e-ISSN:2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

DEVELOPMENT OF INTERCONNECTED SENSOR ECOSYSTEM TO MAP, SENSE AND DETECT AUTOMOTIVE PARAMETERS USING MULTIPROCESSOR

Rutuja Nannar*[1], Pratiksha Gosavi*[2], Hrutuja Sapate*[3], Mr. Prashant Titare*[4], Dr. D.G. Khairnar*[5]

*[1,2,3]Students, Department of Electronics & Telecommunication Engineering, D.Y. Patil College of Engineering, Akurdi, Pune -411044, India.

*[4] Project Guide, Department of Electronics & Telecommunication Engineering, D.Y. Patil College of Engineering, Akurdi, Pune -411044, India.

*[5]Prof, Department of Electronics & Telecommunication Engineering, D.Y. Patil College of Engineering, Akurdi, Pune -411044, India.

ABSTRACT

There can be instances of implementation of the vehicle echo device due to different physical features such as power train (e.g. switching between engine and generator operation), environmental variations (e.g. ground grade change), traffic laws (e.g. speed limits), and safety problems (e.g., headway to the leading vehicle). By taking into account the disruption of the system dynamics and the constraints on control and state variables, the proposed structure solves these real- world issues. Early work presumed that behind the steering wheel, human drivers were fully responsible for vehicle speed control; therefore, the intention of the paper is to advise individuals on how to adjust their driving style for better fuel efficiency. Everything incorporated using multiprocessor technology. The picture of connected and automated vehicles is becoming clearer as connectivity technologies and the computing capacity of onboard electronics are rapidly developing in recent years and is expected to be fully realized in the coming decades.

I. INTRODUCTION

Most car drivers today have problems driving at night. This is mostly due to the high light beam of the headlights they use. In order to escape such conditions, the driver must move the headlight of his vehicles to a lower beam to see what's ahead. These problems are also faced by the fuel monitoring program, as a vehicle moves through an inclined plane. It seems that the fuel level is suddenly shifting. Recently, many fuel theft incidents have been recorded at many fuel stations, this system allows us to be aware of and prevent such thefts. There are also times where the wheel pressure shoots up to a large degree due to the rise in temperature when moving in hot regions. And there are high risks of tire breakage due to the rise in pressure. This could lead to accidents that are fatal. Air pollution, which is detrimental to humans and our world, is a significant contributor to global warming. Many cars are not in accordance with emissions control requirements and regulations. Therefore, the production of carbon monoxide from cars increases, leading to deadly diseases and environmental conditions. Limiting this gas is also important to reduce emissions. In order to overcome this issue, multiprocessor based sensor eco-system is designed to map, sense and detect automotive parameters. Hence the overall performance gets improved with respect to speed and efficiency.

II. LITERATURE SURVEY

1) Paper Name: Air Pollution 6Monitorin Device based on IoT using Arduino
Authors: Misha Kumari2, Monika Singh1, Pradeep Kumar Chauhan3
Description: In today's case, we face a key challenge, which is pollution. India, or just Indians, are not facing this issue. This pollution crisis confronts our world as a whole. There are a number of sources of pollution, including air pollution, water pollution, noise pollution, nuclear pollution, etc. Yet here we are concerned with the detrimental consequences of air pollution and the solution to air pollution. The level of pollution is rising day by day. The amount of emissions is rising day by day due to variables such as industries, urbanization, growing population, increasing the use of a vehicle that can have an effect on human health. The device uses the internet to monitor air quality from the web server above in Air Pollution Control based on the Internet of Things.

