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VEHICLE ACCIDENT PREVENTION USING SENSORS

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Abstract: *This project mainly related to road accidents that happen in sleepy and lethargic / half sleep or otherwise intoxicated persons while in driving mode. The eye blink sensor detects the half sleep persons and alert the alarm by using buzzer. Accidents can be performed due to lethargic and it is controlled and prevented with the help of eye blink sensor using Infrared rays. This sensor will be connected with the Intel Galileo kit. The Intel IoT Developer Kit can develop the sensor by using C, C++, Python, and Nodejs /JavaScript.*

Key Words*: *IR sensor, Eye blink sensor, Intel Galileo kit, Vibration sensor, Arduino, GSM, GPS.

1. INTRODUCTION

Accidents may be varying in different position and it can be done through sleepiness or third party. To avoid these types of accidents we introduce the alert system by using different types of sensors. It consists of two types one is transmitter and another is receiver. The transmitter sends the rays to eye. If our eye is closed, then the output will be increased. If the eye is open, then the output is decreased. The output is set like an alarm that is located inside to the vehicle. It will go on for a period of time until the driver is back to his senses. If the driver can't have any control within the time, then the alarm outside the vehicle will give alert to the driver. There may be a case that the vehicle can meet with an accident. In such situation, an alert will be sent to the nearest hospital.

1.1 LITERATURE SURVEY ON ACCIDENTS DUE TO DROWSINESS:

Accidents can be happened in various factors such as drunk driving, texting while driving, speeding, distractions, sleeping on the vehicle, etc. Accidents due to drowsiness are more inclined and need to be controlled. This results in reduced vehicle the major causes of road accidents. Techniques for identify and observe the persons of deprivation and overall health into practices. Drivers with sleep liability have risks in being involved with the accident. While driving at the speed of 100km/hr., if the person falls sleepy not more than 4 seconds the buzzer will enable.

The drowsiness features are characterized by the blinking frequency of the eye by the driver. IR contains transmitter and receiver to sense eye blink of the driver. Here the CNY 70 IR transmitter, receiver and the buzzer is interfaced with 8051 Microcontroller. If infrared transmitter sends the rays to the receiver then the non-inverting amplifier is less then inverting amplifier. Then the transmitted signal takes a hold to receiver.

Non inverting amplifier:

G=1+ (RES1/RES2) --------- (1)

Inverting Amplifier:

G=-RES2/RES1) --------- (2)

Depending on the output of receiver, the position of the eye can be determined. When the blink rate is more than the pre-defined threshold value, it indicates that the driver is in half sleep mode. Buzzer will be activated to alert the driver and the accident can be prevented.

1.2. ANALYZING AN EXISTING SYSTEM:

Drowsiness is main thing to simulate whether the accident happened due to the driver asleep. Each and every second number of accidents happened due to driver drowsiness/speed of the vehicle. Drowsiness detection system can identified through non-intrusive machines and the kit having camera that was fixed to record your head movements to detect the asleep.

When the vehicle met with any accident the sensor will detect the vibration depending upon the crashes. Then the vibration will sends to microcontroller/ chip to find the location of the accident. The main purpose of the chip is used to find the latitude and longitude of the accident by using GPS.

GPS will helps to send an alert message to the ambulance which is located nearest to the accident. The ambulance immediately finds the location by using Google Maps and rescues the accidents.

Drawbacks:

- ✓ Less expensive
- ✓ Face detection is not more accurate
- ✓ It is complex to use

2. PROPOSED SYSTEM:

Another method to detect drowsiness is by observing the eye blinking action of the driver. In this

system, the eye blinks of the person are determined and the resulting output is analyzed to finalize whether that person is sleeping or not.

The proposed algorithm is developed to minimize the complexity level from existing system while efficiency has given prime importance which was a main objective of this project by tracking the blinks of the eye.

In addition to that, an alert will also be given to the user to inform him not to sleep while driving. Intel Galileo gen 2 is used along with some sensors and motors to detect and alert the drowsy driver. If any accidents occur because of the environment or third party, then an alert message and an image of the accident occurred will be sent to the nearby ambulance unit.

The accident occurred is detected by the vibration sensor and the alert message will be sent to the nearest hospital.

Advantages of Proposed System:

- ✓ Intelligent and safe transportation
- ✓ Accident can be avoided
- ✓ Cost Reduction
- ✓ Eye blink sensor is used to detect the eye movement.

