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IMPLEMENTATION OF SAFE DRIVING USING MOBILE PHONES AND DRIVER ASSISTANCE SYSTEM FOR VITAL SIGNAL MONITORING

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Abstract:

In present day's mobile phones are plays most important role in every human life, but at the same time in driving of automobile, mobile phones using is the main reason for accidents of automobiles. This Paper is designed and implemented for Safe driving using mobile phones with ARM7 and GSM modules. The use of mobile phones affected driving in different ways. Drivers missed exits, failed to observe traffic signals, and forgot to adjust the speed according to the limit. It was not unusual with incidents or near collisions with other vehicles or objects, or driving off the road, when mobile phones were used while driving. So the driver compulsory take some kind of safety precaution in conjunction with a mobile phone call. By using this system thoseproblems are maximum reduced and safely drive the automobile. and also detect the alcohol detection and also to track the vehicle to find the culprit and in intimation to the Control Room with their location, and also the vehicle can be stopped . ECG is used to detect the pulse of the driver. If the driver is in abnormal condition that is pulse rate of the person is high then the vehicle is stopped and the position of the vehicle is traced by GPS…this information is sent to the concerned doctor by using GSM module.

I.INTRODUCTION

Cellular .phones were first introduced in the Unite States in the mid-1980s, and their use has since experienced explosive growth. Today there are more than 262 million cellphonesubscribers, representing 84 percent of the United States population. Recent surveys demonstrated that majority of mobile phone users while driving are increased day by day. It has been also proved that use of cell phones while driving puts a driver at a significantly higher risk of collision by distracting his or her mind. It hardly matters whether the person makes use of hands free or hand-held phones, there's no escape to it. The use of mobile phones affected driving in different ways. Drivers forgot to adjust the speed according to the limit. So the driver compulsory takes some kind of safety precaution

rowing aging population is a global phenomenon in recent decades. The increasing number of elderly car drivers and the prevalence of chronic diseases call for driver assistance systems to monitor the health state of drivers. For medical-assistance systems, the reliable measurement of vital signals such as EEG and ECG is one of the most important features . EEG, the recording of electrical activity along the scalp, reflects the brain activities and is widely used in the diagnosis of coma and encephalopathy. ECG and the secondary parameters including heart rate (HR) and heart rate variability (HRV) are key indicators of the cardiac health state. The stressful condition of driving and the possible sudden scenarios on the road, e.g. fatal traffic accidents, may cause severe effects especially on the drivers with chronic diseases . Therefore, a driver assistance system that can monitor the multiple vital signals during driving

is highly desirable for elderly drivers or drivers with chronic diseases. in conjunction with a mobile phone call.. In this paper a concept for overcome the automobile accidents, which the person (driver) mobile phones using while driving. This system consists of two sections, one is mobile section and another is the vehicle section. The functional operation of the system and related work result analysis explained given below.

Proposed System:

Wet electrodes were commonly used to guarantee good contact with skin and prevent relative motion. Capacitive electrodes were also attempted by several groups for unobtrusive ECG measurement. Large area metal plates were installed on the steer or car seat as grounding or driven-right-leg (DRL) electrodes to ensure stable signals. In this study, we developed an innovative in-vehicle non-intrusive driver assistance system that can measure ECG, EEG and eye-blinking activities in one device . Unipolar electrode was adopted to minimize the placement and enhance the simplicity of installation and comfort of drivers. It also provides an easy way to detect the eye activities compared with a video camera. The proposed non-contact vital signal monitoring system can not only monitor the health state of drivers, but also detect driver fatigue. In this paper, details of technology concept and system design were described. Experiments were conducted on a high fidelity driving simulator. It was found that EEG, ECG, and eye-activity signals can be reliably measured by the system. From these, basic medical care functions such as HR monitoring can be accomplished in real time. Moreover, eye features, EEG spectrum, and HRV features from the subjects in alertness and sleepiness states were analyzed to explore the potential algorithm for driver fatigue detection.

