CSE331.8

Individual Report

Project Title

Driver Drowsiness and Alcohol Detection System

Using 8051 Microcontroller

Submitted To

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Group No

4

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Introduction:

The act of operating a motor vehicle while exhausted or sleepy is known as "drowsy driving." There are several causes of inadequate sleep, including job stress and disrupted nights with young children. Other elements, such as a drug you are taking or an untreated sleep issue that makes you exhausted and unable to stay awake during the day, can also cause sleepy driving.

It has been demonstrated that drowsy driving increases the chance of accidents, including possibly deadly ones. Some drivers fail to recognize the tremendous risk that they are taking. You put yourself and other drivers on the road in danger when you go behind the wheel while excessively fatigued.
According to data, drowsy driving contributes to 2.4 percent of all fatal car accidents. However, there are numerous other circumstances, such as driving while intoxicated, that can cause deadly collisions.

About 32 persons in the United States perish in drunk driving accidents each day. Alcohol is a chemical that decreases brain activity, which affects thinking, reasoning, and muscle control. To operate a vehicle safely, you need to possess all of these skills. The detrimental effects on the central nervous system increase as a person's blood alcohol levels rise.

Objective:

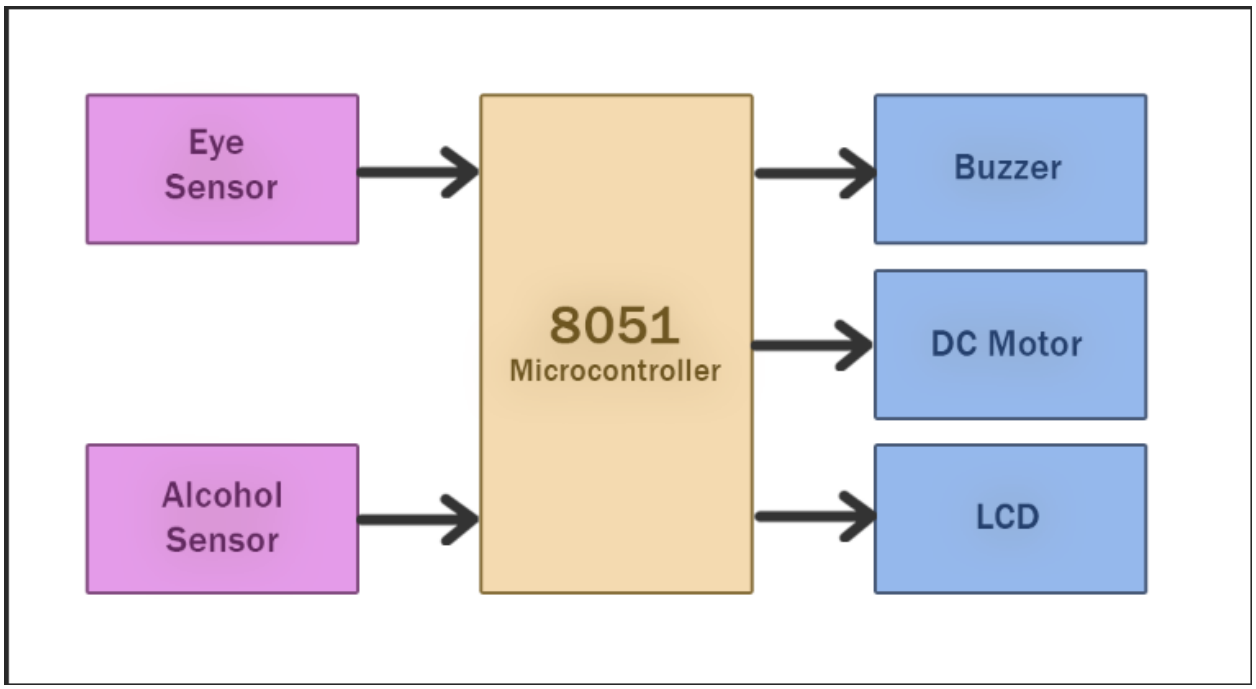
The objective of this project was to build a system that would help in vehicle safety.

- Detect Driver Drowsiness
- Detect the Alcohol content of the Driver
- Turn on the Buzzer to alert the Driver
- Halt the car to avoid running into others vehicles or pedestrians

