SMART SECURITY AND SAFETY SYSTEM FOR DRIVER AND VEHICLE

SYED NAWAZ HUSSAIN, Mrs. G. DEEPIKA

Syed Nawaz Hussain, M.Tech Student, Dept. Of ECE, RRS College of Engineering and Technology, Muthangi, Patancheru, Medak, Telangana, India.

2 Guide Details, Mrs. G. Deepika, Associate Professor M.Tech, Dept. Of ECE, RRS College of Engineering and Technology, Muthangi, Patancheru, Medak, Telangana, India.

Abstract: Driver Fatigue is one of the most common reasons for fatal road accidents around the world. This shows that in the transportation industry especially, where a driver of a heavy vehicle is often exposed to hours of monotonous driving which causes fatigue without frequent rest period. Due to the frequent incidence of driver fatigue this has become an area of great socio economic concern. Consequently, road accidents prevention systems by detecting driver's drowsiness, which measure the level of driver inattention and provide a warning when a potential hazard exists, have received a great deal of attention as a measure to prevent accidents caused by driver inattention. In this paper an efficient driver's drowsiness detection system is designed using yawn detection by taking eye detection and mouth detection into consideration simultaneously so that road accidents can be avoided successfully.

Key words: GSM, Sensors, Microcontroller.

I. INTRODUCTION

Road accidents and collisions occur frequently. Every hour 40 people under the age of 25 die in road accidents. Most of the city accidents are due to carelessness of driver but outside the city, accidents occur due to drunken driving only. Due to health condition accident may occur, that is if there is a less pulse level then person may lead to unconscious stage. Loss of person is mainly due to heart attack, drunken driving only so this can be reduced by using different techniques. Alcohol detection method, Heart rate monitoring system, Human level identification methods are used to minimize the level of an accident. Apart from this due to driver vigilance within a fraction of second accident may occur. Most of the accidents occur, if person attends a phone call while driving. To avoid this problem many technique have been used. For Heart rate heartbeats are typically expressed as beats per minute. Sensor is a device that detects changes or events in quantities and provides an output corresponding to the input the signal generally is in optical or electrical signal. Sensors obey certain condition and rules. It is sensitive to the measured property only. It is insensitive to any other property likely in its application. An individual PIR sensor detects changes in the amount of infrared radiation. Their value varies on the temperature and surface characteristics of the objects in front of the sensor. The sensor converts the resulting change in the incoming infrared radiation into a change in the output voltage, and this triggers the detection. For counting the eye blink and detecting the drowsiness level by use of IR sensor. Every year nearly 1.4 million people have been killed because of the wireless customers. There is a highly efficient automatic system for early detection of incoming and outgoing call. Detecting the causes such as alcohol consumption, range pulse level, person and drowsiness level identification, theft detection and security systems are handled in the hybrid driver safety awareness method.
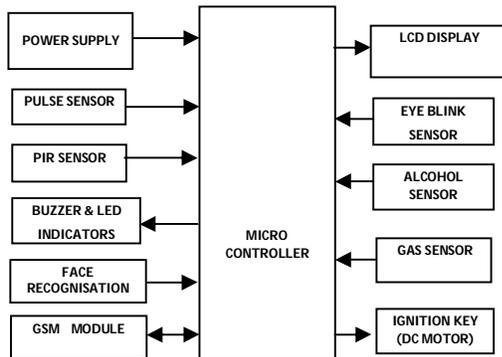
II.   HARDWARE SYSTEM

Fig 1: Block diagram

The main objective of the proposed system is to avoid accident occurrence due to driver abnormal behavior. At the time of vehicle start alcohol sensor will detects the alcohol consumption of the driver if the driver alcohol consumption is above 30mg means access for user is denied by locking of ignition. And if alcohol consumed is limited means the vehicle will be running and next the driver may meet accident due to drowsiness so eye blink sensor monitors the eye blink status of the driver if for particular duration driver doesn't blink his eyes means the vehicle is stopped. Heart strokes may be another reason for accident so the heart rate of patient is measured through PULSE sensor if the heart rate detected is beyond threshold value then along with vehicle stop condition the status will be informed to registered number.

III.   METHODOLOGY

Micro controller: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7TDMI: ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

Liquid-crystal display (**LCD**) is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

Alcohol sensor:

Sensitive material of MQ-3 gas sensor is SnO_2, which with lower conductivity in clean air. When the target alcohol gas exist, the sensor's conductivity is higher along with the gas concentration rising. Please use simple electro circuit, Convert change of conductivity to correspond output signal of gas concentration. MQ-3 gas sensor has high sensitivity to Alcohol, and has good resistance to disturb of gasoline, smoke and vapor. The sensor could be used to detect alcohol with different concentration; it is with low cost and suitable for different application.

Fig 2: Alcohol sensor

Eye Blink sensor:

FEATURES

- EYE BLINK indication by LED
- Instant output digital signal for directly Connecting to microcontroller
- Compact Size
- Working Voltage +5V DC
- TTL output 5V or 0V

APPLICATIONS

- Digital Eye Blink monitor
- Vehicle Accident prevention.
- Suite for real time driving applications.

Fig 3: Eye blink sensor

Gas sensor:

They are used in gas leakage detecting equipments in family and industry, are suitable for detecting of LPG, i-butane, propane, methane, alcohol, Hydrogen, smoke. The surface resistance of the sensor Rs is obtained through effected voltage signal output of the load resistance RL which series-wound. The relationship between them is described:

$Rs \backslash RL = (Vc - VRL) / VRL$

Fig 4: Smoke sensor

PIR sensor:

A Passive InfraRed sensor (PIR sensor) is an electronic device that measures infrared (IR) light radiating from objects in its field of view. PIR sensors are often used in the construction of *PIR-based motion detectors* (see below). Apparent motion is detected when an infrared source with one temperature, such as a human, passes in front of an infrared source with another temperature, such as a wall.

