ALCOHOL DETECTION AND ENGINE LOCKING SYSTEM TO PREVENT DRUNK DRIVING

M.Devaraju
Associate Professor
Dept.of ECE
MIST.

G. MUKESH
DECE, MISTP.
gattumukeshgoud@gmail.com

T. SHAMBAIAH
DECE, MISTP.
shambaiaht6@gmail.com

Md. OWAIZ
DECE, MISTP.

Abstract

The Automatic Engine Locking System for Drivers project addresses the issue of drunk driving by implementing a robust and reliable solution. This project employs various hardware components, including Arduino, an alcohol sensor, a DC motor as the engine, GSM technology, a GPS module, and a display module. By combining these technologies, we have developed an automated system that detects alcohol levels in the driver's breath and disables the engine if alcohol is detected, ensuring safer roads and Preventing accidents caused by drunk driving.

Introduction

The current scenario shows that the most of the road accidents are occurring due to drunk- driving. The drivers who drink alcohol are not in a stable condition and so, rash driving occurs on highway which can be risky to the lives of the people on road, the driver inclusive. The enormity of the dangerous driving transcends boundary. The laws in India are currently prohibiting drivers to drink and drive so that the fine can stop them to drink and drive. Whatsoever, effective observation of inebriated drivers could be a challenge to the policemen and road safety officers, the rationale for this stems from the natural inability of citizenry to be present additionally as state among identical house and time. This restricted ability of enforcement agents undermines each manual effort geared toward edge drink-driving. There is therefore the need for an alcohol detection system that can function without the restriction of space and time. The Indian Ministry of Statistics reported thousands of road accidents in 2016. Though the report declared speed violation is the foremost reason for these accidents, it will safely be inferred that almost all of the cases are because of driver's unstable condition caused by drivers becoming drunk before they drive.

The investigation done by the Planet Health Organization in 2008 shows that concerning 50%- 60% of traffic accidents square measure associated with drink-driving.

Moreover, WHO information on road traffic deaths disclosed 1.25 million traffic deaths were recorded globally in 2013 with the low- and middle-income countries having higher fatality rates per a 100K population (24.1% and 18.4% respectively), information collected showed that several of economic vehicles drivers in Bharat admitted to drinking alcohol throughout operating days. This shows that almost all drivers, particularly business and serious duty trucksdrivers interact in drink driving, which may result in accident. Bharat sets a legal limit of 30mg/100mL blood alcohol concentration (BAC), any level higher than that's same to be ineligible. The BAC depicts the amount of alcohol in an exceedingly sure volume of blood. It's measured as either grams of alcohol per metric capacity unit of blood or milliliters of blood,(mg/ml, utilized in a lot of of Europe). For BAC level from 0.4 to 0.6, drivers feel dazed/confused or otherwise disoriented, and it's typically not safe for a driver to drive a vehicle beneath such condition. Also, BAC level for 0.7 to 0.8 makes a driver's mental, physical and sensory functions to be severely impaired. At this stage, a driver is inactive and incapable of driving. BAC level of 0.2 to 0.3 continues to be not safe however the motive forcestill. So, there is need of such system which can reduce the number of road accidents caused due to drunk driving.

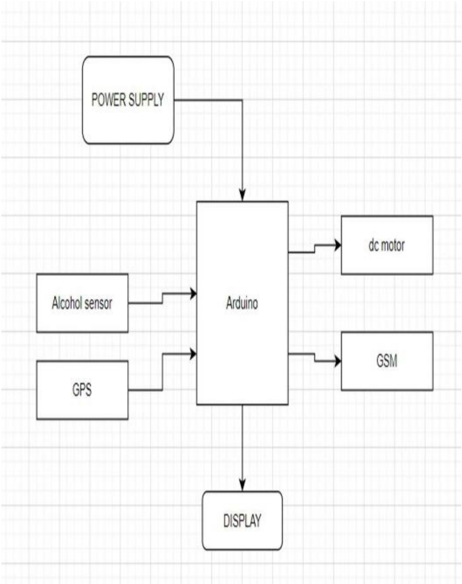

Fig 1-Block Diagram

EMBEDDED SYSTEM

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. A good example is the microwave oven. Almost every household has one, and tens of millions of them are used every day, but very few people realize that a processor and software are involved in the preparation of their lunch or dinner.