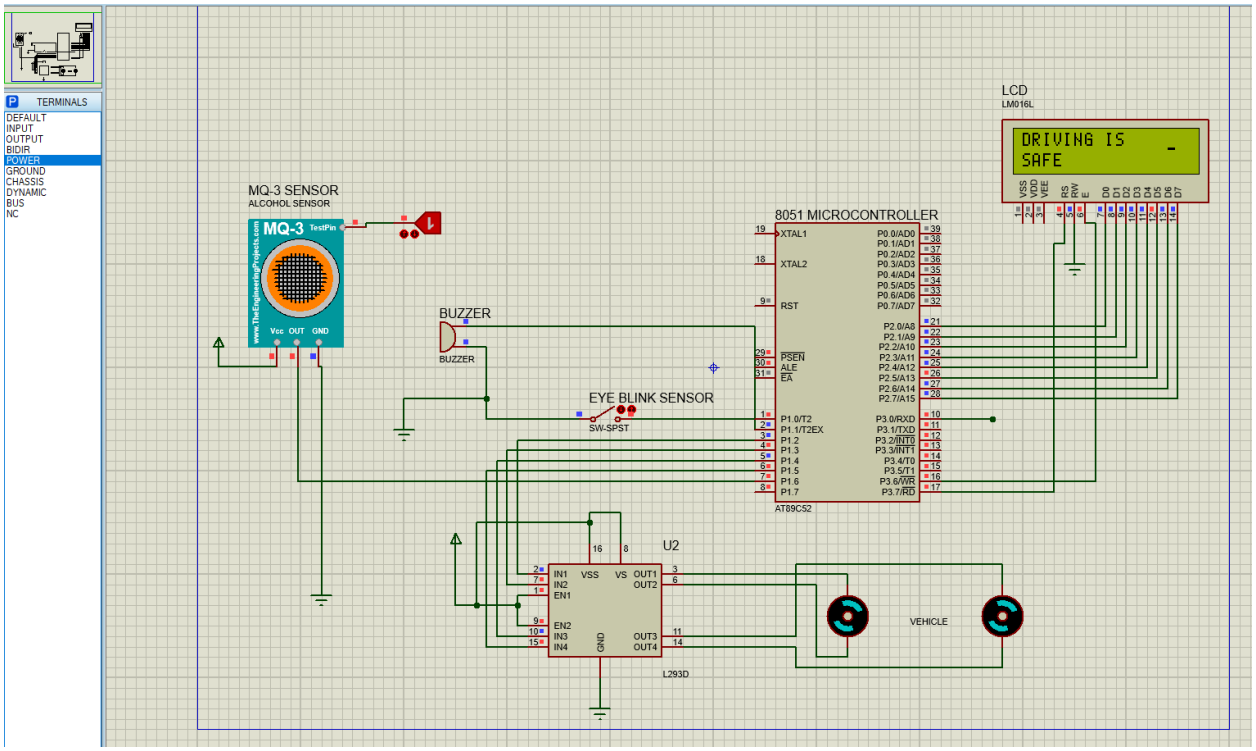
Components Required:

- SW-SPST (Eye Blink Sensor)
- MQ-3 Sensor (Alcohol Sensor)
- 8051 Microcontroller
- 16x2 LCD
- 2 x DC MOTOR
- Buzzer
- L293D (Motor Driver Circuit)
- Power
- Ground

Block Diagram:



Simulation:


TERMINALS
DEFAULT
INPUT
OUTPUT
BIDIR
POWER
GROUND
CHASSIS
DYNAMIC
BUS
NC
MQ-3 SENSOR
ALCOHOL SENSOR
MQ-3
TestPin
Vcc OUT GND
BUZZER
BUZZER
EYE BLINK SENSOR
SW-SPST
8051 MICROCONTROLLER
XTAL1
XTAL2
RST
PSEN
ALE
EA
P0.0/AD0
P0.1/AD1
P0.2/AD2
P0.3/AD3
P0.4/AD4
P0.5/AD5
P0.6/AD6
P0.7/AD7
P2.0/A8
P2.1/A9
P2.2/A10
P2.3/A11
P2.4/A12
P2.5/A13
P2.6/A14
P2.7/A15
P1.0/T2
P1.1/T2EX
P1.2
P1.3
P1.4
P1.5
P1.6
P1.7
P3.0/RXD
P3.1/TXD
P3.2/INT0
P3.3/INT1
P3.4/T0
P3.5/T1
P3.6/WR
P3.7/RD
AT89C52
LCD
LM016L
DRIVING IS
SAFE
VSS VDD VEE RS RW E D0 D1 D2 D3 D4 D5 D6 D7
U2
IN1 IN2 EN1 EN2 IN3 IN4
VSS VS GND
OUT1 OUT2 OUT3 OUT4
L293D
VEHICLE

