IJIRCCE

e-ISSN: 2320-9801 | p-ISSN: 2320-9798

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

Volume 11, Issue 7, July 2023

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 8.379

International Journal of Innovative Research in Computer and Communication Engineering

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 7, July 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1107034 |

Vehicle Fuel Theft Detector

Ramya N S [1], Arun Kumar K L [2]

P.G. Student, Department of Master of Computer Applications, Jawaharlal Nehru New College of engineering, Shivamogga, Karnataka, India[1]

Associate Professor, Department of Master of Computer Applications, Jawaharlal Nehru New College of engineering, Shivamogga, Karnataka, India[2]

ABSTRACT: The automotive industry has become worried about gasoline theft from vehicles, which has resulted in huge financial losses for both individuals and enterprises. This study suggests a unique the internet of Things (IoT)-based vehicle fuel theft detection system to address this problem. To effectively identify and stop fuel theft occurrences in real time, the system combines advanced technology for sensors, mobile connectivity, and data analytics. fuel level sensors, GPS modules, microcontrollers, and a central monitoring server are some of the essential parts of the IoT-based gasoline theft detection system. The fuel level sensors are placed strategically inside petrol tanks of automobiles and continuously check the fuel level. An alarm is set off by any unexpected and unauthorized drop in fuel levels. The GPS module keeps tabs on the whereabouts of the car, which is helpful for locating theft incidents and speeding up the recovery procedure. The sensors and the central monitoring server are connected by the microcontrollers as an interface. They acquire the sensor data, carry out the required calculations, and wirelessly transfer the information that's needed to the server. The data is gathered and analysed by the central monitoring computer, which then employs advanced algorithms to look for trends suspicious of fuel theft. The technology sends quick alerts to the car owner, fleet managers, or law enforcement organizations in the event that a theft the occurrence becomes known. Fuel theft from vehicles is an issue that is getting worse and is putting people's finances and security at risk. The adoption of Internet of Things (IoT) technology has opened the door for creative responses to this problem, such as car fuel theft detectors. These detectors use Internet of Things (IoT) elements such sensors, microcontrollers, and wireless connectivity to keep track of fuel levels and find unapproved fuel siphoning. Through mobile applications or web interfaces, the system immediately notifies vehicle owners or authorities of any fuel theft incidents. An overview of a system that uses IoT technology to detect fuel theft from vehicles is provided in this abstract. The design and development of the system includes the selection of sensors, microcontroller programming, Internet of Things connectivity, data processing and analysis, alert and notification systems, and user interfaces. The system offers a strong defence against gasoline theft by relying on in-the-moment observation and cognitive analysis, giving vehicle owners and businesses more protection and control. The use of IoT technology in the vehicle fuel theft detector system offers real-time monitoring, instant notifications, and integration capabilities with other IoT devices or platforms. This gives vehicle owners and businesses an efficient tool to combat fuel theft, reducing financial losses, minimizing operational disruptions, and promoting a safer environment.

KEYWORDS: Vehicle fuel theft, IOT connectivity, Fuel level monitoring, Wireless communication.

I. INTRODUCTION

Fuel theft from vehicles has become a serious issue around the world, resulting in considerable financial losses for both individuals and companies. Fuel theft has become a lucrative business for thieves due to the rising cost of fuel and the simplicity with which fuel tanks can be siphoned or modified. Modern tools that can effectively identify and stop fuel theft instances in real time are required to tackle this problem. IoT revolutionizes fuel theft detection by integrating sensor technologies, wireless communication, and data analytics, offering a comprehensive solution for vehicle owners.Fuel theft from moving vehicles, which is happening more frequently and costs people and companies' money, has become a major concern on a global scale. The development of cutting-edge solutions, such as car fuel theft detectors, has been made possible by the integration of Internet of Things (IoT) technology in order to address this issue. These detectors make use of the IoT's power to monitor fuel levels in real-time, spot illegal fuel siphoning, and immediately notify vehicle owners or authorities, reducing the impact of fuel theft. Fuel theft from moving vehicles, which is happening more frequently and costs people and companies' money, has become a major concern on a global scale. The development of cutting-edge solutions, such as car fuel theft detectors, has been made possible by the integration of Internet of Things (IoT) technology in order to address this issue. These detectors make use of the IoT's

