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ACCIDENT PREVENTION AND AUTOMATIC SPEED CONTROL USING EYE BLINKING, HEAD MOVEMENT AND ALCOHOL DETECTION

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Abstract: *This paper describes a real-time online prototype driver-fatigue monitor. It uses remotely located charge-coupled-device cameras equipped with active infrared illuminators to acquire video images of the driver. Various visual cues that typically characterize the level of alertness of a person are extracted in real time and systematically combined to infer the fatigue level of the driver. The visual cues employed characterize eyelid movement, gaze movement, head movement, and facial expression. A probabilistic model is developed to model human fatigue and to predict fatigue based on the visual cues obtained. The simultaneous use of multiple visual cues and their systematic combination yields a much more robust and accurate fatigue characterization than using a single visual cue. This system was validated under real-life fatigue conditions with human subjects of different ethnic backgrounds, genders, and ages; with/without glasses; and under different illumination conditions. It was found to be reasonably robust, reliable, and accurate in fatigue characterization.*

Keywords*- Security, Artificial intelligence, Movement detection.*

1. INTRODUCTION

The ever increasing numbers of traffic accidents all over the world are due to diminished driver's vigilance level. Drivers with a diminished vigilance level suffer from a marked decline in their perception; recognition and vehicle control abilities & therefore pose a serious danger to their own lives and the lives of the other people. For this reason, developing systems that actively monitors the driver's level of vigilance and alerting the driver of any insecure driving condition is essential for accident prevention. Many efforts have been reported in the literature for developing an active safety system for reducing the number of automobiles accidents due to reduced vigilance. Drowsiness in drivers can be generally divided into the following categories:

- Sensing of physiological characteristics.
- sensing of driver operation
- Sensing of vehicle response.
- Monitoring the response of driver.

Among these methods, the techniques based on human physiological phenomena are the most accurate. This technique is implemented in two ways:

- Measuring changes in physiological signals, such as brain waves, heart rate, and eye blinking.
- And measuring physical changes such as sagging posture, leaning of the driver's head and the open/closed states of the eyes.

The first technique, while most accurate, is not realistic, since sensing electrodes would have to be attached directly on to the driver's body, and hence be annoying and distracting to the driver. In addition, long time driving would result in perspiration on the sensors, diminishing their ability to monitor accurately. The second technique is well-suited for real world driving conditions since it can be non-intrusive by using video cameras to detect changes. Driver operation and vehicle behavior can be implemented by monitoring the steering wheel movement, accelerator or brake patterns, vehicle speed, lateral acceleration, and lateral displacement. These too are nonintrusive ways of detecting drowsiness, but are limited to vehicle type and driver condition. The final technique for detecting drowsiness is by monitoring the response of the driver. This involves periodically requesting the driver to send a response to the system to indicate alertness. The problem with this technique is that it will eventually become tiresome and annoying to the driver. The propose system based on eyes closer count & yawning count of the driver. By monitoring the eyes and mouth, it is believed that the symptoms of driver fatigue can be detected early enough to avoid a car accident. The eye blink frequency increases beyond the normal rate in the fatigued state. In addition, micro sleeps that are the short periods of sleep lasting 3 to 4 seconds are the good indicator of the fatigued state, but it is difficult to predict the driver fatigue accurately or reliably based only on single driver behavior. Additionally, the changes in a driver's performance are more complicated and not reliable so in this system second parameter is also considered which a yawning count is. In order to detect fatigue probability the facial expression parameters must be extracted first.

2. LITERATURE REVIEW

Accident avoidance and detection on highways"[1] is when you think of work-related safety hazards, you probably think about what goes on inside the work place. Boneo the greatest threats to your safety are not in the workplace, but rather on the road. Someone is injured every 18seconds.

"Implementation of the Driver Drowsiness Detection System"[2] is Driver fatigue is a significant factor in a large number of vehicle accidents. The development of technologies for detecting or preventing drowsiness at the wheel is a major challenge in the field of accident avoidance systems.

"Accident Prevention Using Eye Blinking and Head Movement"[3] is that describes a real-time online prototype driver fatigue monitor. It uses remotely located charge-coupled-device cameras equipped with active infrared illuminators to acquire video images of the driver.

"Intelligent Car System for Accident Prevention Using ARM-7"[4] that is about making cars more intelligent and interactive which may notify or resist user under unacceptable conditions, they may provide critical information of real time situations to rescue or police or owner himself.

