegrip force applied to the steering wheel. As sensing element we investigated the possibility of using the capacitor that isintroduced by the presence of the hands whose value canchange with the pressure applied to the steering wheel. Thesensing capacitor is inserted in a free running oscillator, whosefrequency can easily be measured by the microcontroller.

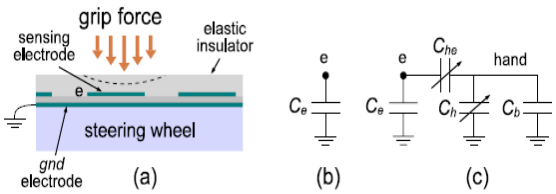

Fig.3.11(a) Capacitive sensing element. (b) and (c) Electrical models in the absence and presence of the driver's hand respectively.

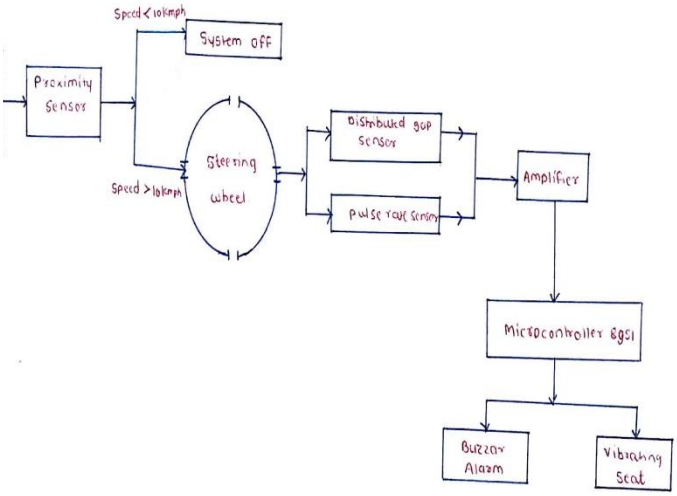

Fig.3.13 Complete circuit for main system

The grip force measured by the potentiometer will be sent to the AT89C51 microcontroller for the next process. Force for left hand and right hand of the driver and vibration status either switch on or switch off.

There is two outputs system for this module, buzzer and vibrator of the seat. Thehigh frequency buzzer was used in this project because it can interrupt the attentiveness of driver whenhim/her getting sleepy or fatigue while driving. So, the driver's will put lots of attention while drivingto prevent this buzzer from activated. The chip AT89C51 will encode the data and driver will get aware.

According to the block diagram in Fig. generally main system supply by two input sensors. Theinput sensors consist of distributed gap sensor and pulse rate sensor. Potentiometer was mounted around the outersteering surface. Each of this sensor were covered half of the steering surface. Then, the output terminal of the sensor will pass through the amplifier circuit to amplify the lower signal generated bythis sensor when some hand forces act on the steering. After that, the output signals that already amplifiedwere connected to the analog input AT89C51 microcontroller. When the vehicle speed reaches the certain threshold speed, all the system will automatically activated.

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