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 7, July 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1107034 |

power to monitor fuel levels in real-time, spot illegal fuel siphoning, and immediately notify vehicle owners or authorities, reducing the impact of fuel theft. The ability to provide real-time monitoring and immediate notifications is one of the main benefits of using IoT technology for fuel theft detection. This makes sure that the owners of the vehicles are instantly informed of any suspicious activity connected to fuel theft, enabling them to act right away and stop further losses. The technology may also produce thorough statistics and analytics, giving vehicle owners insightful information about fuel use patterns and spotting possible weaknesses. Fuel theft from vehicles has grown significantly in recent years, endangering businesses and car owners' finances and security. Vehicle fuel theft detectors are one of the cutting-edge solutions made possible by the Internet of Things (IoT) technology integration that has been used to address this issue. The impact of gasoline theft is reduced by these detectors, which use the IoT to monitor fuel levels in real-time, spot illicit fuel siphoning, and instantly warn vehicle owners or authorities. There are various benefits to using IoT technology to detect fuel theft. First of all, it makes it possible to continuously monitor the fuel levels in moving vehicles, giving real-time information about the patterns of fuel usage. This not only enables car owners to efficiently manage their gasoline supplies, but it also enables them to see any abrupt or unusual drops in fuel levels that may signify fuel theft.

II. LITERATURE REVIEW

Researchers and industry experts have focused their attention on the pervasive problem of vehicle fuel theft. Through the use of cutting-edge detection technologies, fuel theft can now be thwarted thanks to the Internet of Things (IoT) integration. In this study of the literature, we look at recent advancements in the field of IoT-based fuel theft detectors for vehicles. An additional crucial component of fuel theft detection systems is the creation of clever algorithms for the analysis of fuel level data. A machine learning-based strategy was put forth by Zhang et al. (2020) to find patterns suggestive of fuel theft episodes using real-time sensor readings and historical fuel usage data.

The accuracy in identifying fuel theft incidents in the results was encouraging. In addition, Zhou et al. (2021) developed a rule-based algorithm that could identify unusual swings in fuel levels and send out rapid alerts to car owners or authorities. These studies highlight the value of clever algorithms in enhancing the precision and dependability of fuel theft detection systems.

Real-time monitoring and immediate notifications made possible by the incorporation of IoT connectivity are essential for prompt response to fuel theft situations. An IoT-enabled gasoline monitoring and theft detection system was created by Garg et al. (2017), and it used a GSM module to relay data to a central server. The technology sent SMS messages to car owners in real time to ensure prompt response.

The same IoT-based gasoline theft detection system employing Wi-Fi connectivity was proposed by Chakraborty et al. (2019), allowing for seamless communication between the vehicle and the monitoring system. These studies underline how crucial IoT connectivity is for the quick identification and reaction of fuel theft situations.

The success of gasoline theft detection systems is significantly influenced by user acceptability and satisfaction. An IoT-based gasoline theft detector system underwent a user perception research by Kumar et al. (2020) in order to address this issue. The findings showed that users were extremely satisfied with the system's operation and capability to identify fuel theft instances. The study also emphasized the significance of easy installation and user-friendly interfaces for user approval.

III. DESIGN AND IMPLEMENTATION

Clarify the Requirements: State the goals and specifications for the fuel theft detector system. Think about things like real-time monitoring, the precision of theft detection, financial limitations, scalability, and integration with current car systems. Hardware selection: Select appropriate IoT hardware parts for the system. A microcontroller or single-board computer (such as Arduino or Raspberry Pi), communication modules (such as GSM or Wi-Fi), power supply components, sensors for monitoring fuel levels, GPS for vehicle tracking, and others are frequently used in this. Install fuel level sensor in vehicle's fuel tank, ensuring proper calibration and compatibility with fuel system. IoT device integration involves connecting microcontrollers to fuel level sensors, writing firmware, and transmitting data to a central server or cloud platform. Secure IoT data transmission using protocols like MQTT, HTTP, TCP/IP, and encryption for data protection. Set up a scalable cloud platform for IoT data processing using a reliable provider like AWS, Google Cloud, or Azure, and implement appropriate algorithms. Real-time fuel monitoring and analysis using

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 7, July 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1107034 |

software algorithms, thresholds, and anomaly detection techniques to detect fuel theft and abnormal consumption. Implement an alarm system to alert vehicle owners and fleet managers about fuel theft incidents via SMS, email, and push notifications. Create a user-friendly interface for accessing and visualizing data, including web dashboards and mobile applications.

