

Project Presentation

"IOT IN FLEET MANAGMENT IN LOGISTICS ”

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Outline

- Introduction
- Real-life Example
- Hardware Components & Sensors Used
- How It Works
- Advantages of system
- Disadvantages of system
- Future work
- Conclusion



Introduction

This project is a Smart Fleet Management System that helps keep track of important things in a vehicle like fuel level, door status, and temperature. It uses different sensors connected to an Arduino to check these conditions and shows the results on a small screen (OLED display). If there is any problem, like low fuel, high temperature, or an open door, the system gives a warning using LED lights and the display. This system is useful for managing many vehicles safely and efficiently



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Real-Life Example:

A delivery company that manages many trucks can use this system to monitor each vehicle. For example, if a truck's fuel level is low, or the door is left open, or the engine is overheating, the system can immediately alert the driver. This helps prevent fuel shortages, theft, or damage to goods, and improves the safety and efficiency of daily operations.



Hardware Components & Sensors Used:

Component	Description	Purpose
Ultrasonic Sensor (x2)	e.g., HC-SR04	Measures distance to detect door position and fuel level.
DHT11 Sensor	Digital Temperature & Humidity sensor	Monitors temperature and humidity inside the car.
Servo Motors (x2)	e.g., SG90	Simulates automatic door opening/closing.
Adafruit SSD1306 OLED Display	128x64 pixel I2C OLED	Displays temperature, humidity, fuel status, and door status.
LEDs (Green and Red)	Indicator lights	Green = Normal, Red = Alert (door open, high temp, low fuel).
Arduino Board	e.g., Arduino UNO	Main controller running the logic.



How It Works:

1. Startup (setup()):

- Initializes all sensors, servos, LEDs, and the OLED display.
- Displays “Smart Car Ready” on the screen.

2. Main Loop (loop()):

A. Door Detection:

- Uses an ultrasonic sensor to measure the distance near the door.
- If an object (like a person) is detected closer than 50 cm, it opens the door by rotating servos.
- Else, it closes the door (servo angles = 0°).

B. Temperature & Humidity Monitoring:

- Reads data from DHT11.
- If temperature > 50°C, it triggers a temperature alert.

C. Fuel Level Detection:

- Measures fuel tank depth using another ultrasonic sensor.
- If distance > 30 cm, it indicates Low Fuel.



How It Works:

D. LED Alerts:

- Green LED is ON if everything is normal.
- Red LED is ON if any of the following is true:

- ☐ Door is open
- ☐ Fuel is low
- ☐ Temperature is too high

E. OLED Display:

Shows real-me info:

- Temperature
- Humidity
- Fuel status: OK / Low
- Door status: Open / Closed
- System status: ALERT / OK



System Status:

Condition	LED	Display Message	Servo
All normal	Green ON	Status: OK	Door Closed
Any issue (temp, fuel, door)	Red ON	Status: ALERT	Door may be open



Fuel Level Detection – Explanation:

In this project, we are using an ultrasonic sensor to simulate a fuel level detector inside the car's fuel tank.

Working Principle:

- The ultrasonic sensor is placed at the top of the fuel tank.
- It measures the distance from the top to the fuel surface.
- If the fuel is full, the distance will be short.
- If the fuel is low, the distance will be larger.

Logic Used in Code:

- We define a threshold distance of 30 cm.
- If the measured distance is greater than 30 cm, we assume the fuel level is low.
- This is because the sensor detects more empty space inside the tank.



Output and Alerts:

- If fuel is low:
 - The OLED display shows: Fuel: Low
 - Red LED turns ON
 - Status on OLED: Status: ALERT

- If fuel is sufficient:
 - OLED shows: Fuel: OK
 - Green LED remains ON
 - Status: Status: OK



Advantages of the System:

- **Real-time Monitoring:**
Continuously tracks fuel level, temperature, and door status.
- **Safety Alerts:**
Gives immediate warnings through LEDs and display if there's low fuel, high temperature, or open door.
- **Cost-Effective:**
Uses affordable sensors and components for basic fleet monitoring.
- **Easy to Use:**
Simple OLED screen and LED indicators make it easy for drivers to understand.
- **Prevents Damage & Theft:**
Alerts for open doors help prevent theft or goods damage in transport.
- **Can Be Expanded:**
More sensors or GPS can be added for advanced tracking and control.



Disadvantages of System:

- **No GPS or Remote Tracking:**
Cannot track vehicle location or send alerts remotely.
- **Manual Setup Required:**
Needs proper wiring, calibration, and mounting in each vehicle.
- **Power Dependence:**
Requires stable power supply to function properly.



Future Work:

- **Add GPS Tracking:**

To monitor vehicle location in real-time.

- **Mobile Notifications:**

Send alerts (like low fuel or high temperature) to the driver's or manager's phone.

- **Cloud Data Storage:**

Store sensor data online for future analysis and reports.

- **Integration with Mobile App:**

View vehicle status remotely using an app.



Conclusion:

The Smart Fleet Management System successfully monitors fuel level, door status, and temperature using sensors connected to an Arduino. It provides real-time alerts and displays information clearly on an OLED screen. The system improves vehicle safety, reduces the chances of theft or failure, and helps in the efficient operation of a fleet. It is simple, cost-effective, and suitable for small and medium-sized vehicle fleets.



Thank You



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