2) Paper Name: Automatic Intensity Monitoring of Headlights and Obstacle Alerting System
Authors: Akhila M Jain, Arpita K, Avi Kumar R R
Description: With the assistance of two vehicles, it can be seen from the proposed system that, with the help of another vehicle coming in the opposite direction, the high vehicle beam can be controlled, and vice versa, using the LDR sensor and zig-bee contact to prevent accidents to a greater extent. We are building a prototype of automatic headlight intensity control system, and we expect the headlight to dim in order to stop this glare. This beam causes a person to be temporarily blind, resulting in night-time road accidents. This effectively transforms the high beam into a low beam, reducing the glare effect by detecting the approaching car. The model concept reduces the need for a driver to switch manually, which is not always achieved.
3) Paper Name: FUEL MONITORING SYSTEM FOR FUEL MANAGEMENT
Authors: Mr. Senthil kumar.R1, Ganapathi.M2, Arunkumar.D3, Goutham.G4,Karthick.M5
Description: The thesis focuses on the potential creation of the automotive environment under which vehicles can function under the Global Positioning System. We have built a system to find the fuel consuming factor in the display with on-time reading, and this system also recommends that the driver use the fuel optimally by adjusting the vehicle's speed. For the assessments, two different petrol engines are used. There is one two-wheeler engine and one four-wheeler engine. This work of the Fuel Monitoring System is an initial step and also becomes the scope of our work for improved fuel management**.**
4) Paper Name: A SMART MONITORING SYSTEM IN VEHICLES
Authors: 1Kavitha.N, 2Shakthipriya.P, 3Sivakannan S, 4Greeger Varcky Peter, 5Ragul K, 6Hamlyn Joy
Description: The CO2 sensor is used to detect the concentration of CO gas released from the engine, and the ultrasonic sensor is used to detect vehicle fuel levels. An initial warning is given to the driver in case of abnormal conditions with the aid of an LCD display and the same information is later transmitted to the mobile users through an Android application. This is achieved with the aid of the vehicle-integrated Arduino Controller. To pass the information from the sensors to the commuter, the Arduino Controller is used. The main objective of this paper is to stabilize all car tyres with ideal pressure, free of contaminants, achieve adequate fuel efficiency and create an affordable system.

III. PROPOSED SYSTEM

The high light beam of the headlights that they use in order to escape such conditions, the driver must move the headlight of his vehicles to a lower beam to see what's ahead. These problems are also faced by the fuel monitoring program, as a vehicle moves through an inclined plane. It seems that the fuel level is suddenly shifting. Recently, many fuel theft incidents have been recorded at many fuel stations, this system allows us to be aware of and prevent such thefts. There are also times where the wheel pressure shoots up to a large degree due to the rise in temperature when moving in hot regions. And there are high risks of tire breakage due to the rise in pressure. This could lead to accidents that are fatal.
Air pollution, which is detrimental to humans and our world, is a significant contributor to global warming. Many cars are not in accordance with emissions control requirements and regulations. The production of carbon monoxide from vehicles thus increases, leading to deadly diseases and environmental conditions. So, the aim is to overcome such problems and to improve the overall performance.

PROBLEM DEFINATION

To measure accuracy in the calculation of fuel in this device and a polluting car. It causes a problem due to elevated beam vision loss. Pressure of tire. Today, all these application is concerned as a measure problem.

