Women Safety Device

1Divya Sareen, 2Prerna Gupta, 3Abhishek Walia
1Student, 2Student, 3Student
Dr. Akhilesh Das Gupta Institute of Technology & Management

Abstract - **Drinking and driving is already a serious public health problem, which is likely to emerge as one of the most significant problems in near future the system implemented by us aims at reducing the road accident in the near future due to drunken and drive. This project present the progress in using the alcohol detector, a device that senses a change in the alcoholic gas content of the surrounding air these device is more commonly referred to as a breath analysis, as it analysis the alcohol content from person's breath. The system detects the presence of alcohol in the vehicle and immediately locks the engine of the vehicle.**

keywords - **LM2596, Keypad, GSM, Buck Converter, Arduino UNO, LCD, Transistor, MQ-3 Sensor**

I. INTRODUCTION

Alcohol detectors are commonly required by the law enforcement. The police need to catch and check people who drive after taking alcohol. Driving after taking alcohol can result in serious accidents. People who drive after consuming alcohol not only risk their own life but also of others. That is why police need to remain alerted and verify any person who they found suspicious of driving after drinking.

For the verification, they use an instrument called alcohol detector. This project is aimed at building a similar device which will detect the consumption of alcohol by a suspect and display a digital reading indicating the level of alcoholic consumption. The device will also have a dial which will rotate and an LED indicator which glows to indicate a dangerous level of consumption by a suspect.

Women safety device mini project can be used in college campus, hospitals. It can also be used in Companies. This low cost alcohol detection system can be installed in a vehicle to detect if the driver has drunk alcohol.

This is an important sensor based project implemented using microcontroller. In this project, we have interfaced MQ series gas sensor with 8051 microcontroller. We cannot interface alcohol sensor directly to the 8051 microcontroller because the output of gas sensor is in analog format. The 8051 microcontroller recognizes only digital input. The best and the low cost solution for this is to connect a comparator between gas sensor and Microcontroller. Comparator contains an operational amplifier comparator has two inputs.

One input is from the sensor and another is from the Potentiometer. Whenever the sensor value crosses threshold limit then the comparator output goes high. In this way microcontroller comes to know that the alcohol percentage is more than the threshold limit. Potentiometer can be used to vary the trigger level or the threshold limit.

We have provided a piezoelectric buzzer in this project. This Buzzer will be turned on whenever this project detects the alcohol. This Buzzer helps to alert the people that the person undergoing the test for alcohol detection has consumed alcohol. This buzzer is driven through a transistor.

We have also provided LCD display in this alcohol detector mini project. LCD display shows two messages. Whenever you turn on the project, LCD shows project title. And whenever alcohol is detected, system shows message as Alcohol sensor crossed limit.

II. EXISTING MODEL

In this project we describe the alcohol detection system for vehicle by using alcohol sensor, GSM module and Arduino uno. In this project we have discussed about the women safety device using alcohol detection for preventing crime against women. This paper introduces methods such as alcohol detection; messaging and call alert and discuss how they can be implemented to avoid accidents. Instead of using microcontroller 16F877A in this project they used Arduino board. In this paper we have discussed about driver's behaviour, safety application & auto theft prevention system. In this paper they describe about body area sensing, alcohol detection craving. In our project we discussed about the alcohol detection system for vehicle drivers using alcohol sensor MQ3 and LED using Arduino. The Arduino libraries are not very efficient in certain parts and waste RAM and CPU cycles. Also if we use Arduino IDE we get limited library. If we use Atmel studio we can know the microcontroller deeply. But the Atmel studio has it's own disadvantages. Limitations of GSM are that multiple users share the same bandwidth. With enough users, the transmission can encounter interference.

III. HARDWARE

ARDUINO UNO

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6

analog I/ O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. It is also similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and production files for some versions of the hardware are also available.

The word "uno" means "one" in Italian and was chosen to mark the initial release of Arduino Software. The Uno board is the first in a series of USB-based Arduino boards; it and version 1.0 of the Arduino IDE were the reference versions of Arduino, which have now evolved to newer releases. The ATmega328 on the board comes pre-programmed with a bootloader that allows uploading new code to it without the use of an external hardware programmer.

Fig. 1: Arduino Uno Board [2]

Specifications

- Microcontroller: ATmega328P
- Operating Voltage: 5 Volts
- Input Voltage: 7 to 20 Volts
- Digital I/O Pins: 14 (of which 6 can provide PWM output)
- Analog Input Pins: 6
- DC Current per I/O Pin: 20 mA
- DC Current for 3.3V Pin: 50 mA
- Flash Memory: 32 KB of which 0.5 KB used by bootloader
- SRAM: 2 KB & EEPROM: 1 KB
- Clock Speed: 16 MHz
- Length: 68.6 mm
- Width: 53.4 mm
- Weight: 25 g

General Pin Functions

- LED: There is a built-in LED driven by digital pin 13. When the pin is high value, the LED is on, when the pin is low, it is off.
- VIN: The input voltage to the Arduino/Genuino board when it is using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.
- 5V: This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 20V), the USB connector (5V), or the VIN pin of the board (7-20V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage the board.
- 3V3: A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA. GND: Ground pins.
- IOREF: This pin on the Arduino/Genuino board provides the voltage reference with which the microcontroller operates. A properly configured shield can read the IOREF pin voltage and select the appropriate power source, or enable voltage translators on the outputs to work with the 5V or 3.3V.
- Reset: Typically used to add a reset button to shields that block the one on the board.