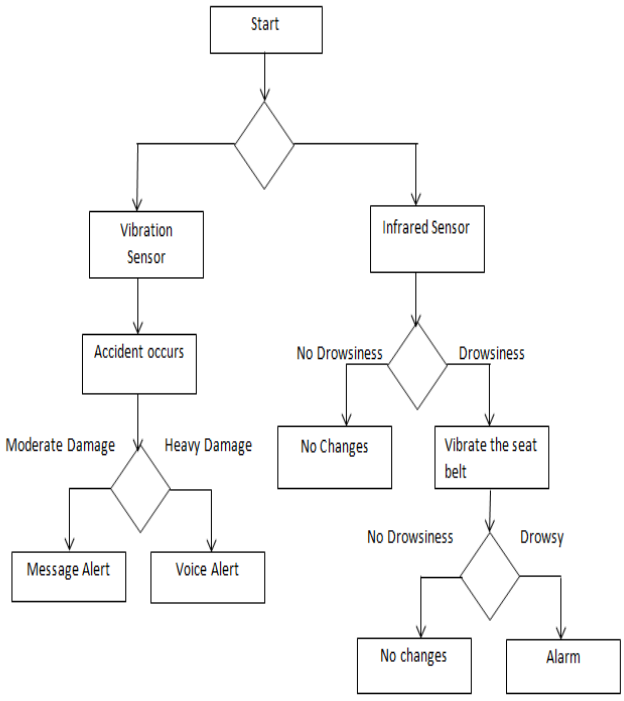


Fig: 1 shows the flow diagram of the preventing systems.

3. RELATED WORK:

3.1ALERTS TO DRIVER:

The Intel Galileo kit is connected with IR sensor, vibration motor and an alarm. The IR sensor is used to detect the drowsiness of the driver. At first, the status of the driver will be analyzed by monitoring the eye blinks using IR sensor. The IR transmitter is used to transmit the infrared rays in our eye.

The IR receiver is used to receive the reflected infrared rays from eye. If the eye is closed the output of IR receiver is high and so the motor fixed in the seat belt will vibrate. If the driver does not wake up by vibration alert, the output is given to logic circuit to alert the driver using alarm.

The pin connections are made as follows. Initially, the analog pins from A0 to A5 are used for IR sensor. Any pin, among those five pins can be used for this sensor. If A0 is used for IR sensor, then any of the remaining pins can be used for Vibration sensor.

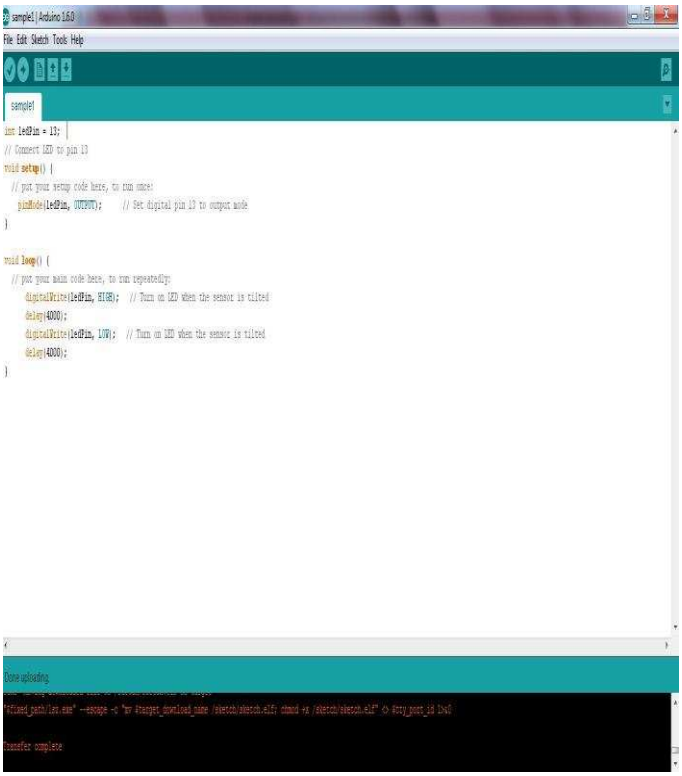
The digital pins will be used to connect the vibration motor and the alarm. Except PWM pins (which is used denoted with ~ symbol in the kit), we can use all the other pins for digital pin connection. For both analog and digital pin connections, ground and power supply will be given to the bread board. In addition to the above connections, relay module is used to delay the vibration of the seat belt for some particular time.