This is in direct contrast to the personal computer in the family room. It too is comprised of computer hardware and software and mechanical components (disk drives, for example). However, a personal computer is not designed to perform a specific function rather; it is ableto do many different things. Many people use the term general-purpose computer to make this distinction clear. As shipped, a general-purpose computer is a blank slate; the manufacturer does not know what the customer will do wish it. One customer may use it for a network file server another may use it exclusively for playing games, and a third may use it to write the next great American novel.

Frequently, an embedded system is a component within some larger system. For example, modern cars and trucks contain many embedded systems. One embedded system controls the anti-lock brakes, other monitors and controls the vehicle's emissions, and a third displaysinformation on the dashboard. In some cases, these embedded systems are connected by some sort of a communication network, but that is certainly not a requirement.

At the possible risk of confusing you, it is important to point out that a general-purpose computer is itself made up of numerous embedded systems. For example, my computer consists of a keyboard, mouse, video card, modem, hard drive, floppy drive, and sound card-each of which is an embedded system.

Each of these devices contains a processor and software and is designed to perform a specific function. For example, the modem is designed to send and receive digital data over analog telephone line. That is, it and all the other devices can be summarized in a single sentence as well.

Moreover, even systems which do not expose programmability as a primary feature generally needto support software updates. On a continuum from "general purpose" to "embedded", large application systems will have subcomponents at most points even if the system is "designed to perform one or a few dedicated functions" and is thus appropriate to call "embedded".

If an embedded system is designed well, the existence of the processor and software could be completely unnoticed by the user of the device. Such is the case for a microwave oven, VCR, or alarm clock. In some cases, it would even be possible to build an equivalent device that does not contain the processor and software. This could be done by replacing the combination witha custom integrated circuit that performs the same functions in hardware. However, a lot of flexibility is lost when a design is hard cooled in this way. It is much easier, and cheaper, to change a few lines of software than to redesign a piece of custom hardware.

MICROCONTROLLER:

A microcontroller is a tiny, affordable and self-contained computer-on-a-chip which will be used as an embedded system. It's a pc on-a-chip optimized to manage electrical gadgets. It is meant significantly for specific tasks like an exact system. A microcontroller is often abbreviated as μC, or MCU. Also, a micro-controller could be a fraction of a set in system that is essentially a whole card. A fixed-in system could be a computing system supposed to hold out one or a lot of functions over and all over again with real-time estimate limits. It is embedded as a part of a full machine typically enumeration hardware and motorized parts in addition.

Examples of microcontrollers are the arduino, Intel, PIC and Motorola. Microcontrollers that are usually incorporated in toys, cars, appliances and workplace machines are gears that amalgamate variety of constituents of a micro-processor system on a solo chip.

A few microcontrollers might utilize four-bit expressions and work on clock rate frequencies that typically include:

- An 8 or 16 bit chip
- A tiny amount of RAM.
- Programmable computer memory (ROM) and non-volatile storage (Flash memory)
- Serial & parallel I/O.
- Timers.
- Analog to Digital and Digital to Analog conversion
- Programmable computer memory and non-volatile storage.

The similarity between the 2 is that a micro-controller integrates the options of a chip (ALU, CPU, Registers) at the side of the existence of additional characteristics like existence of computer memory, RAM, counter, Input/ Output ports, etc. On the contrary, a microcontroller controls the work of a device by using fastened programs accumulated in computer memory that will no amend with period.