Special Pin Functions

- Serial / UART: pins 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB to-TTL serial chip.
- External interrupts: pins 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value.
- PWM (pulse-width modulation): pins 3, 5, 6, 9, 10, and 11. Can provide 8-bit PWM output with the analogWrite() function.
- SPI (Serial Peripheral Interface): pins 10 (SS), 11 (MOSI), 12 (MISO), and 13 (SCK). These pins support SPI communication using the SPI library.
- TWI (two-wire interface) / I²C: pin SDA (A4) and pin SCL (A5). Support TWI communication using the Wire library.
- AREF (analog reference): Reference voltage for the analog inputs.
- Rather than requiring a physical press of the reset button before an upload, the Arduino/Genuino Uno board is designed in a way that allows it to be reset by software running on a connected computer. One of the hardware flow

control lines (DTR) of the ATmega8U2/16U2 is connected to the reset line of the ATmega328 via a 100nF capacitor. When this line is asserted (taken low), the reset line drops long enough to reset the chip.

DC-DC BUCK CONVERTER

A buck converter (step-down converter) is a DC-to-DC power converter which steps down voltage (while stepping up current) from its input (supply) to its output (load). It is a class of switched-mode power supply (SMPS) typically containing at least two semiconductors (a diode and a transistor, although modern buck converters frequently replace the diode with a second transistor used for synchronous rectification) and at least one energy storage element, a capacitor, inductor, or the two in combination. To reduce voltage ripple, filters made of capacitors (sometimes in combination with inductors) are normally added to such a converter's output (load-side filter) and input (supply-side filter).
Switching converters (such as buck converters) provide much greater power efficiency as DC-to-DC converters than linear regulators, which are simpler circuits that lower voltages by dissipating power as heat, but do not step up output current.

Fig. 2: DC-DC Buck Converter

Buck converters can be highly efficient (often higher than 90%), making them useful for tasks such as converting a computer's main (bulk) supply voltage (often 12 V) down to lower voltages needed by USB, DRAM and the CPU (1.8 V or less).
The basic operation of the buck converter has the current in an inductor controlled by two switches (usually a transistor and a diode). In the idealised converter, all the components are considered to be perfect. Specifically, the switch and the diode have zero voltage drop when on and zero current flow when off, and the inductor has zero series resistance.

Efficiency factors and Switching losses

- Conduction losses that depend on load:
- Resistance when the transistor or MOSFET switch is conducting.
- Diode forward voltage drop (usually 0.7 V or 0.4 V for schottky diode)
- Inductor winding resistance
- Capacitor equivalent series resistance
- Voltage-Ampere overlap loss
- Frequency*CV2 loss
- Reverse latency loss

MQ-3 SENSOR

The Grove - Gas Sensor (MQ3) module is useful for gas leakage detection (in home and industry). It is suitable for detecting Alcohol, Benzene, CH4, Hexane, LPG, CO. Due to its high sensitivity and fast response time, measurements can be taken as soon as possible. The sensitivity of the sensor can be adjusted by using the potentiometer.
The output voltage from the Gas sensor increases when the concentration of gas increases. Sensitivity can be adjusted by varying the potentiometer. Please note that the best preheat time for the sensor is above 24 hours. For detailed information about the MQ-3 sensor, please refer to the data-sheet provided in Resources section.

Technical Data

- Concentration: 0.05 mg/L ~ 10 mg/L Alcohol
- Operating Voltage: 5V ±0.1
- Current Consumption: 150mA
- Operation Temperature: -10°C ~ 70°C Pin Out
- VCC – Input Power Supply
- GND – Supply Ground
- DO – Digital Output
- AO – Analog Output

Features

- High sensitivity to alcohol and small sensitivity to Benzene
- Stable and long life
- Fast response and High sensitivity

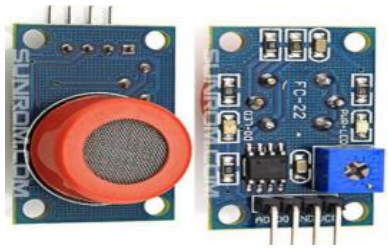

Fig. 3: MQ-3 Sensor

IV. SOFTWARE

Embedded C Language

Embedded C is a set of language extensions for the C programming language by the C Standards Committee to address commonality issues that exist between C extensions for different embedded systems.

