# TRAFFICTELLIGENCE: ADVANCED TRAFFIC VOLUME ESTIMATION WITH MACHINE LEARNING

(A Project Report for the Internship of)

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING INTERNSHIP

in

APSHE SMART INTERNZ

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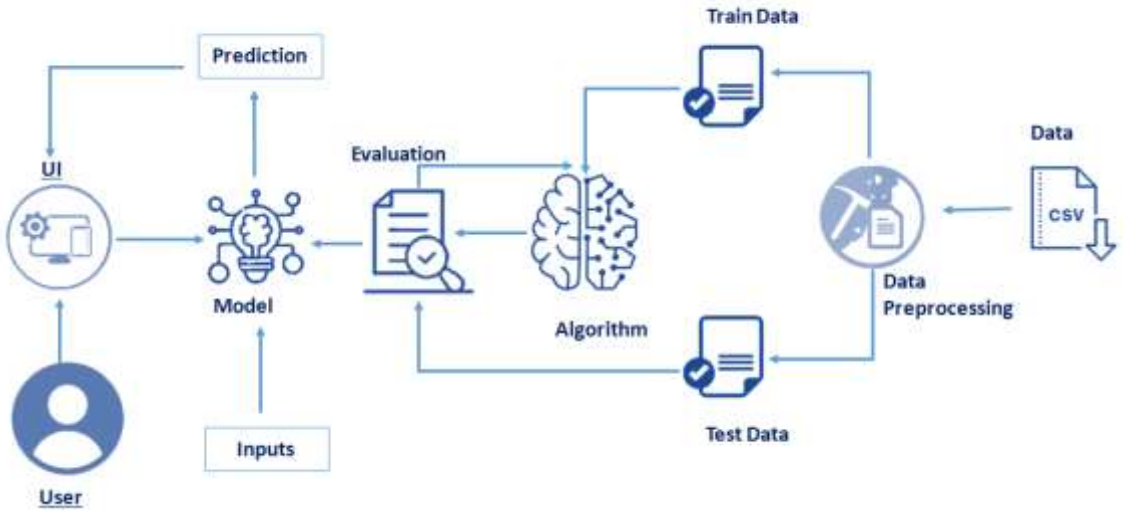
# PROJECT INTRODUCTION

## TRAFFICTELLIGENCE: ADVANCED TRAFFIC VOLUME ESTIMATION WITH MACHINE LEARNING

Growth in the number of vehicles and degree of urbanization means that the annual cost of traffic jams is increasing in cities. This leads to a decrease in the quality of life among citizens through a considerable waste of time and excessive fuel consumption and air pollution in congested areas. Traffic congestion has been one of the major issues that most metropolises are facing despite measures being taken to mitigate and reduce it. The safe and time-efficient movement of the people and goods is dependent on Traffic flow, which is directly connected to the traffic characteristics. Early analysis of congestion events and prediction of traffic volumes is a crucial step to identify traffic bottlenecks, which can be utilized to assist traffic management centres.Traffic jams on Urban Network are increasing day by day, because the traffic demand increases, and the speed of the vehicles is drastically reduced thus causing longer vehicular queuing and more such cases substantially hamper the traffic flow by giving rise to holdup.



# PROJECT PREQUISITES

To complete this project, you must require the following software's, concepts, and packages

- ANACONDA NAVIGATOR
- JUPITOR NOTEBOOK
- SPIDER SOFTWARE

## PACKAGES

Open anaconda prompt as administrator.

- Type "pip install numpy" and click enter
- Type "pip install pandas" and click enter.
- Type "pip install matplotlib" and click enter.
- Type "pip install scikit-learn" and click enter.
- Type "pip install Flask" and click enter.
- Type "pip install xgboost" and click enter.

# PROJECT OBJECTIVES

By the end of this project:

- You'll be able to understand the problem to classify if it is a regression or a classification kind of problem.
- You will be able to know how to pre-process/clean the data using different data pre-processing techniques.
- You will able to analyze or get insights into data through visualization.
- Applying different algorithms according to a dataset and based on visualization.
- You will be able to know how to find the accuracy of the model.
- You will be able to know how to build a web application using the Flask framework.

