

# Analysing Vehical Dataset

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# Agenda

- Objectives
- Backgrounds
- Key findings
- Recommendations

# Objective

- To conduct exploratory data analysis on the provided vehicles dataset.
- By analyzing the dataset, we aim to gain insights into various aspects of vehicles attributes and trends.
- Creating Visualization ,trends and pattern for given data set.

# Background

- Taabi is SaaS company that help businesses identify the problematic factors in the operation in real-time and take swift actions to reduce cost and increase uptime for Fleets. Taabi Solutions utilize IoT devices data to monitor your operations in terms of fuel specifics, vehicle health status, route details, and driver behavior. we deal with a diverse range of automobile data to provide insights and solutions.

# Key Findings

## Engine Performance Analysis :

- ❑ Engine load is almost directly proportional to the engine torque percentage. This indicates efficient power delivery where the engine's output closely matches the required load, suggesting good synchronization between engine demand and output.
- ❑ Higher engine loads tend to increase coolant temperature, which is expected as the engine works harder and generates more heat.
- ❑ It preventing overheating issues by ensuring that cooling systems are effective under high loads.
- ❑ The engine effectively converts driver inputs and load demands into the required torque and adjusts fuel consumption accordingly, ensuring optimal performance and efficiency.

# Key Findings

## Fuel Efficiency Analysis :

- ❑ Fuel economy improves as the vehicle speed increases up to a certain point, potentially indicating that driving at moderate speeds might be more fuel-efficient.
- ❑ The boxplot of fuel economy by RPM range (not provided) suggested a zone around 2000-3000 RPM might be optimal for fuel efficiency.
- ❑ Higher RPMs are associated with lower fuel economy, highlighting that driving in lower gears or at higher RPMs can reduce fuel efficiency.
- ❑ higher RPMs are associated with increased fuel consumption. This suggests that the engine's fuel efficiency decreases at higher RPMs, as more fuel is required to sustain higher engine speeds.
- ❑ Efficient driving, with moderate accelerator inputs and controlled RPMs, can lead to better fuel efficiency and smoother engine performance.

# Key Findings

- Gear and Speed Dynamics:

- ☐ Inconsistent patterns might indicate issues with gear shifting or delays in gear engagement, which could affect vehicle performance and fuel efficiency.
- ☐ When the clutch is pressed, the vehicle tends to consume more fuel. Conversely, when the vehicle is in a parked state and the brake is pressed, it indicates lower fuel consumption.
- ☐ Higher gears (gears 5 and up) is more fuel-efficient than using lower gears (gears 1 through 3).

- OBD Distance and Fuel Consumption :

- ☐ The rate at which fuel is consumed is directly proportional to the distance traveled, implying a steady fuel consumption rate.
- ☐ As the vehicle travels farther, it naturally consumes more fuel.
- ☐ The vehicle operates under very consistent conditions where both its fuel consumption rate and speed are stable over time and distance.

# Recommendations

- Encourage driving at moderate speeds and maintaining lower RPMs to maximize fuel economy.
- Educate drivers about the benefits of maintaining steady speeds and avoiding unnecessary acceleration or deceleration.
- Maintain engine loads within optimal ranges to ensure efficient fuel consumption. Avoid excessive engine loads that could lead to increased fuel usage.
- Reduce aggressive driving behaviors such as rapid acceleration and hard braking, which can increase fuel consumption and wear on the vehicle.
- Implement real-time monitoring and alert systems to notify drivers when they are operating at inefficient engine loads.
- Continuously monitor coolant and engine oil temperatures to prevent overheating and maintain optimal engine performance.



# Recommendations

- Install advanced temperature monitoring systems that alert drivers when temperatures approach critical thresholds. Regularly inspect and maintain the cooling system to ensure it operates efficiently under high engine loads.
- Ensure that the engine torque is appropriately matched with the engine load to optimize power delivery and fuel efficiency.
- Validate that the vehicle's transmission system is correctly aligning the selected gear with the current gear to prevent performance issues and inefficient fuel usage.
- Use data from fuel rate monitoring to adjust engine control settings and ensure that fuel is delivered efficiently based on load and performance needs.
- Use route planning and traffic management tools to avoid congested areas and smooth out driving patterns. Encourage drivers to maintain steady speeds where possible.
- Encourage moderate and steady acceleration to reduce vibrations and improve overall vehicle stability and comfort.

THANK YOU