From an added purpose of read, the foremost similarity amid a usual small-processor and a micro controller parting there space terms is that the area of their application. Usual microprocessors like the Intel Core processors or Pentium processors are in computers as a universally functioning programmable machine. In its generation it's to manage various totally different assignments and programs such that to that. In distinction a microcontroller of PIC family or arduino family or the other have detected their applications in small embedded systems such as- system of traffic signals or some variety of robotic system. Additionally these gadgets manage similar task or similar program in the course of their entire life cycle. Another distinction is that the microcontroller usually has got to handle instant tasks whereas on the contrary the micro-processors in an exceedingly system maybe won't handle a right away task in the slightest degree times.

ARDUINO MICROCONTROLLER:
Features:

- High Performance, Low Power AVR® 8-Bit Microcontroller
- Advanced RISC Architecture
- 131 Powerful Instructions – Most Single Clock Cycle Execution
- 32 x 8 General Purpose Working Registers
- Fully Static Operation
- Up to 20 MIPS Throughput at 20 MHz
- On-chip 2-cycle Multiplier
- High Endurance Non-volatile Memory Segments
- 4/8/16/32K Bytes of In-System Self-Programmable Flash program memory
- 256/512/512/1K Bytes EEPROM
- 512/1K/1K/2K Bytes Internal SRAM
- Write/Erase Cycles: 10,000 Flash/100,000 EEPROM
- Data retention: 20 years at 85□C/100 years at 25□C(1)
- Programming Lock for Software Security

Peripheral Features:

- Two 8-bit Timer/Counters with Separate Pre scaler and Compare Mode
- One 16-bit Timer/Counter with Separate Prescaler, Compare Mode, and Capture Mode
- Real Time Counter with Separate Oscillator
- Six PWM Channels
- Programmable Serial USART
- Master/Slave SPI Serial Interface
  - Byte-oriented 2-wire Serial Interface (Philips I C compatible)
  - Programmable Watchdog Timer with Separate On-chip Oscillator
  - On-chip Analog Comparator
  - Interrupt and Wake-up on Pin Change
- Special Microcontroller Features
  - Power-on Reset and Programmable Brown-out Detection
  - Internal Calibrated Oscillator
  - External and Internal Interrupt Sources
  - Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby, andExtended Standby
- I/O and Packages
  - 23 Programmable I/O Lines
  - 28-pin PDIP, 32-lead TQFP, 28-pad QFN/MLF and 32-pad QFN/MLF
- Operating Voltage:
  - 1.8 - 5.5V
- Temperature Range:
  - -40□C to 85□C
- Speed Grade:
  - 0 - 4 MHz@1.8 - 5.5V, 0 - 10 MHz@2.7 - 5.5.V, 0 - 20 MHz @ 4.5 -

5.5V

- Power Consumption at 1 MHz, 1.8V, 25□C
  - Active Mode: 0.2 mA
  - Power-down Mode: 0.1 µA
  - Power-save Mode: 0.75 µA (Including 32 kHz RTC)

