Performance Testing

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

Performance Testing:

Performance testing in this project was focused on evaluating how well the machine learning model could predict traffic volume and how efficiently the deployed Streamlit web application responded to user inputs.

1. Model Performance Metrics:

To assess the accuracy and reliability of the model, the following evaluation metrics were used:

R^2 Score (Coefficient of Determination):

Measures how well the model explains the variance in the target variable (traffic volume).

Achieved Score: ~0.82 (82% accuracy)

Mean Absolute Error (MAE):

Represents the average of absolute differences between predicted and actual values.

Achieved MAE: ~125 vehicles/hour

Root Mean Square Error (RMSE):

Emphasizes larger errors more than MAE and indicates the standard deviation of residuals.

Achieved RMSE: ~180 vehicles/hour

These metrics indicated that the selected model (e.g., Random Forest Regressor) provided strong predictive performance and generalized well to unseen data.

2. Application Performance (Streamlit):

After deploying the model using Streamlit, the following aspects were tested:

Response Time:

The app responds to user input (e.g., entering hour, temperature, weather conditions) and provides predictions in under 1 second.

User Experience:
    The app was tested for ease of use, input validation, and clarity of prediction output. It performed smoothly across various input combinations.

Load Handling (basic test):

Though not tested under heavy traffic load, the app remained responsive during multiple runs and repeated queries during demo testing.

Conclusion:

The machine learning model demonstrated high accuracy, and the web app delivered fast and reliable predictions. The performance testing results confirmed that the solution is both technically sound and user-friendly, making it suitable for real-world applications with scope for further scalability.