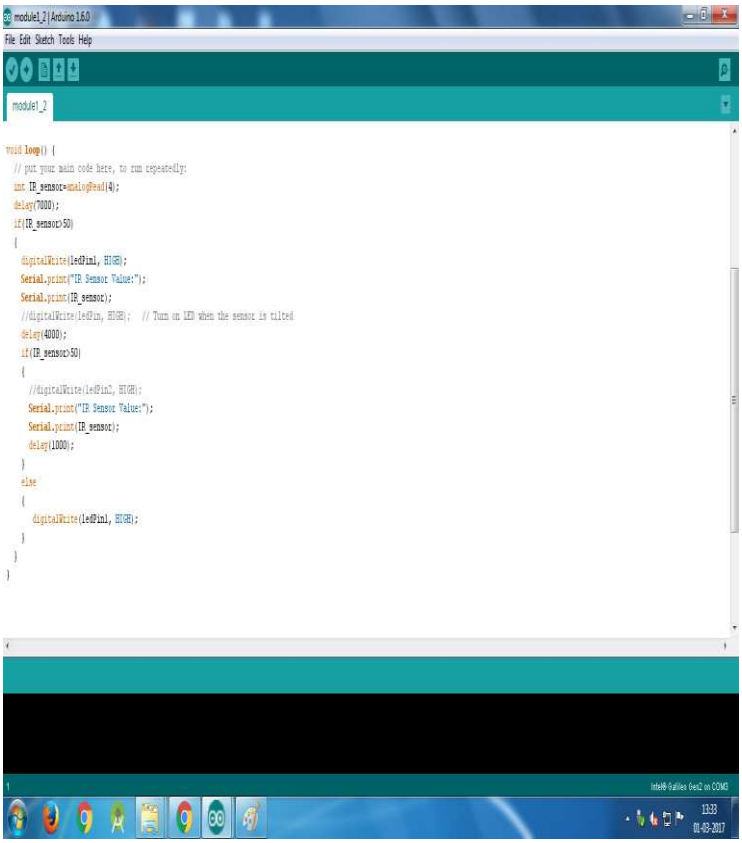
3.2RESCUE ALERT:

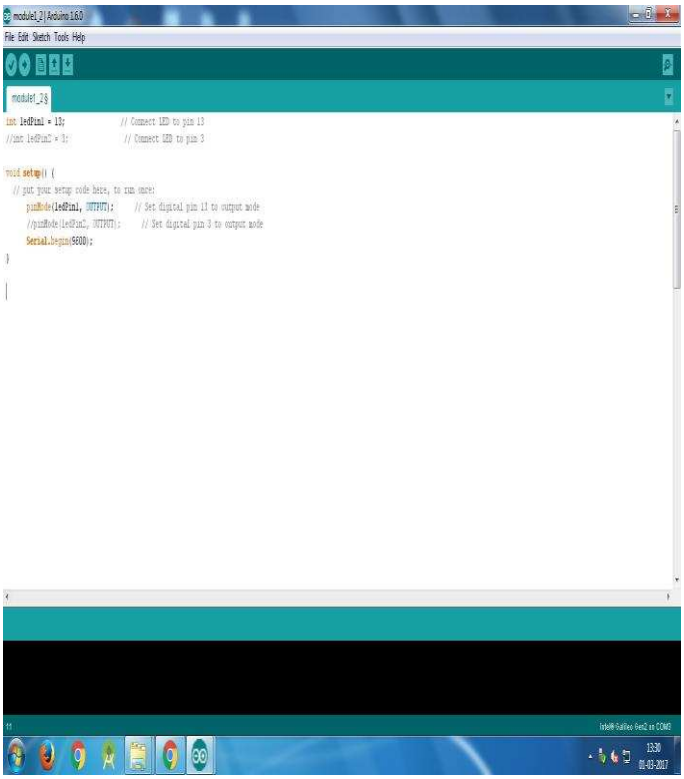
In this module, we are observing whether the vehicle is safe or not by monitoring the vehicle with vibration sensor. Whenever we are travelling, there is a chance for accidents to occur. If the vehicle is met with an accident, the vibration sensor will be activated. With the values received from the vibration sensor, the threshold value is calculated. The threshold value is the current value, which is displayed by the serial monitor. The value ranges from 0 % to 100%.