e-ISSN:2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

IV. SYSTEM ARCHITECTURE

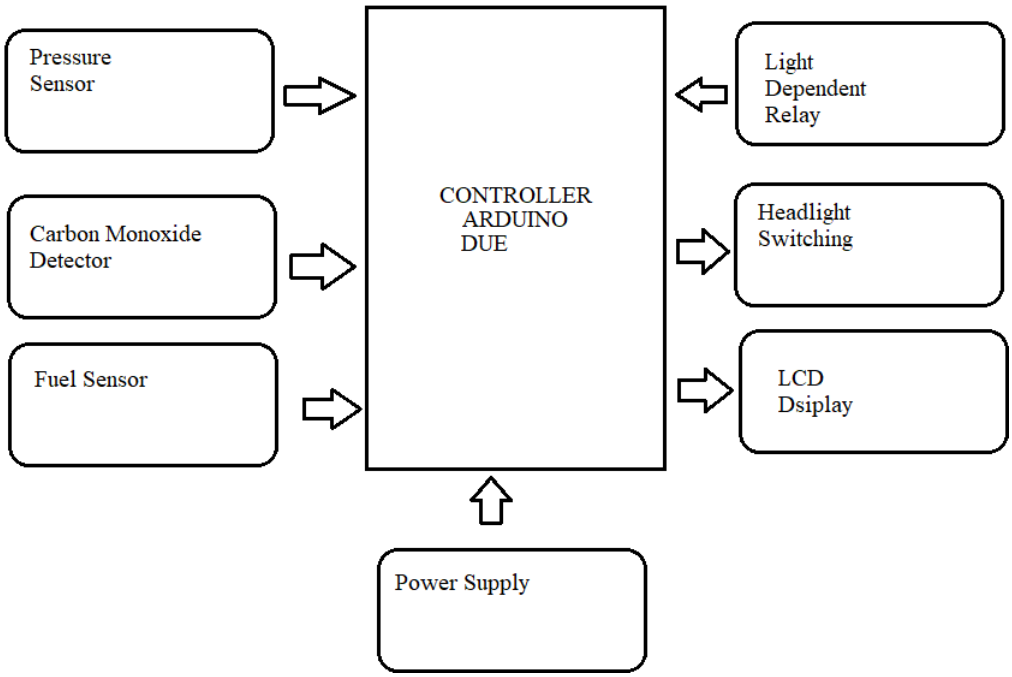
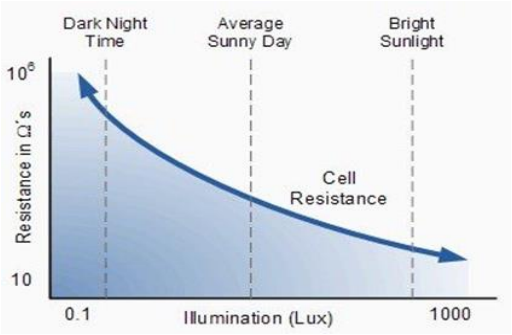


Fig 1. System Architecture

EXPLAINATION OF SYSTEM ARCHITECTURE

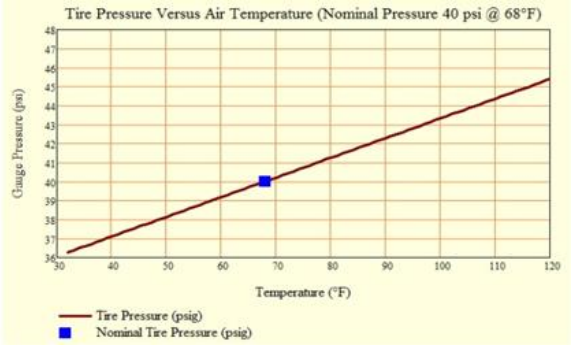
1. Headlight Switching:-

The Light Dependent Resistor (LDR) is a special whose resistance changes with the range in the intensity of light. It would thus be used to sense the light of incoming vehicles and give that data to the controller. Resistance of LDR decreases with increase in light intensity



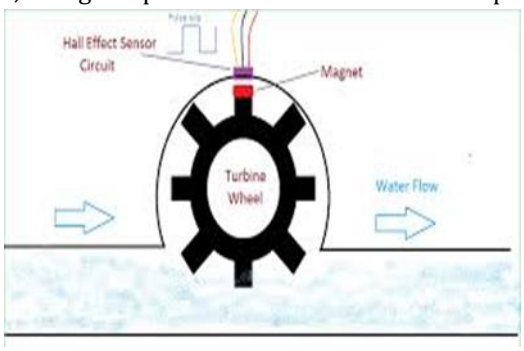
2. Monitoring System:-

The BMP 180 is selected for the purpose. The BMP 180 sense pressure from 300-1100 hpa. The maximum pressure wheel can sustain is around 44psi.The allowable pressure in bike and car it's considered is 30-35 psi. Using BMP 180, the pressure increased by temp can be measured and tire burst condition can be avoided .Pressure drop can be calculated in tire and driver can be warned about tire puncture according to the data.