ARDUINO & ITS ARCHITECTURE

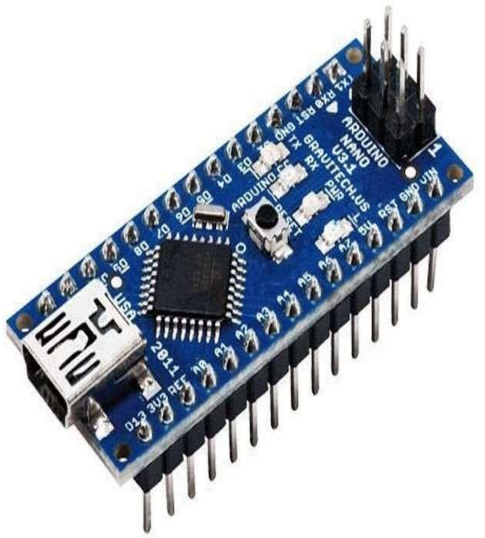

Fig 2 - Nano Arduino

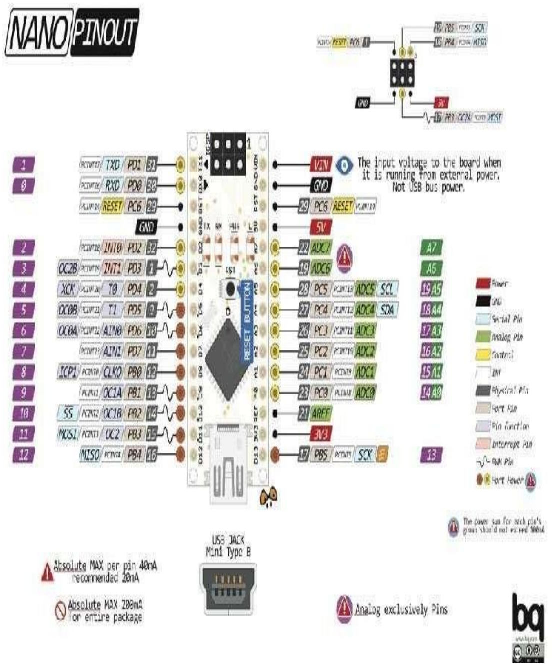

Fig 3 - Nano Pins

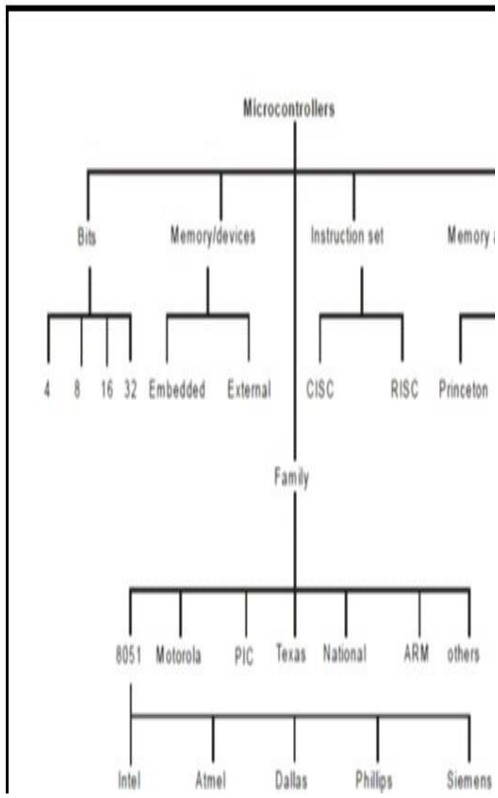

Fig 4 - Types Of Microcontroller

PROJECT RESULTS

The Automatic Engine Locking System for Drivers provides an automated and efficient solution to combat drunk driving. By accurately detecting alcohol levels in the driver's breath and disabling the engine if necessary, this system ensures safer roads and minimizes the riskof accidents caused by impaired driving. By leveraging advanced technologies such as Arduino, GSM, and GPS, this project contributes to enhancing road safety measures and encourages responsible driving practices