LITERATURE REVIEW

eventually results in slow moving traffic, which increases the time of travel, thus stands-out as one of the major issues in metropolitan cities. In [7], green wave system was discussed, which was used to provide clearance to any emergency vehicle by turning all the red lights to green on the path of the emergency vehicle, hence providing a complete green wave to the desired vehicle. A ‘green wave’ is the synchronization of the green phase of traffic signals. With a ‘green wave’ setup, a vehicle passing through a green signal will continue to receive green signals as it travels down the road. In addition to the green wave path, the system will track a stolen vehicle when it passes through a traffic light. Advantage of the system is that GPS inside the vehicle does not require additional power. The biggest disadvantage of green waves is that, when the wave is disturbed, the disturbance can cause traffic problems that can be exacerbated by the synchronization. Traffic congestion is a major problem in cities of developing Countries like India. Growth in urban population and the middle-class segment contribute significantly to the rising number of vehicles in the cities [6]. Congestion on roads.

III. SYSTEM ARCHITECTURE

In this system consists of three main sub systems shown in block diagram fig:1 show in below

- Sensor network.
- Communication network like GSM/GPS systems.
- Vehicle stop systems .

In system contain main part is microcontroller. When any sensor activated in sensor network then automatically microcontroller calculate current location GPS value send alert message to stored number in system, and vehicle automatically stopped.

Block diagram1: **Traffic section**

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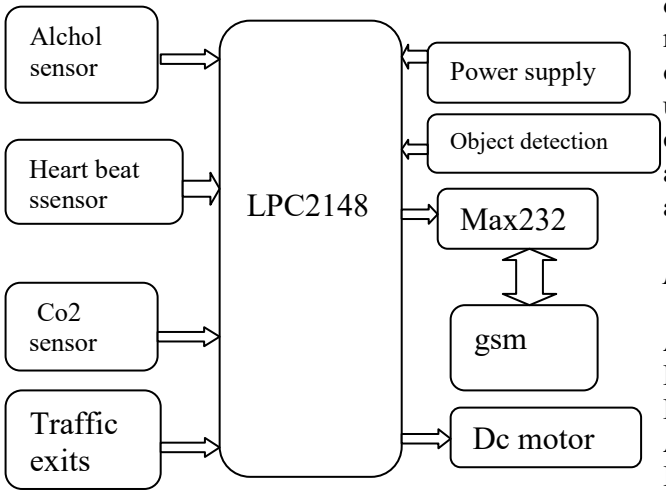

Fig. 1 MAIN SYSTEM BLOCKDIGRAM

Sensor Network:

Proposed system contains rfid sensors from a single net work. These sensors produce analog signal corresponding input parameters. These signals feed to lpc2148 device. list of sensors are given below.

- Heart beat sensor.
- Co2 sensor
- Object sensing sensor
- Traffic signals exists

Co2 sensor:

Co2 level rate contains a receiver module. The c02 rate measure kit can be used to monitor heart rate of patient and athlete. The result can be displayed on a screen via the serial port and can be saved for analysis. The entire system has a high sensitivity, low power consumption and is very portable.

of the intruders. We can't take care of ours while in running by less conscious. If we done all the vehicles with automated security system that provides high security to driver,

heart beat sensor :

EEG detection Based on the raw EEG data detected from the system, the Fast Fourier Transform (FFT) algorithm was applied to decompose the signal into four frequency bands, i.e., β, α, θ, and δ bands. The detected wave components were compared with the standard clinic signals in order to evaluate the performance of the device. Fig. 7 (a)-(c) compared α, θ, and δ waves, respectively. In each figure, the lower trace is the signal obtained from the non-intrusive system whereas the upper one is the typical reference signals detected by a clinic EEG device. The patterns of the two signals are allied to each other, which verify that the brain waves associated with EEG can be detected by the system.

Microcontroller:

The NXP (founded by Philips) LPC2148 is an ARM7TDMI-S based high-performance 32-bit RISC Microcontroller with Thumb extensions 512KB on-chip Flash ROM with In-System Programming (ISP) and In-Application Programming (IAP), 32KB RAM, Vectored Interrupt Controller, Two 10bit ADCs with 14 channels, USB 2.0 Full Speed Device Controller, Two UARTs, Two I2C serial interfaces, Two SPI serial interfaces Two 32-bit timers, Watchdog Timer, PWM unit, Real Time Clock with optional battery backup, Brown out detect circuit General purpose I/O pins.