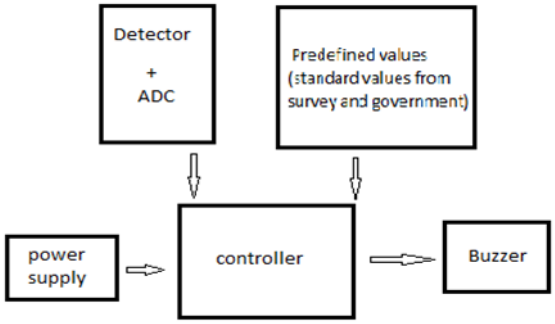
e-ISSN:2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

3. **Fuel monitoring system: -** The Flow rate sensor is used to find out the flow of the fuel in the fuel tank. The Hall Effect sensor was selected, as it gives pulses when the fuel would be passed be passed through it



4. **Pollution Monitoring System: -** For the pollution control we have used a carbon monoxide sensor (MQ-2).

In India allowable pollution in vehicles is up to 100ppm. Using mq7 data is collected and converted into digital using ADC. Controller detects collected data with predefined data, it exceeds the limits using buzzer it is indicated to the driver.



V. SIMULATION DIAGRAM

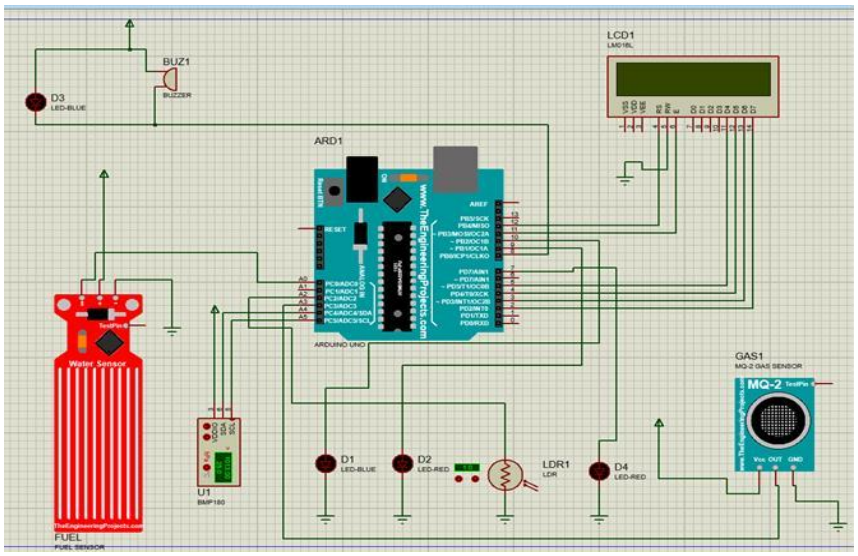


Fig.2 Circuit Diagram of System

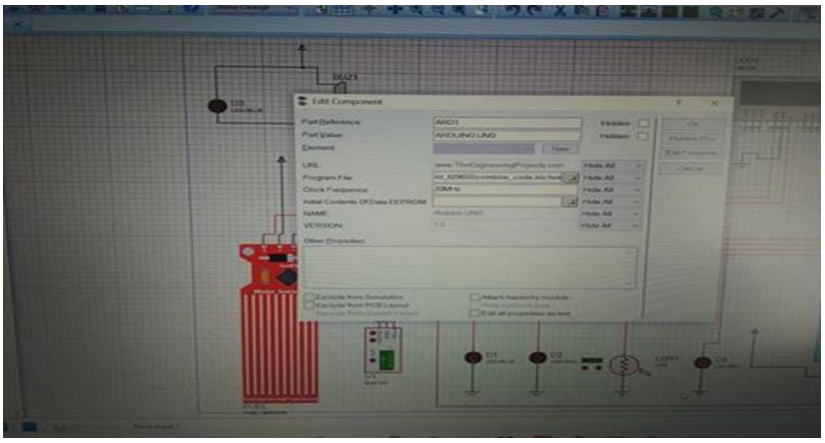
1) We have used proteus software for simulation. Above is the circuit diagram we have built for our system in proteus .
2) Analog Pin connections:
i) A0 – Fuel sensor
ii) A2 – LDR
iii) A3 – Gas sensor
iv) A4,A5 – Pressure sensor
3) Digital pin connections:
i) Pin2,3,4 – LCD

e-ISSN:2582-5208
International Research Journal of Modernization in Engineering Technology and Science
Volume:03/Issue:06/June-2021 Impact Factor- 5.354 www.irjmets.com