Embedded C programming typically requires nonstandard extensions to the C language in order to support enhanced microprocessor features such as fixed point arithmetic, multiple distinct memory banks, and basic I/O operations. In 2008, the C Standards Committee extended the C language to address such capabilities by providing a common standard for all implementations to adhere to. It includes a number of features not available in normal C, such as fixed-point arithmetic, named address spaces and basic I/O hardware addressing. Embedded C uses most of the syntax and semantics of standard C, e.g., main() function, variable definition, datatype declaration, conditional statements (if, switch case), loops (while, for), functions, arrays and strings, structures and union, bit operations, macros, etc.

V. RESULT ANALYSIS

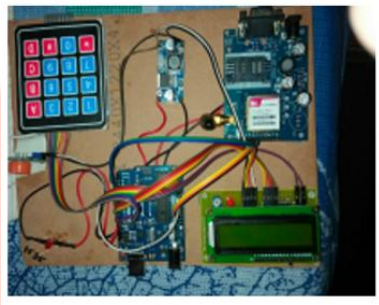

Fig. 4: Women Safety Device Setup

Fig. 5: LCD display with Project Title

Fig. 6: Details of car

Fig. 7: After entering car details

Fig. 8: Readings after detecting alcohol

Fig. 9: Message received after alcohol is detected

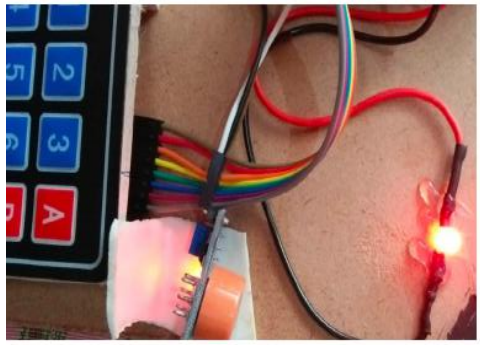

Fig. 10: Output given by LED after detection of alcohol

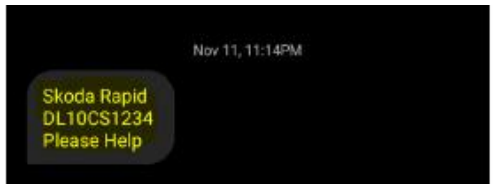

Fig. 11: Message received after emergency button is pressed

VI. RESULT ANALYSIS

Proposed system will efficiently detect alcohol through driver breath. Proposed system will notify relatives of women, police station. It can also check whenever the accident happens will notify immediately to the numbers provided in application by the end user and therefore people in the car can get service as early as possible by minimizing the casualties. To implement this approach GSM system is used, it also helps police to identify drunken drivers and give punishment them by tracking it's vehicle.

REFRENCES

[1]. D. Chitkara, N. Sachdeva and Y. Dev Vashisht, "Design of a women safety device," 2016 IEEE Region 10 Humanitarian Technology Conference (R10-HTC), Agra, 2016, pp. 1-3, doi: 10.1109/R10-HTC.2016.7906858.

[2]. R. Ramachandiran, L. Dhanya and M. Shalini, "A Survey on Women Safety Device Using IoT," 2019 IEEE International Conference on System, Computation, Automation and Networking (ICSCAN), Pondicherry, India, 2019, pp. 1-6, doi: 10.1109/ICSCAN.2019.8878817.

[3]. Muskan, T. Khandelwal, M. Khandelwal and P. S. Pandey, "Women Safety Device Designed Using IoT and Machine Learning," 2018 IEEE SmartWorld, Ubiquitous Intelligence & Computing, Advanced & Trusted Computing, Scalable Computing & Communications, Cloud & Big Data Computing, Internet of People and Smart City Innovation (SmartWorld/SCALCOM/UIC/ATC/CBDCom/IOP/SCI), Guangzhou, China, 2018, pp. 1204-1210, doi: 10.1109/SmartWorld.2018.00210.

[4]. Monisha, D. & Monisha, M. & Gunasekaran, Pavithra & Radhakrishnan, Dr.Subhashini. (2016). Women safety device and application-FEMME. Indian Journal of Science and Technology. 9. 10.17485/ijst/2016/v9i10/88898.

[5]. N. Bhardwaj and N. Aggarwal, "Design and Development of "Suraksha"-A Women Safety", International Journal of Information & Computation Technology, vol. 4, no. 0974-2239, pp. 787-792, 2014.

[6]. P Premkumar, R CibiChakkaravarthi, M Keerthana and R'Sharmila. T Ravivarma, "One Touch Alarm System For Women's Safety Using GSM", International Journal of Science Technology & Management, vol. 04, no. 2394-1537, March 2015.

[7]. AWadhawane, A. Attar, P. Ghodke and P. Petkar, "IoT based Smart System for Human Safety", International Journal of Computer Applications, vol. 179, no. 7, March 2017.