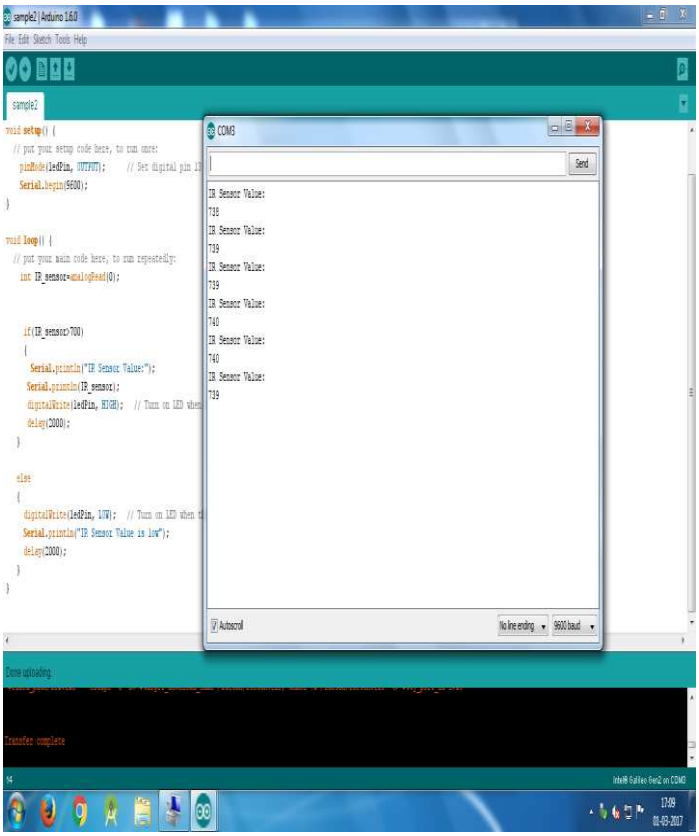
- The threshold value is split into three classes. If the threshold value ranges between 0 and 30%, the accident occurred can be ignored. So, no alert will be given.
- If the threshold value ranges between 30% and 70%, then the predicted accident is moderate and so a message alert is sent to the nearest hospital with the help of GSM module.
- Finally, if the threshold value is greater than 70%, then we can predict that the accident occurred is critical and immediately VOIP will be activated. The VOIP is the delivery of voice communications over Internet protocol networks

such as the Internet. The Voice call will be sent to the hospital. As soon as the voice call is received, the ambulance will be reach the accident occurred spot.









4. CONCLUSION:

In our time, people have become more inclined to accident. Consequently, we as an engineer need to take some stroke against this and provide the desired way out. For the safety of the human being some methodization is made. The persistence of such a model is to progress a system to detect fatigue symptoms in drivers and control the fatigue of the driver.

Progressive technology offers some confidence to avoid these accidents up to some extent. This project involves measure and controls eye blink using eye blink sensor. Eye Blink sensor is IR based .This helps in controlling accidents due to unconsciousness through Eye blink. They work entirely by detecting the energy given off by other objects.

Though we have many prevention techniques to avoid accidents internally it can happens by many external factors. When an accident occurs there will be little chance of passerby's calling an ambulance to rescue the sufferers of the accident. So there might be a delay in the rescue. To overcome this, accident detection system automatically detects the accident and give a clear way to emergency purpose vehicles on road so that they can reach their destination in least time without any delay.

The system can track geographical information automatically and sends an alert SMS regarding accident to the nearest hospital. This system is fully automated, as it finds the accident spot, helping by saving life of victims to reach the hospital in time. This system can aid in reducing the loss of lives of human which happen by the accidents.

5. FUTURE ENHANCEMENT:

In future, this system can be extended to more applications. Driver's drowsiness can result to lack of control of the vehicle and leads to accidents. If driver feels drowsy driver can't control the vehicle, when the driver wakes. We can prevent this kind of accidents by using the braking system. The accidents can happened due to asleep state the driver is prevented using automatic breaking system by using eye blink sensor. The asleep can be sensed by the eye blink sensor and the blinking frequency is measured. If the driver is drowsy, then the system will give buzzer alert to driver and the speed of the vehicle is reduced.

To improve the rescue assistance in the accident spot, image processing can be used more effectively in order to determine the environmental factor with the exact location using GPS. This provides the latitude and longitude information about vehicle location through GSM. Vibration sensors are also fixed to measure the damage of the vehicle. Based on the frequency values, the damage condition of the vehicle is measured. If a vehicle has met accident, vibration sensor gives signal to the system and image is sent to the hospital server. Based on this ambulance rescue will be sent to defined location.

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