# PROJECT FLOW

- User interacts with the UI (User Interface) to enter the input values.
- Entered input values are analyzed by the model which is integrated.
- Once the model analyses the input the prediction is showcased on the UI.

To accomplish this, we have to complete all the activities and tasks listed below

- Data Collection.
    - Collect the dataset or Create the dataset
- Data Pre-processing.

    Import the Libraries.

    Importing the dataset.

    Checking for Null Values

    Data Visualization

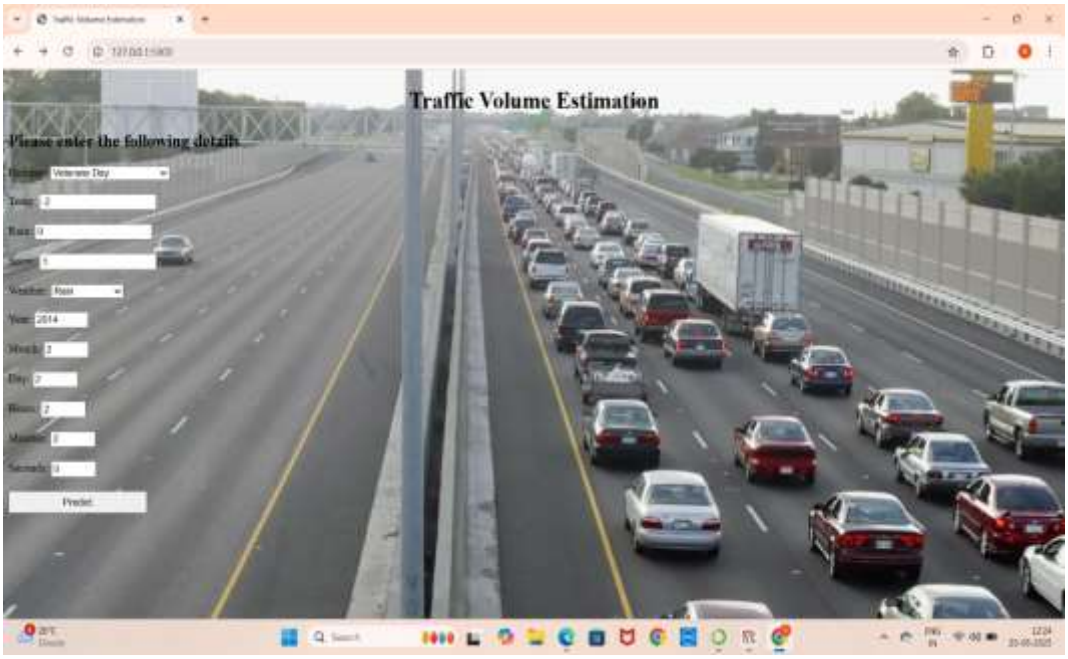
    Taking care of Missing Data.

    Feature Scaling

    Splitting Data into Train and Test.

- Model Building
    - Import the model building Libraries
    - Initializing the model
    - Training and testing the model
    - Evaluation of Model
    - Save the Model
- Application Building
    - Create an HTML file
    - Build a Python Code
    - Run the App

# APPENDIX


Traffic Volume Estimation
Please enter the following details
Predict


Traffic volume estimation
192 UYP

# CONCLUSION

**TrafficTelligence** showcases how advanced machine learning techniques can revolutionize traffic volume estimation by transforming raw traffic data into actionable insights. Through the integration of environmental, temporal, and contextual features, our models effectively predicted traffic volume patterns with high accuracy and reliability.

This intelligent system not only enhances traditional traffic monitoring but also supports smarter urban planning, real-time traffic management, and informed decision-making. By leveraging models such as Random Forest, XGBoost, and Linear Regression, we demonstrated the practical benefits of data-driven forecasting in mitigating congestion, reducing travel time, and improving road safety.

In conclusion, TrafficTelligence serves as a vital step toward smarter, more sustainable cities—where predictive analytics and machine learning work together to optimize mobility and infrastructure planning. Future work may focus on real-time data integration, edge computing deployment, and expanding the system to multi-modal traffic environments.