CIRCUIT

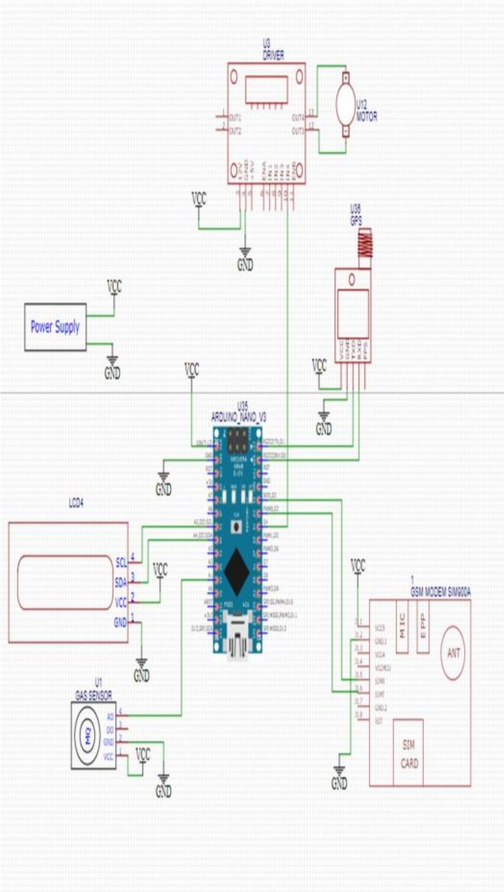

Fig 5 - Circuit Connection

PIN CONNECTIONS OF EACH INPUT OUTPUT DEVICES:Power Supply:

Microcontroller (e.g., Arduino):

Connect to a stable power source within the specified voltage range. Ground (GND): Connect to the ground of the microcontroller.

Input Devices:

Alcohol Sensor:

Analog Output: Connect to an analog pin on the Arduino (e.g., A0).Power (Vcc): Connect to 5V on Arduino.

Ground (GND): Connect to GND on Arduino.