GSM (Global System for Mobile communications):

The GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services. GSM differs from first generation wireless systems in that it uses digital technology and time division multiple access transmission methods. GSM is a circuit-switched system that divides each 200 kHz channel into eight 25 kHz time-slots; GSM supports data transfer speeds of up to 9.6 Kbit/s, allowing the transmission of basic data services such as SMS (Short Message Service). Another major benefit is its international roaming capability, allowing users to access the same services when traveling abroad as at home. This gives consumers seamless and same number connectivity in more than 210 countries. GSM satellite roaming has also extended service access to areas where terrestrial coverage is not available.

LCD

A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals. Liquid crystals do not emit light directly.

LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They

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use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

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IV.PROPOSED ALGORITHM

Algorithm for the proposed system is divided in two parts as

Algorithm for system consists sensors,ARM7:

1. Initialize SPI (Serial Peripheral Interface).
2. Initialize LCD.
3. Initialize GSM,GPS
4. Initialize all sensors.
5. Display sensors current statues.
6. If any sensor responds then go step7else go to step 8.
7. Car will be stopped and send SMS local station, alerting system on.
8. Car will running condition goes to step 9.
9. Check for impact and if impact detected sends A else go to step 5.

V.WORKING MODEL AND TEST RESULTS

In fig2 show main working display of this system. It displays all sensors statues and show in fig bleow figer.

Fig2: display sensors current statues

Fig3: display and initialized gsm and status

If any rfid activated then microcontroller automatically excute the program. Calculate gps values and location and sends messages to predefine numbers in system. this process show in fig3and alert message in fig4

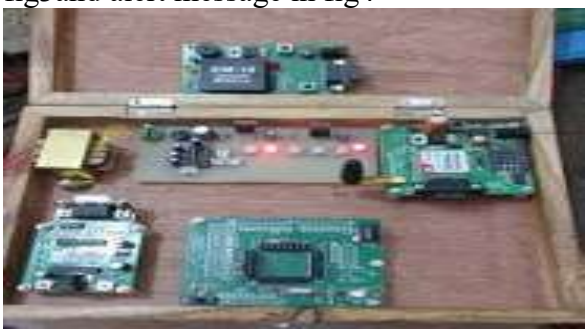

Fig4: display sensors current statues in mobile

CIRCUIT DIAGRAM

Main wiring diagram show in fig:6 is shows how to communication establish all devices and components.

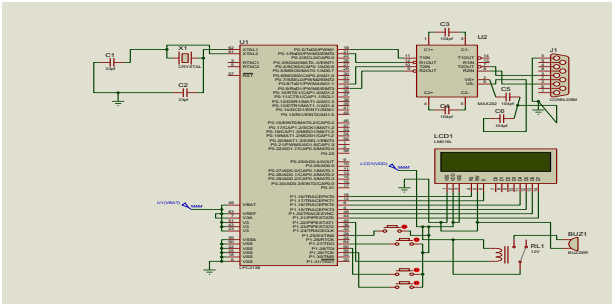

Fig6: circuit diagram for interfacing the sensors and lcd&serial communication

switch is pressed, it will transmit the signal. the sig-nal contains unique id and security code. the transmitter contains pic16f877a microcontroller and zigbee module. the microcontroller sends the commands and data to the zigbee via serial communication. second part is the receiver, which is placed at traffic pole. it also contains pic16f877a microcontroller and zigbee module. the receiver compares the security code received to the security code present in its database. if it matches, then it will turn the green light on. for testing purpose, we used short range rfid reader in our prototype. first, the receiver part is turned on. the red and green signal will be on for 10 seconds duration and orange light will be on for 2 seconds duration one after the other. secondly, we bring the rfid of stolen vehicle into the range of rfid reader. then the signal will turn to red for duration of 30 seconds and a sms is received. thirdly, we bring 12 rfids into the range of rfid reader, and then the green light duration will change to 30 seconds. fourthly, we bring an emergency vehicle carrying zigbee transmitter into the range of zigbee receiver, and then the traffic light will change to green till the receiver receives the zigbee signal as shown in figure 4.

