



# **Air Pollution and Insurance Based Vehicle Locking System**

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**ABSTRACT:** Vehicle is one of the major thing in our daily life, it creates lot of pollution to the surrounding environment of the world and this pollution will affect the people health and the environment, this will give ugly appearance. So, when the vehicle pollution exceeds over the limit, it will be reported to the RTO office using wireless technology of GSM. Another part of this project is insurance, the number of vehicle increased in this world and people misusing this concept those who had a power to own profit. To avoid misguide of profit and to claim an insurance amount from the insurance office incase accident will occur to those vehicles. Both are continuously monitored and reported to the module user.

**KEYWORDS:** Arduino, GSM, MQ7 Sensor, Motor Driver.

## **I. INTRODUCTION**

The main source of pollution in cities is due to vehicles by reducing of the trees in rural and urban areas. The increase use of vehicles in cities results will ends with increase in the emission of various toxins into air. This kind of high inflow of vehicles in urban areas causing more air pollution and decreasing air quality that leads to severe health diseases. Due to this type of the air pollution at present, the Indian Government introduces pollution based fitness certification for the public and commercial vehicles and it will be granted by an Indian Pollution control board and it will be verified once in a year.

A new technique to control the vehicle causing air pollution in the environment has been developed. This proposed system is designed with Atmega processor that controls the engine of vehicle based on the values of the sensors and preset date on the controller. Any vehicle exceeds the threshold level of pollution in an area then the engine of the vehicle was automatically switched off by the circuit designed. The proposed system as to be inbuilt with the vehicles, it is not going to control the pollution generated by vehicles. This will be going to do only limitation of the vehicle pollution by a system.

## **II. METHODOLOGY**

In this project, we are using Arduino Nano development board. It is the microcontroller board to control the interfaced devices and response to that device input and output. The main concept is to monitor the vehicles carbon mono oxide emission continuously to lock the vehicles and it is notified to the Air pollution control unit, when pollution is existing their limit it is informed to office via GSM module. It is identified by the temperature sensor and the pressure sensor readings. And its main part of this one is mq7 sensor to identifies a carbon mono oxide from the vehicles silencers. Other part of this project heart is insurance, to identifies whether the vehicles insurance is on date or out of date. The expired date of the insurance is recorded in the EEPROM (Electrically Erasable Programmable Read Only Memory) of the Arduino Nano board. When the date to be expired that is notifies to the user before 5 days out of the expired, it is notifying by use of the LCD (Liquid Crystal Display) display (16\*2) to the user in vehicles and SMS is sends to the user mobiles. After the out of day of the insurance the vehicle is going to be locking the vehicle through petrol flow to the engine, to stop the motion of the vehicles. The user can renew the insurance via internet with mobile



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app control or direct renewable option. The renewed date is updated by using GSM module. The date is updated in EEPROM of Arduino Nano board also. The vehicle will get lock, if the pollution is crossing the permitted limit or the insurance date is expired. After the update of the Insurance date and level carbon-monoxide emission, the vehicle is moving in normally.

### III. HARDWARE USED

#### A. ARDUINO

Arduino is an open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. Arduino can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators. The microcontroller on the board is programmed using the Arduino programming language (based on Wiring) and the Arduino development environment (based on Processing). Arduino projects can be stand-alone or they can communicate with software running on a computer (e.g. Flash, Processing, Max MSP). The **Arduino NANO** is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. The board can operate on an external supply from 6 to 20 volts. If supplied with less than 6V the board may become unstable.



Figure 1. Hardware Architecture of Arduino NANO

#### B. GSM

GSM (Global System for Mobile Communications) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile phones, first deployed in Finland in July 1991. As of 2014 it has become the de facto global standard for mobile communications - with over 90% market share, operating in over 219 countries and territories. 2G networks developed as a replacement for first generation (1G) analog cellular networks, and the GSM standard originally described a digital, circuit-switched network optimized for full duplex voice telephony. This expanded over time to include data communications, first by circuit-switched transport, then by packet data transport via GPRS (General Packet Radio Services) and EDGE (Enhanced Data rates for GSM Evolution) or EGPRS. Subsequently, the 3GPP developed third-generation (3G) UMTS standards followed by fourth-generation (4G) LTE Advanced standards, which do not form part of the ETSI GSM standard.