RE**SULTS**

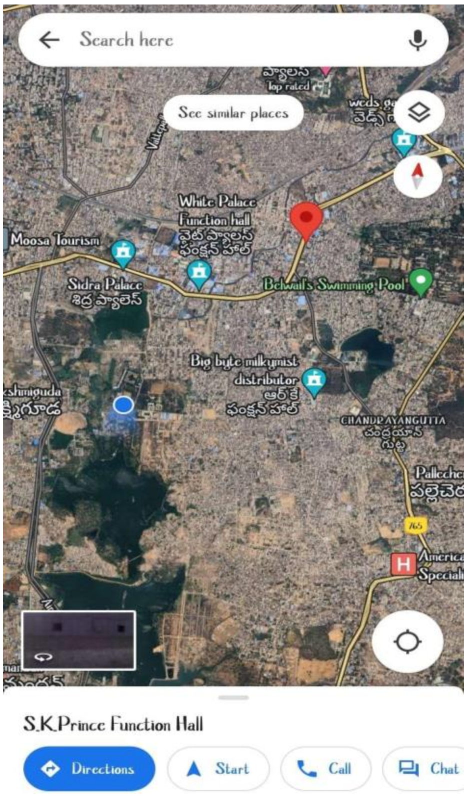

Fig 6 - Map

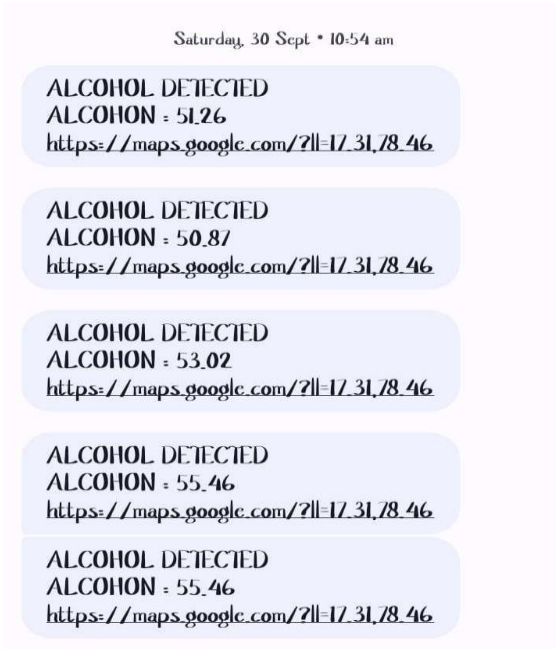

Fig 7 - Message

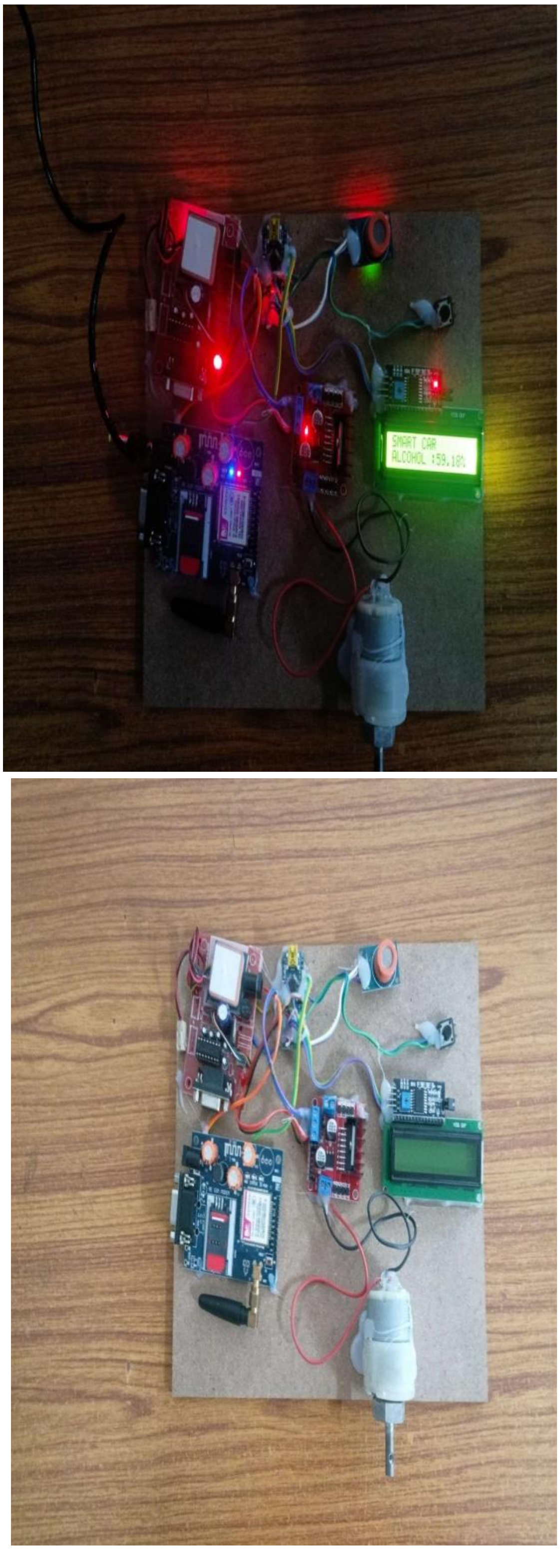

Fig 8 - Alcohol Sensor

Conclusion

In conclusion, implementing an automatic engine locking system for drunken drivers can significantly contribute to road safety by preventing impaired individuals from operating vehicles. This innovative technology serves as a proactive measure, promoting responsible behavior and potentially reducing the incidence of alcohol-related accidents. By incorporating such systems, we take a step towards creating a safer and more responsible driving environment for everyone on the road. The future scope for an automatic engine locking system for drunken drivers is promising and can evolve in several ways. Firstly, advancements in sensor technologies, such as improved alcohol detection methods and biometric sensors, could enhance the precision and reliability of the system. Integration with emerging technologies like artificial intelligence may enable more sophisticated decision-making algorithms, ensuring accurate identification of impaired individuals.

Additionally, there's potential for collaboration with smart city initiatives, allowing for a seamless connection between vehicles and traffic management systems. This integration could lead to more comprehensive monitoring and control mechanisms, contributing to a holistic approach in ensuring road safety.

Furthermore, as electric and autonomous vehicles become more prevalent, adapting the automatic engine locking system to these evolving transportation technologies will be essential. The system could be integrated into the overall safety protocols of autonomous vehicles, adding an extra layer of precaution.

In conclusion, the future of automatic engine locking systems for drunken drivers lies in continuous technological advancements, integration with smart city infrastructure, and adaptation to the changing landscape of transportation, ultimately enhancing road safety and preventing alcohol-related accidents.

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