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Integrated Automated System for Monitoring and Alerting Vehicle Pollution

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ABSTRACT

In the growing global economic environment, road transportation is one of many factors that determine the economic resources of a country. This will result in economic growth, the fulfillment of needs, and a favorable environment for employment. However, the environmental disorder has caused air pollution, noise pollution, light pollution, thermal pollution. This creates great damage to the individual and the environment. There are currently various types of equipment's and regulations to prevent or reduce this. But there are several practical problems in implementing them. Lot of researches is taking place around the world to solve these problems. One of these is the INTEGRATED AUTOMATED SYSTEM FOR MONITORING AND ALERTING VEHICLE POLLUTION. The main purpose of this system is to monitor air pollution, noise pollution, light pollution and thermal pollution when vehicles violate traffic rules, using the microcontroller, sensors, GSM-GPS and LCD display, and the vehicle will send the message to the RTO / Control Room within the area and the Owner of the vehicle. Furthermore, the above message is displayed in the LCD display on the vehicle's dashboard with the cell phone number of the nearest service center. The driver / owner of the vehicle must provide the vehicle for service and provide an explanation for the relevant officer within a specified period. These will be recorded on the vehicle's service record if not given proper description. Furthermore, by taking legal actions, environmental degradation and accident can be reduced and make road transport safe and secure.

Key Words: *Economic resources Environmental disorder, Violate traffic rules, Service record, Safe and Secure*

I. INTRODUCTION

India is one of the largest countries in the world for road transport. The number of vehicles registered in India on March 2017, was 252354000. This is much higher than the vehicle number 201491000 on March 2016.Thus, the number of vehicles in India is increasing every year. Of course, this reflect the growth of the country. At the same time, it creates huge repercussions like air pollution, noise pollution, thermal pollution and photo pollution. Air pollution creates respiratory irritation, lung diseases, cough and wheezing problems for people. And also, this air pollution causes different types of environmental impacts. When use the horns more than the limit allowed in the vehicles, the ear is causing dullness and air noise problems. Sometimes it leads to accident when the exceeded limit horn is used. Thermal pollution causes various problems, like skin cancer, and various environmental impacts in the environment. Furthermore, accidents can be triggered by the motorist when they use powerful headlights with more light intensity than the permitted levels and it also causes damage to the eyes and affects the environment. In considering this, the Government has passed legislation in the last 2017, directing the new vehicles to matching the BIS (IV) standard to reduce pollution. But there are many practical problems in monitoring and detecting the old vehicles which are not maintained properly which causes much pollution to the environment. In this journal, we will see detailed about the system of INTEGRATED AUTOMATED SYSTEM FOR MONITORING AND ALERTING VEHICLE POLLUTION and its processing.

II. PROPOSED DESIGN:

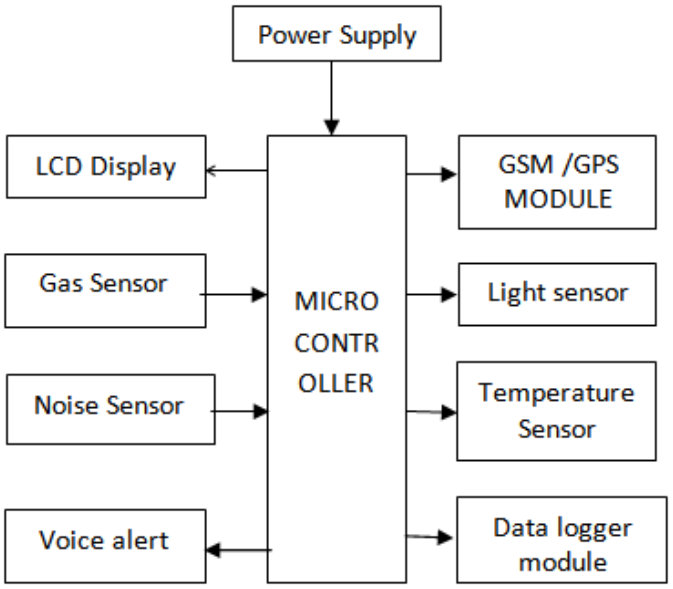

Fig1: Functional block diagram of Microcontroller unit

A. MICROCONTROLLER:

The Arduino Uno microcontroller board based on the AT mega 328. It has a 14-digitalinput /output pins (of which 6 can be used as PWM outputs),6 analogue inputs, a16 MHz crystal oscillator, a USB connection a power Jack, an ICSP header and reset button. It contains everything needed to support microcontroller simply connect it to a computer with a USB cable or power it with AC to DC adaptor or battery to get started. The recommended input voltage is 7_9V. Its flash memory is 32 KB it has 2KB SRAM and 1KB EEPROM. Its clock speed is 16MHz.

