**Ideation Phase**

**Define the Problem Statements**

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| Date | 16 July 2025 |
| Team ID | LTVIP2025TMID44001 |
| Project Name | TrafficTelligence: Advanced Traffic Volume Estimation with Machine Learning |
| Maximum Marks | 2 Marks |

**Problem Statement**

Urban areas are facing growing challenges in managing traffic congestion due to increasing population, vehicle usage, and unpredictable environmental conditions. Traditional traffic monitoring systems are often reactive and require costly infrastructure.

This project aims to develop a machine learning-based traffic volume prediction system using readily available features such as:

* Temperature
* Rain
* Snow
* Holiday
* Weather Condition
* Date-based features (day, month, year)

By leveraging historical traffic and weather data, the system will predict traffic volume for a given set of conditions. This predictive capability can help:

* City planners improve traffic flow and infrastructure
* Traffic control systems proactively manage congestion
* Reduce environmental impact through better forecasting

**Core Goal**

To build and evaluate a machine learning model that accurately predicts traffic volume using weather and temporal features, and prepare it for deployment via a user-friendly interface.

**Who is the Customer?**

The primary customers are:

* City traffic management authorities
* Urban planners and government agencies
* Smart city solution providers
* Navigation and mobility app developers (e.g., Google Maps, Uber, Ola)

**What is the Customer Problem?**

Customers struggle to **accurately predict traffic volume**, which affects:

* Traffic flow efficiency
* Commuter delays
* Environmental impact due to congestion
* Increased costs in urban planning and traffic management infrastructure

They often rely on outdated or manual systems that are **reactive** instead of **predictive**, leading to poor traffic control decisions and public dissatisfaction.

**How is it Currently Being Solved?**

Currently, traffic volume is managed using:

* Road sensors, CCTV cameras, and human observations
* Basic time-based rules or historical averages
* Weather alerts used independently, not integrated into traffic systems

These methods lack **real-time intelligence** and **predictive power**, and are **costly to scale**.

**Why is it Important to Solve?**

* To enable proactive traffic management using intelligent data-driven systems
* To reduce congestion, emissions, and accidents
* To enhance public safety and mobility experience
* To support smart city infrastructure development

**Proposed Solution**

Build a machine learning model that:

* Predicts traffic volume based on weather, holiday, and date-related inputs
* Provides real-time insights for better decision-making
* Can be integrated into existing city or app infrastructures
* Is affordable, scalable, and data-driven