Figure 2. GSM module



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### C.MQ135 SENSOR

This is a simple-to-use Carbon Monoxide (CO) sensor, suitable for sensing CO concentrations in the air. The MQ-135 can detect CO-gas concentrations anywhere from 40-250 pascal. This sensor has a high sensitivity and fast response time. The sensor's output is an analog resistance. The drive circuit is very simple; all you need to do is power the heater coil with 5V, add a load resistance, and connect the output to an ADC. This sensor comes in a package similar to our MQ-3 alcohol sensor, and can be used with the breakout board below.



Figure 3. MQ135 Sensor

### D.RTC

Real time clocks (RTC), as the name recommends are clock modules. The DS1307 real time clock (RTC) IC is an 8 pin device using an I2C interface. The DS1307 is a low-power clock/calendar with 56 bytes of battery backup SRAM. The clock/calendar provides seconds, minutes, hours, day, date, month and year qualified data. The end date of each month is automatically adjusted, especially for months with less than 31 days. They are available as integrated circuits (ICs) and supervise timing like a clock and also operate date like a calendar. The main advantage of RTC is that they have an arrangement of battery backup which keeps the clock/calendar running even if there is power failure. An exceptionally little current is required for keeping the RTC animated. We can find these RTCs in many applications like embedded systems and computer mother boards, etc. In this article, we are going to see about one of the real-time clock (RTC), i.e. DS1307. While designing any real-time system which deals with time, there are two ways of handling the time factor. One is to generate the time internally which is done by programming the timers of the controller; and the other is to use an RTC. The following table shows the comparison of these methods while designing a real-time application.

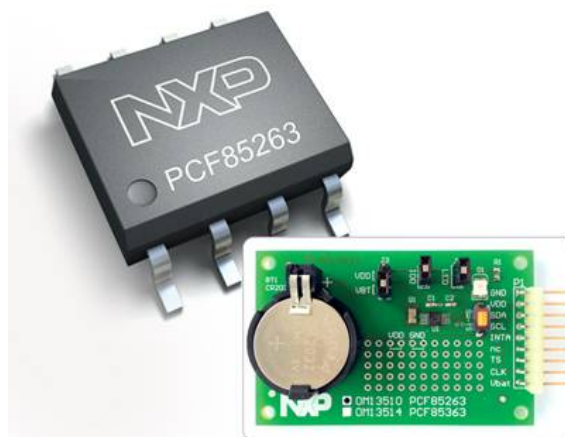


Figure 4. RTC



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## E. LCD DISPLAY

A liquid-crystal display (LCD) is a flat-panel display or other electronic visual display that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.



Figure 5. LCD DISPLAY

## IV. PROPOSED WORK

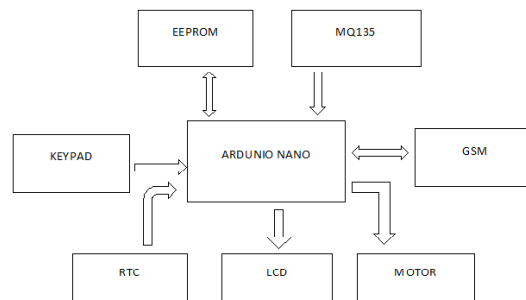


Figure 5. Block Diagram

## F. DC MOTOR

Electrical motors are everywhere around us. Almost all the electro-mechanical movements we see around us are caused either by AC or a **DC motor**. Here we will be exploring DC motors. This is a device that converts DC electrical energy to a mechanical energy.





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## G. MOTOR DRIVER

A motor driver is a little current amplifier; the function of motor drivers is to take a low-current control signal and then turn it into a higher-current signal that can drive a motor.

## V. WORKING

### INSURANCE

The fixed date is stored in EEPROM. And present time and date is stored in RTC by using buttons. By the usage of CMOS battery RTC still runs even the power is shut down. The overall process is controlled by Arduino and nano board. When the kit is on the RTC and EEPROM date's are monitored if they equal or not. LCD display shows warning before 3 days. When the dates are equal motor will get off. The expired date message sends to user by GSM. Then we renew the insurance in RTO office for one year.

### POLLUTION

The MQ7 sensor will find the CO<sub>2</sub>'s emission level in the unit of PPM. If the emission exceeds the desired level the motor will get off. After over coming those problem the vehicle gets unlocked.

## VI. CONCLUSION

The overall project is based on monitoring the Emission of Carbon monoxide from the vehicle's silencer whether the emission of smoke is within limit provided by pollution control board and due date of vehicle's insurance. The smoke level is detected by the MQ7 sensor and Temperature sensor. If the insurance exceeds the due date or emission of smoke is cross over the limit, the vehicle will stop automatically by controller. The vehicle will unlock only after taken necessary steps for the cause.

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