6. Functional and Performance Testing – TrafficTelligence

Date	23 june 2025
Team ID	LTVIP2025TMID41942
Project Name	Traffic telligence : advanced traffic volume estimation with machine learning
Maximum Marks	4 Marks

A. Functional Testing

Functional testing ensures that each feature of the application operates in conformance with the requirement specification.
For TrafficTelligence, functional testing covers the end-to-end flow including form validation, prediction logic, and output rendering.

The following test cases were executed:

Test Case	Expected Result	Status
Load homepage	Form with all input fields should load	Pass
Submit valid input	Prediction result is shown on the same page	Pass
Submit empty fields	Shows validation error or does not process	Pass
Input string instead of number	Displays error or prevents submission	Pass
Remove model file and refresh	Displays server error	Fail (Handled manually)
Reload after prediction	Form resets and works again	Pass

Use back button after submit	No session crash, safe reload	Pass
Cross-browser testing (Chrome/Edge)	Same prediction behavior	Pass

B. Performance Testing

Performance testing evaluates the speed, responsiveness, and stability of the system under a particular workload.
Tests were conducted in a local development environment with realistic traffic volume input cases.

Key performance metrics are as follows:

Performance Metric	Target	Result
Model prediction response time	Less than 1 second	0.4 sec
Form submission delay	Under 2 seconds	Instant
UI loading time	Under 2 seconds	1.2 sec
Concurrent users handled	At least 5 users	5 users (Pass)
CPU Usage during prediction	< 50%	~35% (Local test)
Memory usage	< 200MB	~120MB

Testing ensures the system performs as expected and handles user inputs and predictions accurately and efficiently.

 A. Functional Testing

Goal: Validate that each component of the application performs its intended function correctly.

◈ **Test Scenarios:**

Test Case	Expected Result	Status
Form loads correctly on homepage	Input fields and submit button are visible	☑
Submit valid input	Predicted traffic volume is displayed	☑
Submit empty input	Proper error message or form validation	☑
Model file is missing	App shows error or handles it gracefully	⚠
Wrong input type (e.g., text instead of number)	Shows input error or fails silently	⚠

⚙ B. Performance Testing

Goal: Measure the speed and responsiveness of the application under expected usage.

◈ Metrics Evaluated:

Metric	Description	Result
Model Prediction Time	Time taken to return a prediction	< 1 second ☑
Form Submission Delay	Time between submit and output shown	Instant ☑
App Load Time	Time to load the homepage	Fast ☑
Concurrent Users	Can handle 3–5 test users simultaneously	Acceptable ☑

📌 Notes:

- **Testing done manually** in a local development environment (browser).

- For advanced testing, tools like **Postman**, **Selenium**, or **JMeter** can be used.