

# Requirements Analysis

Date	23-06-2025
Team ID	LTVIP2025TMID40978
Project Name	Traffic intelligence
Maximum Marks	4 Marks

The Requirements Analysis phase focuses on identifying and documenting the functional and non-functional requirements needed to successfully design, develop, and deploy the traffic prediction system. This phase ensures clarity on what the system must achieve and how it should operate.

## 1. Functional Requirements:

These define what the system should do:

Data Input:

The system should accept inputs such as:

Hour of the day

Temperature

Rain and snow levels

Cloud coverage

Holiday status

### Prediction Functionality:

The system should process the input data and output an estimated traffic volume (number of vehicles).

### User Interface:

Provide a simple, interactive web interface (via Streamlit) where users can enter input values and receive real-time predictions.

### Model Training and Evaluation:

The system must be able to:

- Preprocess historical data

- Train machine learning models

- Evaluate model accuracy using appropriate metrics ( $R^2$ , MAE, RMSE)

### Deployment:

The final model should be integrated into a deployed application accessible via a web browser.

## **2. Non-Functional Requirements:**

These define how the system performs:

Performance:

The system should respond to user input with predictions in under 1 second.

#### Scalability:

The system should be capable of being scaled to handle more features or larger datasets in future versions.

#### Usability:

The application must be intuitive and easy to use, requiring no technical background.

#### Reliability:

The system must generate consistent and reproducible predictions for identical inputs.

#### Maintainability:

Code should be modular and well-documented for future enhancements or debugging.

### **3. Dataset Requirements:**

The dataset must include:

Timestamped traffic volume records

Weather conditions (temperature, rain/snow, cloud coverage)

Holiday indicators

Data should be in a clean and structured format (CSV or similar)

Sufficient historical data points for accurate model training

#### **4. Software and Tools Requirements:**

Programming Language: Python

Libraries: Pandas, Scikit-learn, Matplotlib, Seaborn, Streamlit