B. DATA LOGGER MODULE:

The Data Logger Module Shield V1.0 with SD Card Slot incorporates the DS1307 battery supported ongoing clock (RTC). This RTC will keep a precise track of the information and time for up to quite a while, notwithstanding when at that point shield isn't being fueled. A standard SD card peruse is given to permit FAT16 or FAT32 organized SD cards up to 32GB in size to be perused or written to and is perfect with the standard SD card library. The shield additionally contains proper dimension moving hardware to secure the 3.3V interface of the SD card.

C. GSM/GPS MODULE:

SIM808 module is a GSM/GPS/BT three-in-one capacity module. It depends on the most recent GSM/GPS/BT module SIM808, underpins GSM/GPRS Quad-Band system and joins GPS innovation for satellite route. It has high GPS get affectability with 22 following and 66 securing recipient channels. In addition, it underpins A-GPS that accessible for indoor limitation and it additionally bolsters for Bluetooth 4.0. The sim 808 module has the accompanying highlights,

- Quad-band 850/900/1800/1900MHz.
- Supports Real Time Clock.
- Supply voltage go 5V ~ 12V.
- Supports for Bluetooth 4.0.
- Supports 3.0V to 5.0V rationale level.
- Low control utilization, 1mA in rest mode

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D. SENSORS:

This framework has Light sensor, Gas sensor, Noise sensor and Temperature sensor. The Gas locators measure a predetermined gas focus, the sensor reaction fills in as the reference point or scale. Electrochemical sensors or cells are most generally utilized in the discovery of dangerous gases like carbon monoxide, carbon dioxide, Sulfur oxides, nitrogen oxides and un copied hydrocarbons. The LDR module is utilized here as a light sensor. A photoresistor is a light-controlled variable resistor. The opposition of a photoresistor diminishes with expanding episode light force; at the end of the day, it displays photoconductivity. The Sound Detector is a little and simple to utilize sound detecting board with three distinct yields. The Sound Detector gives a sound yield, as well as a double sign of the nearness of sound, and a simple portrayal of its adequacy. The 3 yields are concurrent and autonomous, so you can use the same number of or as few as you need on the double. The DS18B20 is water evidence Temperature test Black which depends on the DS18B20 sensor. These 1-wire computerized temperature sensors are exact and can offer up to 12 bits of exactness from the locally available advanced to simple converter.

E. LCD (Liquid Crystal Display):

A 20x4 LCD show is exceptionally fundamental module and is usually utilized in different gadgets and circuits. These modules are favored more than seven portions and other multi section LEDs. The reasons being: LCDs are sparing; effortlessly programmable; have no restriction of showing uncommon and even custom characters (not at all like in seven sections), movements, etc. A 20x4 LCD implies it can show 20 characters for every line and there are 4 such lines. In this LCD each character is shown in 5x7 pixel network. This LCD has two registers, to be specific, Command and Data. This is standard HD44780 controller

III. WORKING PRINCIPLE:

The sensors relate to the microcontroller. These microcontrollers are designed to act as the threshold value determined by the government. This threshold value is based on the vehicle. The sensors have ADC. (Analogue to Digital converter). If one or more of the attached sensors reach threshold value, they immediately change the analog signal into digital data and send it to the microcontroller. The micro-controller kit is connected to the GSM-GPS module and mounted on the vehicle's dashboard, with LCD display. This LCD display is designed to print the vehicle number, location, type of pollution and cell phone number of the nearest service center. At the same time the voice alter in the dashboard is designed to alert. At the same time, it is designed to send the same information to the nearby control room / RTO office and the owner of the vehicle. If the vehicle is running when the alert mode is present, the information will be recorded in a five minutes interval at the microcontroller kit and control room / RTO Office. This five-minute interval can be adjusted to the time that the government determines. If the sensors do not reach the threshold level the display, displays that there is no problem found and displays the locality of the vehicle. This information is also sent to the control room/RTO office.