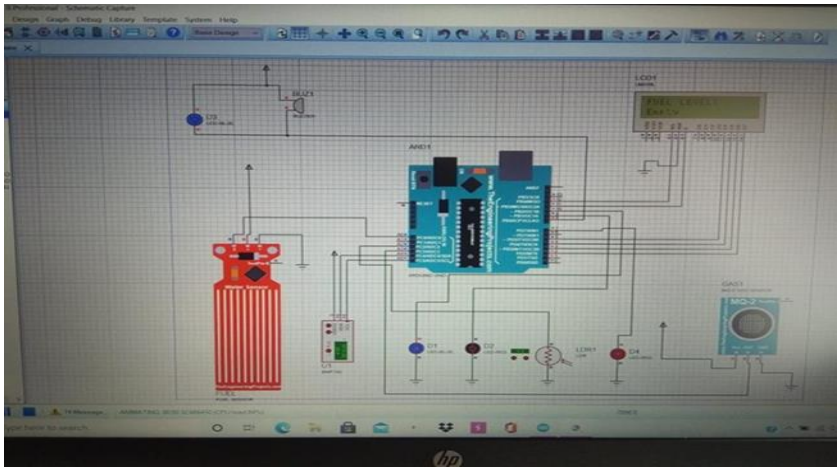
ii) Pin8 – Buzzer

iii) Pin7,9,10 – LED

4) Developed a program with embedded C programming language. The .hex file of the Arduino , Fuel sensor and Gas sensor are added in the program file at components in simulation diagram.



5) On the basis of conditions we have given in Arduino code we will see the output on LCD and LEDs will also glow forrespective sensor.



VI. SYSTEM SPECIFICATION

A. Hardware Specification

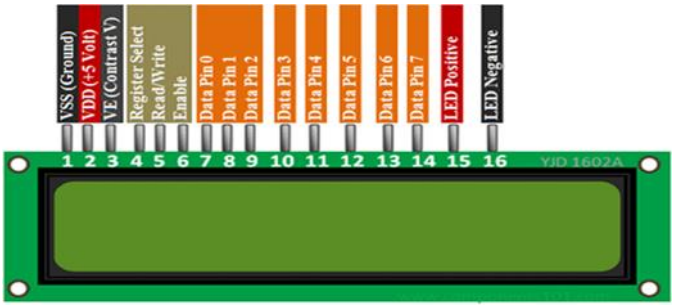
1. Arduino UNO

1. Microcontroller: Microchip ATmega328P [7]
2. Operating Voltage: 5 Volts
3. Input Voltage: 7 to 20 Volts
4. Digital I/O Pins: 14 (of which 6 can provide PWM output)
5. UART: 1
6. I2C: 1
7. SPPI: 1
8. Analog Input Pins: 6

9. DC Current per I/O Pin: 20 mA
10. DC Current for 3.3V Pin: 50 mA
11. Flash Memory: 32 KB of which 0.5 KB used by bootloader
12. SRAM: 2 KB
13. EEPROM: 1 KB
14. Clock Speed: 16 MHz
15. Length: 68.6 mm
16. Width: 53.4 mm

2. LCD

1. Operating Voltage is 4.7V to 5.3V
2. Current consumption is 1mA without backlight
3. Consists of two rows and each row can print 16 characters.
4. Each character is built by a 5×8-pixel box
5. Can work on both 8-bit and 4-bit mode
6. It can also display any custom generated character
7. Available in Green and Blue Backlight



3. Water level sensor

The specifications of water level sensors are :

1. 0utputs: 4-20 mA or 0.5 to 2.5 VDC,
2. Supply Voltage: 3.3 to 5 VDC,
3. Dimensions: 60 x 20mm, contacts 45mm,
4. when the water level is low then the digital output goes high and Adjustable sensitivity.

