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Car Security System

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***Abstract*—**The project entitled 'Car Security System'is a system which is designed to provide high security in vehicles. This system is based on arduino controller with GSM and sensor networks. Driver's drowsiness is one of the important factor which leads to vehicle's accident. Eye blink detection technique helps to prevent this by controlling the vehicle's speed. Sensors involved in the project help in detecting the occurrence of accident and also help informing the family with the accident location. The human movement is detected using the PIR sensors and the Tilt sensor will trigger arduino if the vehicle is being towed. The limit switch will provide the condition of the door which is open or closed. The system triggers an alarm detecting the presence of person or towing vehicle or opening of the door in a specific interval of time and the GSM call to user gets activated.

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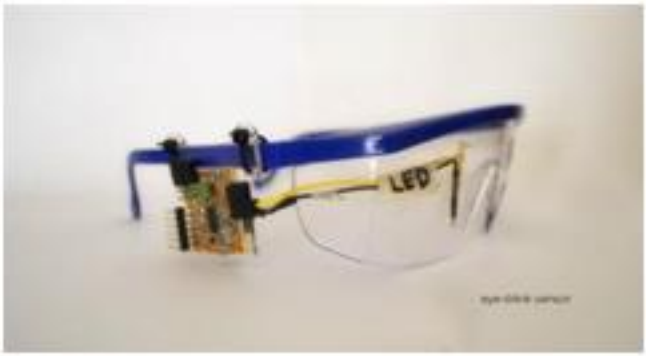
I. INTRODUCTION

In today's world there is a constant need of surveillance at home, industries, public places. There are many vehicle security systems available in the market but tampering with these old security systems is very easy. They lack in providing real time analysis of the scenario. Sirens are used for alerting which can be switched off very easily. To overcome this problem real time analysis must be provided to the user. User can be alerted in real times by many ways. The system can give a call to the user or provide a real time visualization of the scene and record it and some systems are able to keep track of secured valuables if being moved [1].

Being solely concerned with the vehicle security system, we have taken up this project to upgrade existing vehicle security system with this upgraded new technology.

A. Drowsiness detection in vehicle

Inadequate driving leads to vehicle accidents. This happens if the driver is drowsy or if he is alcoholic. An important factor recognized in vehicle accidents is driver's drowsiness. This system detects the eye blink which significantly helps in preventing accidents by alerting the driver.



Infrared transmitter emits infrared rays and these emitted infrared rays are received by an infrared receiver generally called IR transmitter and IR receiver. They should be aligned in Line of sight. When IR transmitter is given a high signal the IR LED is conducts and emits infrared rays.

These transmitted IR rays are received by IR receivers. A Comparator is connected to the IR receiver. The LM358 operational amplifier is used to construct the comparator. In the comparator reference voltage is given to the inverting terminal and the non-inverting terminal receives signal from IR receiver. When there is an interrupt between IR transmitter and receiver the IR receiver is in non-conducting state. Interrupt here is the eye blink of the driver. So the

non-inverting input terminal voltage of the comparator is higher than its inverting input voltage. This sensed analog value feeds as the analog input of the Arduino controller and necessary steps for speed control of the vehicle is initiated.

B. Human movement detection using PIR sensor

Pyro electric ("Passive") Infrared sensor is used to sense motion. It detects movement in sensors range. Sensor detects levels of infrared radiation. Everything in the environment above 0 degree Celsius emits some low radiations. Hotter substances emit more radiations. PIR sensor is used to detect motion (change) and not the average IR levels. The output of the PIR sensor is connected to digital pin of the Arduino controller. Digital output is provided by the PIR sensor. The output of PIR sensor goes high when the sensor detects any variations in its proximity. When the controller receives signal GSM call program is initiated.

C. Vehicle Door opening detection

Switch operated by the presence of the object which is the motion of the machine part is known as limit switch. Safety interlocking is done by limit switch. There is an actuator which is linked with mechanical contacts. When any object comes in contact with this actuator the device breaks the electrical connection. In this way the limit switch will provide the condition of door which is opened or closed. If any object comes in contact with this actuator the device makes or breaks the electrical connection. The system triggers an alarm on detecting opening of the door and initiates a GSM call.

D. Vehicle Towing Detection

Tilt sensors are used to detect the inclination or the orientation. The purpose of using tilt sensor in this project is to detect whether car is being towed .The car towing is detected and informed to the car owner to avoid theft of vehicle or damage in case of towing. It is made up of two cavities and a conductive free mass inside the hollow space. One end of the cavity has two conductive poles. The ball is made of mercury because mercury is dense enough and switch is not susceptible to the vibrations. When the sensor is oriented in a way that the end is downwards the mass rolls on to the poles and conducts them and acts as the switch throw. When the switch conducts it sends sensed value to the arduino controller and controller is programed to initiates a GSM call.

E. Accident detection

For Accident Detection we use Vibration Sensor which on detecting vibrations generates a voltage using piezoelectric effect. Due to the vibration, a counter weight inside the sensor applies pressure on the piezoelectric element. This pressure creates an electric charge in the piezoelectric element and is the sensor's output. This system informs the ambulance, relatives and the police. This system is fitted in the car and

When the accident takes place and it informs the ambulance or any numbers which are input in the system and accordingly sends the GPS locations. It makes use of GSM and GPS technologies. GPS tracks the coordinates of accident location and GSM is used to send these coordinates via SMS.

F. Arduino controller

The Arduino Uno is microcontroller based on ATmega328P. It has 14 Digital and 6 Analog input-output pins. It operates on 16 Mhz quartz crystal. In this project the Transmitter and the receiver pins of Arduino Uno board is used for communication with GSM module. Using these pins AT commands are send for initiating a call and to send & receive messages. The other sensors are connected to the Input-Output (I-O) pins where they are digitally processed.

G. Global System for Mobile Communication (GSM)

A GSM modem is duly interfaced to the Aurdino Controller through the level shifter IC. The SIM card mounted GSM modem upon receiving digit command by SMS from any cell phone send that data to the Controller through serial communication. Depending on the Sensors output controller initiates commands for a call or SMS using GSM device to intimate the desired person [2].

H. Global Positioning System (GPS)

In Today's world tracking has become very easy because of use of GPS technology. In our System in event of Accident or Vehicle theft the controller will sense the event and accordingly will initiate message to the user whose contents will be the GPS coordinates of the vehicle making it easy for the user to track his vehicle easily. The coordinates received will be in form of Latitude and Longitude which can be read on maps and exact location of the vehicle is determined [3].

II. CONCLUSION

Modern security solutions are need of the time to protect the vehicle against Accident, Theft and Unauthorized Access which we can eliminate by implementing effective solutions.

A combination use of GSM and GPS technology lets the user know immediately about the malpractices carried on his vehicle and in case of accident or theft it provides the exact location of the vehicle for immediate action by concerned authorities. In essence, securing vehicles would

be a long-term ongoing research topic.

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