Code:

```
#include <REGX51.H>

//Variable declarations

sbit EyeSensor = P1^0;
sbit AlcoholSensor = P1^6;
sbit Buzzer = P1^1;

sbit Motor11 = P1^2;
sbit Motor12 = P1^3;
sbit Motor21 = P1^4;
sbit Motor22 = P1^5;

sbit rs = P3^7;
sbit en = P3^6;

//Function Prototypes

void Delay(unsigned char x);
void LCD_Command(unsigned char x);
void LCD_Data (unsigned char x);
void LCD_Message (unsigned char *p);

//Main function and code

void main(){

  Motor11=0;
  Motor12=0;
  Motor21=0;
  Motor22=0;
  Buzzer=0; //Buzzer is off at 0
  LCD_Command(0x38); //2 lines
  LCD_Command(0x0E); //Display ON
  LCD_Command(0x80); // Force cursor to start
  LCD_Message("DROWSY DRIVER");
  LCD_Command(0xc0); // Force cursor beginning of second line
  LCD_Message("DETECTING SYSTEM");
  Delay(500);
  LCD_Command(0x01); // Clear Display
```

```
  while(1){

    if(EyeSensor == 1 && AlcoholSensor == 1){
      Buzzer=0;
      Motor11 = 0;
      Motor12 = 1;
      Motor21 = 0;
      Motor22 = 1;
      LCD_Command(0x80);
      LCD_Message("DRIVING IS      ");
      LCD_Command(0xc0);
      LCD_Message("SAFE            ");
    }
    else if(EyeSensor == 0 && AlcoholSensor == 0 ){
      Buzzer=1;
      Motor11 = 0;
      Motor12 = 0;
      Motor21 = 0;
      Motor22 = 0;
      LCD_Command(0x80);
      LCD_Message("DRIVING IS      ");
      LCD_Command(0xc0);
      LCD_Message("UNSAFE & ILLEGAL");
    }
    else if(EyeSensor == 0 && AlcoholSensor == 1){
      Buzzer=1;
      Motor11 = 0;
      Motor12 = 0;
      Motor21 = 0;
      Motor22 = 0;
      LCD_Command(0x80);
      LCD_Message("DRIVER IS       ");
      LCD_Command(0xc0);
      LCD_Message("SLEEPING...     ");
    }
    else{
      Buzzer = 1;
      Motor11 = 0;
      Motor12 = 0;
      Motor21 = 0;
      Motor22 = 0;
      LCD_Command(0x80);
      LCD_Message("DRIVER IS      ");
      LCD_Command(0xc0);
      LCD_Message("UNDER INFLUENCE");
    }

  }
}
```

```
93  //Function Implementations
94
95  void Delay(unsigned char x){
96
97    int i,j;
98    for(i=0;i<x;i++)
99    for(j=0;j<=1000;j++);
100
101 }
102
103 void LCD_Command(unsigned char x){
104
105   rs=0;
106   P2 = x;
107   en=1;
108   Delay(10);
109   en=0;
110
111 }
112
113 void LCD_Data (unsigned char x){
114
115   rs=1;
116   P2 = x;
117   en=1;
118   Delay(10);
119   en=0;
120
121 }
122
123 void LCD_Message (unsigned char *p){
124
125   while(*p)
126     LCD_Data(*p++);
127
128 }
129
```

Workings:

In this project, we have two sensors to ensure driver safety. One is an Eye Sensor and the other is an Alcohol Sensor. When both the Eye Sensor and the Alcohol Sensor are turned off, the microcontroller will keep the DC Motors running while the LCD displays a safe message. As soon as any of the sensors are turned on, the DC Motors will immediately turn off and the buzzer will be turned on, with the LCD displaying a message according to the sensors that are turned on.

For example, when the Eye Sensor turns on the LCD will display the message “Driver is sleeping” while turning on the buzzer and stopping the motors.
When the Alcohol Sensor turns on the LCD will display the message “Driver is under influence” while turning on the buzzer and stopping the motors.
As soon as both the sensors are turned on, the LCD will display that “Driving is unsafe and illegal”

Significance:

Why is this project important in a real-life scenario?

These days we have a lot of stress and problems in life which stop us from getting enough daily rest. The lack of rest will result in drowsiness and lack of attention.
The same result is obtained due to alcohol consumption in teenagers.
This project will ensure the safety of people who are undergoing any of the two mentioned situations. As soon as any of the two sensors are turned on, the car will eventually slow down and the buzzer will be turned on. This will alert the driver to stop driving without taking any risks and ensure proper safety both for themselves and everyone around them.

Road Accidents are one of the main reasons for death in Bangladesh and tackling the primary causes can help us reduce that number.

Discussion:

8051 microcontroller consists of 40 Pins. These 40 pins serve different functions like read, write, I/O operations interrupt, etc. 8051 has four I/O ports wherein each port has 8 pins which can be configured as input or output depending upon the logic state of the pins. Therefore, 32 out of these 40 pins are dedicated to I/O ports. The rest of the pins are dedicated to VCC, GND, XTAL1, XTAL2, RST, ALE, EA' and PSEN'.
The MQ3 sensor is one of the most widely used in the MQ sensor series. It is a MOS sensor. Metal oxide sensors are also known as Chemiresistors because sensing is based on the change in resistance of the sensing material when exposed to alcohol. For the Eye Sensor, we are using a switch to emulate the result as the proteus library does not contain its own Eye Blinker Sensor.

We use the RS pin of the LCD to tell the LCD if we are sending an instruction or data and then the EN pin is used to send the data to the LCD. Pins 0,6 of Port 1 are used as input for the Sensors and Pins 1,2,3,4,5 are used as output for the buzzer and the motors. Finally, Port 2 is used to output data to the LCD.
For our current simulation, we are sending a high signal to pins 3 and 5 which is causing the DC Motors to spin anti-clockwise, sending a high signal to pins 2 and 4 will cause them to spin clockwise. We can increase the speed of the motor by decreasing resistance through the driver circuit.

The commands being sent to the LCD are as follows:

Command	Description
38	The LCD will display in 2 lines
0E	The Display is turned on
80	Move cursor to the beginning
C0	Move cursor to the beginning of second line
01	Clear the Display