All objects emit what is known as black body radiation. It is usually infrared radiation that is invisible to the human eye but can be detected by electronic devices designed for such a purpose. The term *passive* in this instance means that the PIR device does not emit an infrared beam but merely passively accepts incoming infrared radiation. "Infra" meaning below our ability to detect it visually, and "Red" because this color represents the lowest energy level that our eyes can sense before it becomes invisible. Thus, infrared means below the energy level of the color red, and applies to many sources of invisible energy.

Fig 5: PIR Sensor

Fig 6: GSM Module

GSM:

Global System for Mobile Communication (GSM) is a set of ETSI standards specifying the infrastructure for a digital cellular service.

The network is structured into a number of discrete sections:

- Base Station Subsystem – the base stations and their controllers explained
- Network and Switching Subsystem – the part of the network most similar to a fixed network, sometimes just called the "core network"
- GPRS Core Network – the optional part which allows packet-based Internet connections
- Operations support system (OSS) – network maintenance

SM was intended to be a secure wireless system. It has considered the user authentication using a pre-shared key and challenge-response, and over-the-air encryption. However, GSM is vulnerable to different class of attacks, each of them aiming a different part of the network.

Buzzer:

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave ovens, & game shows. The word "buzzer" comes from the rasping noise that buzzers made when they were electromechanical devices, operated from stepped-down AC line voltage at 50 or 60 cycles. Other sounds commonly used to indicate that a button has been pressed are a ring or a beep.

The "Piezoelectric sound components" introduced herein operate on an innovative principle utilizing natural oscillation of piezoelectric ceramics. These buzzers are offered in lightweight compact sizes from the smallest diameter of 12mm to large Piezo electric sounders. Today, piezoelectric sound components are used in many ways such as home appliances, OA equipment, audio equipment telephones, etc. And they are applied widely, for example, in alarms, speakers, telephone ringers, receivers, transmitters, beep sounds, etc.

Fig 7: Types of Buzzers

Pulse sensor:

Attach to finger and get Analog out from the sensor based on heart beat pulse. You can read the analog output with microcontroller ADC and then plot it or calculate readings like heart beat per minute. It is simple to use and accurate results.

Fig 8: Pulse Sensor

WEBCAM

"Webcam" refers to the technology generally; the first part of the term ("web-") is often replaced with a word describing what can be viewed with the camera, such as a netcam or streetcam. Webcams are video capturing devices connected to computers or computer networks, often using USB or, if they connect to networks, Ethernet or Wi-Fi. They are well-known for low manufacturing costs and flexible applications. Video capture is the process of converting an analog video signal—such as that produced by a video camera or DVD player—to digital form. The resulting digital data are referred to as a digital video stream, or more often, simply video stream. This is in contrast with screen casting, in which previously digitized video is captured while displayed on a digital monitor

Webcams typically include a lens, an image sensor, and some support electronics. Various lenses are available, the most common being a plastic lens that can be screwed in and out to set the camera's focus. Fixed focus lenses, which have no provision for adjustment, are also available. Image sensors can be CMOS or CCD, the former being dominant for low-cost cameras, but CCD cameras do not necessarily outperform CMOS-based cameras in the low cost price range. Consumer webcams are usually VGA resolution with a frame rate of 30 frames per second. Higher resolutions, in mega pixels, are available and higher frame rates are starting to appear.

Fig 9: Webcam

The video capture process involves several processing steps. First the analog video signal is digitized by an analog-to-digital converter to produce a raw, digital data stream. In the case of composite video, the luminance and chrominance are then separated. Next, the chrominance is demodulated to produce color difference video data. At this point, the data may be modified so as to adjust brightness, contrast, saturation and hue. Finally, the data is transformed by a color space converter to generate data in conformance with any of several color space standards, such as RGB and YCbCr. Together, these steps constituted video decoding, because they "decode" an analog video format such as NTSC orPAL. Support electronics are present to read the image from the sensor and transmit it to the host computer. The camera pictured to the right, for example, uses a Sonix SN9C101 to transmit its image

over USB. Some cameras - such as mobile phone cameras - use a CMOS sensor with supporting electronics.

FEATURES:

> Smallest wireless video & audio camera
> Wireless transmission and reception
> High sensitivity
> Easy installation & operation
> Easy to conceat
> Light weight
> Low power consumption
> Small size

SPECIFICATIONS:

- Output frequency: 900MHZ 1200MHZ
- Output power: 50mW 200mW
- Power supply: DC +6~12v
- Distance covered: 10m

IV.   CONCLUSION

This system effectively confirms that the driver is not in a drunken condition before driving and while driving the car. By implementing this system it is possible to safe journey by two wheelers as well as the four wheelers. In future, this system can be implemented with modification such as heart beat monitoring system, obstacle sensing system also PIR sensor which will provide complete security to the driver.

V.   RESULTS

This paper designs the automated wireless irrigation system using WSN. this prototype may be very much helpful in avoiding accidents the project will give favorable results even for real time automobile application too Hardware module for hybrid driver

safety system is obtained with three methods namely alcohol detection, heart rate monitoring system, person level identification method, eye blink sensor and theft identification. Based on alcohol consumption different values are ranged with the inputs such as normal and abnormal conditions.

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