4. Light Dependent Resistor

Resistance : 400ohm to 400Kohm
Normal resistance variation: 1Kohm to 10Kohm
Sensitivity: about 3msec
Ratings: I used it on 3V,5V and 12V

5. Pressure Sensor
6. Gas Sensor
7. LED
8. Buzzer

B. Software Specification

1. Proteus
2. Embedded C

VII. RESULT

1.Headlight switching system:-

After testing the system under various conditions, the results of the tests were analyzed, and it is concluded that light intensity varies in the range 40-90 lux at night. The average light intensity of headlight of cars varied from 30-45 lux. All of these gives the clear indication that if 2 cars are approaching each other the average light intensity would sum up to 60-80 lux. Thus, taking in consideration all the above factors, the threshold for headlight switching to take place the light intensity is 60 lux.

2. Tire pressure monitoring:-

The BMP180 sensor is used for tire pressure measurement as well as it monitoring. The proposed system also notifies the driver regarding the excess tire pressure and also detects punctures.

3.Fuel management system:-

The fuel sensor gives the exact value of fuel in the fuel tank, which used to give the approximate value of distance to empty. A well as the current mileage obtained.

4.Pollution control:-

The MQ 2 sensor is used for pollution measurement as well as it also inform the driver if it exceeds the carbon mono-oxide level emitted by the car by buzzer.

VIII. APPLICATION

A. Fuel monitoring to prevent tank draining and fraud attempts. Real time fuel monitoring system.

B. Automatic Headlight switching system**: -** They allow for safer drive. Avoid blinding other vehicles or pedestrians.Improve driving in adverse weather.

C. Check tire pressure continuously. Alerts if pressure crosses threshold limit. Detects punctures in tires also.

D. Alerts if the vehicle is emitting greater quantity of carbon monoxide. A major factor contributing to a greenerenvironment.

IX. CONCLUSION

By using various electronic sensors, actuators that would solve the safety problems of vehicles when driving on highways, using flow rate sensor shows accurate fuel in the fuel tank, accidents using LDR system can be reduced using headlight switching and pollution in vehicles can be detected using buzzer by MQ7 sensor pollution, we have built a real time embedded system. Arduino is the primary component of this project and Arduino controls the entire operation. For the automatic headlight dimmer, the LCD is used for visual output. This allows the driver to use high beam light when required. But it changes the headlight to a low beam automatically when it detects a vehicle coming from the opposite side. In the future, the introduction of this technology in every vehicle would not only prevent accidents, but also provide a safe and enjoyable driving experience.

ACKNOWLEDGMENT

We express our sincere gratitude towards the faculty members who makes this project successful. We would like to express our sincere gratitude to our guide Mr. Prashant Titare for his whole hearted co-operation and valuable suggestions, technical guidance throughout the project work. Special thanks to our Prof. Dr. D.G. Khairnar for his kind official support and encouragement throughout the journey. Finally, we would like to thank all staff members and faculty members of E&TC Department who helped us directly or indirectly to complete this work successfully

X. REFFERENCES

[1] Monika Singh, Misha Kumari, Pradeep Kumar Chauhan. , "IoT Based Air Pollution 6Monitoring System using Arduino", Department of CSE, Bharat Institute of Technology, Meerut, Uttar Pradesh, India Assistant Professor, Dept. of CSE, Bharat Institute of Technology, Meerut, Uttar Pradesh, India.

[2] Arpita K , Akhila M Jain, Avi Kumar R, "Automated Headlight Intensity Control and Obstacle Alerting System", Students, BE, Department of TCE, GSSSIETW, Mysuru, Karnataka, India, Assistant Professor, Department of TCE, GSSSIETW, Mysuru, Karnataka, India.

[3] Mr.Senthil kumar.R,Ganapathi.M, Arunkumar.D, Goutham.G, Karthick.M, "Fuel Monitoring System For Fuel Managemant".

[4] Ashmita B, Alka K, Vaishnavi S, Prashant T, "Smart Museum based on IoT", International Research Journal of Engineering and Technology (IRJET), e-ISSN: 2395-0056, Volume: 07 Issue: 04, Apr 2020

[5] P Titare, DG Khairnar, "Development of Multiprocessor System on chip using Soft core: A review", International Engineering Research Journal (IERJ), ISSN 2395-1621, pg 390-397, March 2020.

[6] Kavitha.N, Shakthipriya.P, Sivakannan S, Greeger Varcky Peter, Ragul K, Hamlyn Joy "A Smart Monitoring System In Vehicles".