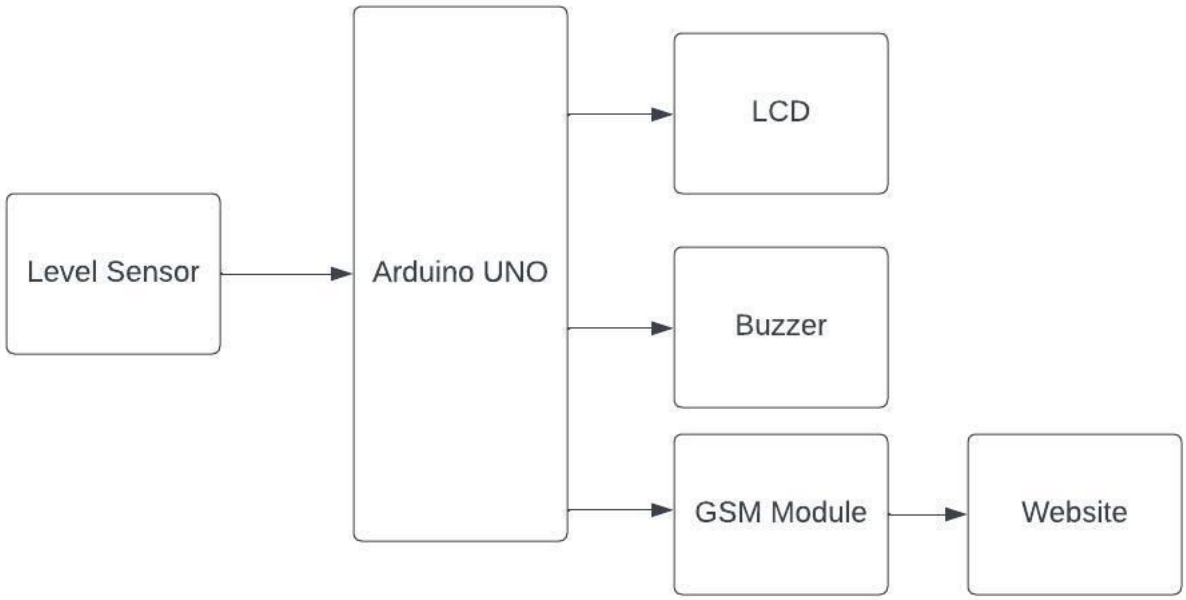

FIGURE: Block Diagram of system

1. Level sensor: A level sensor, commonly referred to as a level transmitter or level gauge, measures the amount of a substance or material present in a tank or container. It offers details regarding the volume of liquid, powder, or granular material contained in a vessel. Numerous industries, including oil and gas, chemical processing, water treatment, food and beverage manufacturing, and pharmaceuticals, employ level sensors extensively. (up to 10liters)
2. Arduino Uno: Popular microcontroller board called the Arduino Uno is based on the ATmega328P microcontroller. As a result of its simplicity and adaptability, it is frequently used for prototyping and DIY electronics projects.
3. LCD: Information is displayed on a flat panel display called an LCD (Liquid Crystal Display), which makes use of the light-modulating capabilities of liquid crystals. LCDs are frequently found in a wide range of electronic products, including digital watches, computer monitors, cellphones, and televisions. They are frequently employed in microcontroller and embedded system projects.
4. Buzzer: A buzzer is an electronic gadget that generates sound by shaking a speaker cone or a diaphragm. It is frequently employed to provide audible alerts or tones in electronic circuits, alarms, timers, and various notification systems. Arduino projects typically incorporate buzzer modules for sound-related purposes.
5. GSM module: A GSM (Global System for Mobile Communications) module is a device that enables communication over cellular networks. It allows electronic devices, such as microcontrollers or computers, to send and receive data or make voice calls via mobile networks. GSM modules are commonly used in applications where remote communication is required, such as IoT (Internet of Things) projects, security systems, and tracking devices.
6. Website: A website is a collection of web pages and associated material that is available online via a special domain name. Websites can be used for a variety of purposes, including personal, business, educational, entertainment, and more, and are created with the intention of providing users with information, services, or products.