"Speed control module"[5] This paper presents a new design to control the speed of the automobiles at remote places for fixed time. Generally, in automobiles throttle position is controlled by the Electronic Control Unit (ECU) mainly according to the one of the inputs received from the accelerator's Pedal position sensor.

"Intelligent accident identification system using GPS, GSM modem"[5] Recently technological and population development, the usage of vehicles are rapidly increasing and at the same time the occurrence accident is also increased.

"Design and Development of Accident Alerting using Eye Blinking and Head Movement"[6] Drowsy driving has been implicated as a causal factor in many accidents. Therefore, real time drowsiness monitoring can prevent traffic accidents effectively.

"Embedded controller for safety in automobile"[7]This paper proposes a real time accident prevention system by using sensor technology. The objective is to detect the driver's fatigue and drunk driving by alarming if the same pattern repeats and to control the speed near the school zone using RF module.

"Intel-Eye[8]: An Innovative System for Accident Detection, Warning and Prevention Using Image Processing (A Two– Way Approach in Eye Gaze Analysis) Driver in-alertness is an important cause for most accidents related to vehicle crashes. Drowsy driver detection methods can form the basis of a system to potentially reduce accidents related to driver doziness.

3. PROPOSED SYSTEM

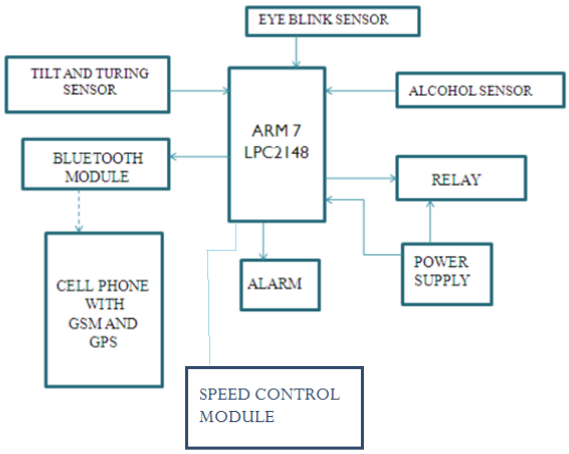

Figure 1: Proposed system

4. WORKING PROCEDURE

The block diagram of proposed system is depicted in fig.1; it consists of LCD, Microcontroller, MQ3, IR, Accelometer and GSM, Buzzer.

Power supply- In this system we are using 5V power supply for microcontroller of Transmitter section as well as receiver section. We use rectifiers for converting the A.C. into D.C and a step down transformer to step down the voltage.

Microcontroller- In this work the micro-controller is playing a major role. Micro-controllers were originally used as components in complicated process-control systems. However, because of their small size and low price, Micro-controllers are now also being used in regulators for individual control loops. The purpose of this work is to present control theory that is relevant to the analysis and design of Micro-controller system with an emphasis on basic concept and ideas. It is assumed that a Microcontroller with reasonable software is available for computations and simulations [3] so that many tedious details can be left to the Microcontroller. The control system design is also carried out up to the stage of implementation in the form of controller programs in assembly language OR in C-Language.

GSM Module- GSM is a digital wireless communication protocol for mobile phones. It is provided with many other useful features such as security, authentication and the ability to switch phones without the need to reconfigure the phone with the existence of the SIM card.

MQ3 Sensor- This alcohol sensor is suitable for detecting alcohol concentration on your breath, just like your common breathalyzer. It has a high sensitivity and fast response time. Sensor provides an analog output based on alcohol concentration.

.***LCD-*** LCD is used to display the data. LCD we have used is 16x2 i.e. 16 characters in 1 line, total 2 lines are there. We could have used a better resolution LCD but due to limitation of money and for project requirement 16x2 LCD is sufficient.

Accelometer- 3-axis sensing small. Accelometer used for the head movement of driver. Different axis gives different values such that we can control the speed of car.

IR Sensor- This Eye Blink sensor is IR based. The Variation Across the eye will vary as per eye blink. If the eye is closed means the output is high otherwise output is low. This to know the eye is closing or opening position. This output is given to logic circuit to indicate by the alarm.

5. CONCLUSION

The project is aimed to provide human safety while driving any vehical. Eye based control will be the future of all types of device control, thus making the operation so comfortable and much easier with less human presence. Several risk operations can be easily performed with this type of application and further research and study on these areas will create a new trend of interacting with machines. Hence, a system to monitor fatigue by detecting eye blink & head movement was developed using self-developed algorithms

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