Project Design Phase-II
Solution Requirements (Functional & Non-functional)

Date	31 January 2025
Team ID	LTVIP2025TMID38998
Project Name	TrafficTelligence: Advanced Traffic Volume Estimation with Machine Learning
Maximum Marks	4 Marks

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form
		Registration through Gmail
		Registration through LinkedIn
FR-2	User Confirmation	Confirmation via Email
		Confirmation via OTP
FR-3	**Real-time Traffic Monitoring**	View Live Traffic Flow on Map (Density, Speed)
		Identify Congestion Hotspots

		Display Incident Alerts (Accidents, Road Closures)
		Filter Traffic Data by Time of Day / Day of Week
FR-4	**Predictive Traffic Analytics**	Forecast Traffic Conditions for Future Time Periods (e.g., next hour, next day)
		Predict Congestion based on Historical Data and Events
		Suggest Optimal Routes based on Predicted Traffic
		Generate Alerts for Predicted High-Congestion Areas
FR-5	**Traffic Control Recommendations**	Recommend Optimal Traffic Light Phasing
		Suggest Diversion Routes during Incidents
		Provide Data for Dynamic Toll Pricing
FR-6	**Data Ingestion & Management**	Ingest Data from Various Sources (e.g., sensors, GPS, public feeds)
		Store Historical Traffic Data
		Data Validation and Cleaning
FR-7	**Reporting & Visualization**	Generate Historical Traffic Trend Reports
		Create Customizable Dashboards for Traffic

		Metrics
		Export Reports in various formats (PDF, CSV)
FR-8	**User & Role Management**	Create and Manage User Accounts
		Assign User Roles and Permissions (e.g., Admin, Analyst, Commuter)
FR-9	**Alerts & Notifications**	Send Real-time Alerts (SMS, Email, Push Notifications) for incidents
		Configure Custom Alert Thresholds

Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

NFR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The system's user interface must be intuitive and easy to navigate for users with varying levels of technical expertise (e.g., traffic engineers, city planners, commuters). Key information and functionalities should be accessible within a minimal number of clicks.
NFR-2	**Security**	The system must protect all

		sensitive data (user credentials, traffic patterns, personal travel data if applicable) from unauthorized access. This includes robust authentication and authorization mechanisms, data encryption in transit and at rest, and protection against common web vulnerabilities (e.g., OWASP Top 10).
NFR-3	**Reliability**	The system must be highly reliable, ensuring continuous operation and accurate data processing, especially for real-time traffic monitoring and prediction. Critical services should have mechanisms for fault tolerance and recovery, minimizing downtime and data loss.
NFR-4	**Performance**	The system must process and display real-time traffic data with minimal latency (e.g., updates every 3-5 seconds). Predictive analytics should provide forecasts within a reasonable timeframe (e.g., within 60 seconds for a 24-hour prediction). The API should handle high volumes of concurrent requests.
NFR-5	**Availability**	The TRAFIICTELLIGENCE system must be available

		24/7 with a target uptime of 99.9% to ensure continuous monitoring and critical decision-making for traffic management, even during peak hours or system failures.
NFR-6	**Scalability**	The system must be able to scale both vertically and horizontally to accommodate increasing volumes of traffic data, a growing number of users, and additional processing demands (e.g., new urban areas, more sensors). It should seamlessly handle spikes in data ingestion and user activity.