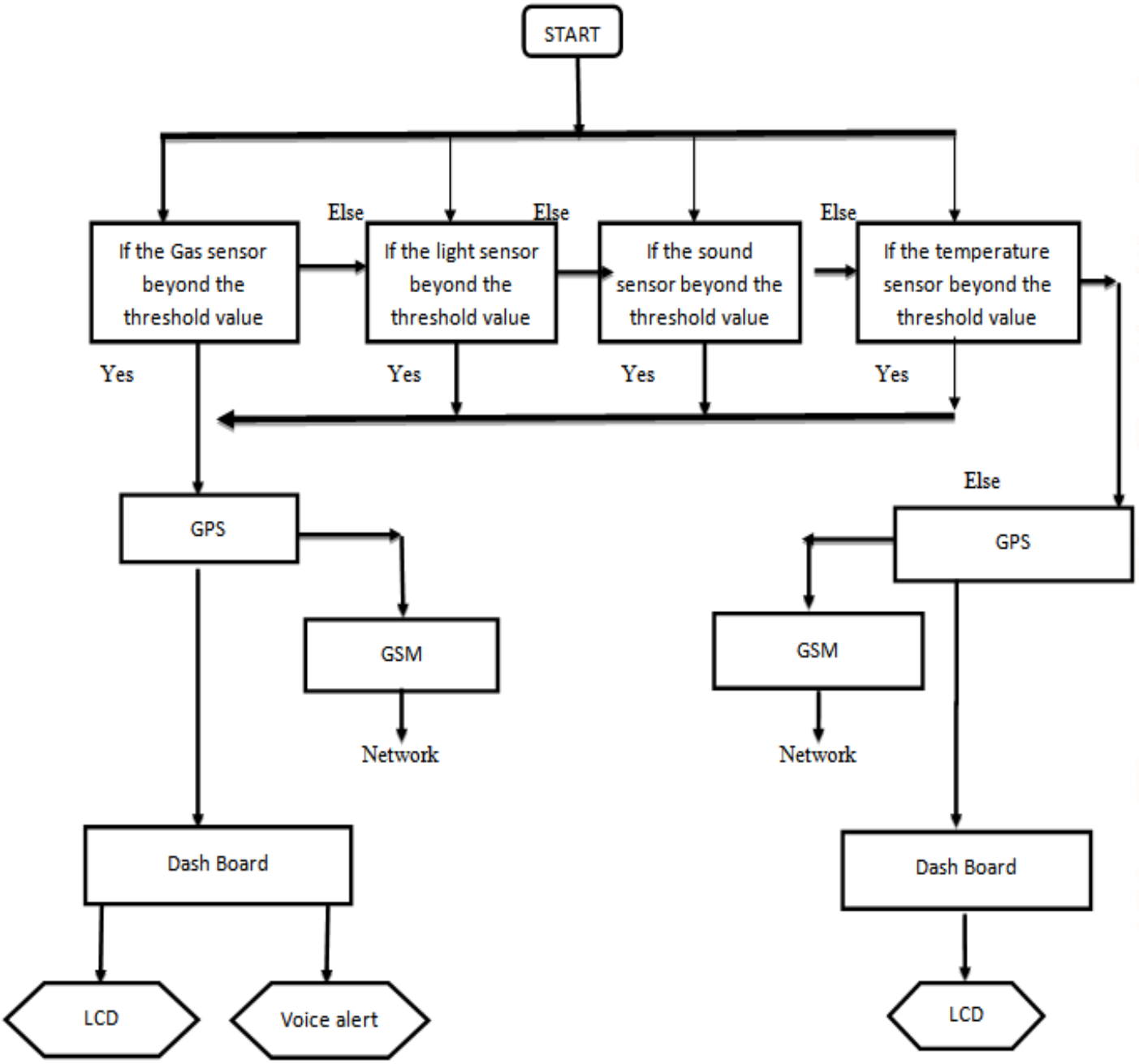

Fig2: Flow chart of Microcontroller operation system

IV. FEATURES:

- In this system microcontroller kit is sealed. It could not be unsealed without get permission from the government. It avoids the chances of making any illegal changes in it.
- By using sensors like the vibration sensor, pressure sensor, we can easily detect the problems in the vehicle and take remedial measures to remove those problems.
- By making small changes in this system can detect and gives alert to remove pollution in industries, business enterprises and the needy places.

V. CONCLUSION:

It is the duty of every single individual to prevent or reduce environmental degradation. In this way the environmental disorder will be greatly reduced when this system is fully implemented in all vehicles in road traffic, and also the vehicles will be properly maintained and reduced fuel consumption. Thus, the individual and the country's economic resources will be rise.

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