CONCLUSION:

Using mobile phones, we have demonstrated someinnovative applications that are integrated inside an automobile to evaluate a vehicle's condition. The purpose of this study is to examine drivers' use of mobile phones while driving In this proposed paper is used to driving of automobile, mobile phones using are maximum reduced or avoid so in thisway safely drives the automobile. The future scope of this project is movethe automobile to the left side of the road and stops the functioning of the automobile

VIII.REFERENCES

[1] T. Wartzek, B. Eilebrecht, J. Lem, H.-J. Lindner, S. Leonhardt, and M. Walter, "ECG on the road: Robust and unobtrusive estimation of heart rate," *IEEE Trans. Biomed. Eng.,* vol. 58, pp. 3112–3120, 2011.

[2] A. H. Taylor and L. Dorn, "Stress, fatigue, health and risk of road traffic accidents among professional drivers: the contribution of physical inactivity," Annu. Rev. Public Health, vol. 27, pp. 371–391, 2006.

[3] L. Copeland, "Study: Sleepiness a factor in 17% of road deaths," *USA Today*, Nov.8, 2010.

[4] A. M. Williamson, A. Feyer, and R. Friswell, "The impact of work practices on fatigue in long distance truck drivers," *Accident Anal. Prev.*, vol. 28, pp.709–719, 1996.

[5] Y. Dong, Z. Hu, K. Uchimura, and N. Murayama, "Driver inattention monitoring system for intelligent vehicles: a review," *IEEE Trans. Intell. Transp.*, vol. 12, no. 2, pp. 596–614, 2011.

[6] S. K. L. Lal, and A. Craig, "A critical review of the psychophysiology of driver fatigue," *Biol. Psychol.*, vol. 55, pp. 173–194, 2001.

[7] P. P. Caffier, U. Erdmann, and P. Ullsperger, "Experimental evaluation of eye-blink parameters as a drowsiness measure," *Eur. J. Appl. Physiol.*, vol. 89, pp. 319–325, 2003.

[8] B. Roman, S. Pavel, P. Miroslav, V. Petr, and P. Lubomir, "Fatigue Indicators of drowsy drivers based on analysis of physiological signals," in J. Crespo, V. Maojo, and F. Martin (Eds.): ISMDA 2001, LNCS 2199, pp. 62–68, 2001.

[9] S. K. L. Lal, A. Craiga, P. Boorda, L. Kirkupb, and H. Nguyenc, "Development of an algorithm for an EEG-based driver fatigue countermeasure. *J. Saf. Res.*, vol. 34, pp. 321–328, 2003.

[10] C. T. Lin, R. C. Wu, S. F. Liang, W. H. Chao, Y. –J. Chen, and T. –P. Jung, "EEG-based drowsiness estimation for safety driving using independent component analysis," *IEEE Trans. Circuits Syst. I, Reg. Papers.*, vol. 52, no. 12, pp. 2726–2738, 2005.

[11] S. Redmond, and C. Heneghan, "Electrocardiogram-based automatic sleep staging in sleep disordered breathing," in *Proc. IEEE Int. Computer Cardiogram Conf.*, pp. 609–612, 2003.

[12] E. Michail, A. Kokonozi, and I. Chouvarda, "EEG and HRV markers of sleepiness and loss of control during car driving," in *Proc. 30th Annual Int. IEEE EMBS Conf.,* August 20-24, 2008, Vancouver, British Columbia, Canada.

[13] R. Grace, and S. Steward, "Drowsy driver monitor and warning system," in *Proc. the 1st Int. Driving Symp. Human Factors Driver Assessment, Training and Vehicle Design*, Aspen, CO, Aug. 2001, pp. 64–69.

[14] Y. M. Chi, T.-P. Jung, and G. Cauwenberghs, "Dry-contact and noncontact biopotential electrodes: methodological review," *Biomed. Eng., IEEE Reviews*, vol. 3, pp.106–119, 2010.

[15