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 7, July 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1107034 |

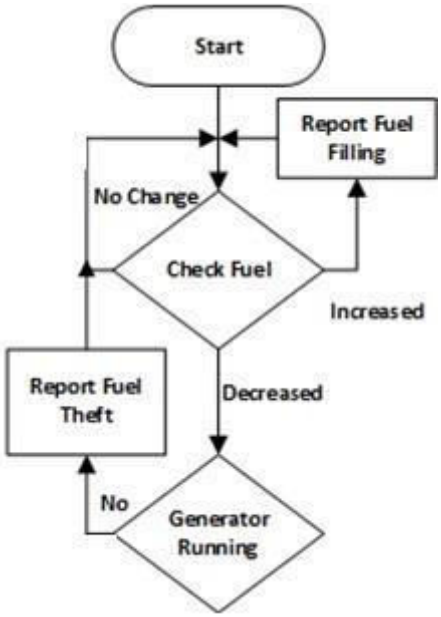

FIGURE 2: Flow Chart of system

IV. EXPERIMENTAL RESULTS

Due to increased gasoline prices, fuel theft needs to be monitored. The intelligent system will activate whenever someone enters or tampers with the fuel and fuel tank and give the owner a precise indicator of the vehicle's location and fuel level. The system's distinctive characteristic is that it keeps texting the owner until the owner confirms the return.

Fig(a) shows the fuel theft detection(b)it shows the fuel level=0(c)it shows the decreasing and increasing the level of the fuel(d)it shows the when someone trying to theft the fuel it will give the message to the owner(e)it shows the sending SMS to the owner.

(a)

(b)

(c)

(d)

(e)

| e-ISSN: 2320-9801, p-ISSN: 2320-9798| www.ijircce.com | |Impact Factor: 8.379 |

|| Volume 11, Issue 7, July 2023 ||

| DOI: 10.15680/IJIRCCE.2023.1107034 |

V. CONCLUSION

IoT-based vehicle fuel theft detectors offer real-time monitoring and alarm mechanisms to detect and stop fuel theft by integrating IoT devices and sensors. IoT-based gasoline theft detectors use sensors like fuel level, GPS, motion, and tamper to monitor fuel levels, detect unauthorized entry, and detect unexpected dips or spikes in fuel quantity. IoT-based car fuel theft detector offers real-time monitoring, quick detection, remote accessibility, and cost savings for improved security, reduced incidents, and fuel management.

REFERENCES

[1] M. G. Rajan, S. Maheswari, R. Karthikeyan, and G. Archana's 2017 project, "Smart Vehicle Fuel Theft Detection and Alert System Using IoT," is published in IJCSIS.
[2] In 2018 IJET publication, G. Vijayakumar, N. Sowmya, and B. Sivaranjani reviewed smart car fuel theft detection system using IoT.
[3] R .K Sharma, S. K. Sharma, M. Maheshwari's 2018 article in IJARCSSE discusses software engineering.
[4] Y. Gharde, P. R. Nerkar, S. R. Deshmukh, V. M. Thakre, 2019; Journal of Engineering Research & Technology International.
[5] A. S. Gopika, K. S. Niranjan, N. R. Meghana, B. N. Chaitra, et al.'s 2019 paper in IJSRSET.

[6] Han, X., Zhao, L., Sun, Y., et al. (2020). Design and implement vehicle fuel theft alarm system using IoT, presented at IMCEC.
[7] Rizvi, S., Rathore, M.M., & Paul, A. study smart vehicle anti-theft system using IoT and cloud computing.
[8] Vashist, A., and Sharma, N. (2018) Design and implement IoT-based vehicle fuel theft detection system.
[9] Yan, L., Gao, Y., Wang, C., et al. (2018). Develop vehicle fuel theft prevention system using Internet of Things.
[10] Moyo, S., & Ngwira, L. (2019). Develop real-time fuel monitoring and theft detection system for mining fleet vehicles.
[11] Ghazali, R., Dahan, H. M., and Raza, M. H. (2019). Design fuel theft detection system for automotive vehicles at ICSET 2019.
[12] Yaseen, S., Abdulijabbar, A., et al. (2021). Develop IoT-based framework for fuel theft detection system.
[13] Puppalwar, R., Shende, S., & Ingole's IoT-based fuel monitoring system prevents theft and optimizes consumption.(2020)

INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 8.379

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN COMPUTER & COMMUNICATION ENGINEERING

9940 572 462 6381 907 438 ijircce@gmail.com

www.ijircce.com

Scan to save the contact details