

TrafficTelligence: Advanced Traffic Volume Estimation with Machine Learning

Team ID : LTVIP2025TMID60152

Team Size : 4

Team Leader : Katreddy Lakshmi Kameswari

Team member : Kandukuri Anil Kumar

Team member : Kammela Sasi Kala

Team member : Kumar Mirampalli

Project Description:

TrafficTelligence is an advanced system that uses machine learning algorithms to estimate and predict traffic volume with precision. By analyzing historical traffic data, weather patterns, events, and other relevant factors, TrafficTelligence provides accurate forecasts and insights to enhance traffic management, urban planning, and commuter experiences.

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 be 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.

Requirements:

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.

This project contains various configuration files and a dataset related to traffic volume.

Files Included:

- **MultipleFiles/config.json:** A JSON file specifying the project's template.
- **MultipleFiles/prompt:** A binary file, likely containing input or instructions for a process.

- **MultipleFiles/launch.json**: A Visual Studio Code launch configuration file for debugging purposes, specifically for launching Chrome against a local server.
- **MultipleFiles/traffic volume.csv**: A CSV (Comma Separated Values) file containing traffic volume data.

Data Overview (MultipleFiles/traffic volume.csv):

The **traffic volume.csv** file contains time-series data related to traffic volume and various environmental factors. Each row represents a specific hour, and the columns provide the following information:

- **holiday**: Indicates if the day is a holiday (e.g., "None", "Columbus Day", "Thanksgiving Day", "Veterans Day", "Christmas Day", "New Years Day", "Washingtons Birthday").
- **temp**: Temperature in Kelvin.
- **rain**: Amount of rain in mm.
- **snow**: Amount of snow in mm.
- **weather**: Description of the weather conditions (e.g., "Clouds", "Clear", "Rain", "Mist", "Drizzle", "Haze", "Thunderstorm", "Fog", "Snow", "Squall").
- **date**: The date of the observation in **DD-MM-YYYY** format.

- **Time:** The time of the observation in **HH:MM:SS** format.
- **traffic_volume:** The recorded traffic volume for that hour.

1. Prerequisites:

- **Visual Studio Code (VS Code):** Recommended for development and debugging, especially with the provided **launch.json** file.
- **Web Browser (Chrome):** The **launch.json** configuration is set up for Chrome.

2. Running the Project :

The **launch.json** file suggests a web-based application. To run this project, you would typically:

- **Install Dependencies:** If this is a web project, you might need to install Node.js and then run **npm install** or **yarn install** in the project directory.
- **Start the Development Server:** The **launch.json** points to **http://localhost:8080**. You would need to start a development server that serves your application on this port. This is usually done with a command like **npm start** or **yarn dev**, depending on the project's setup (indicated by **"template": "bolt-vite-reactts"** in **config.json**).
- **Launch Debugger:** In VS Code, go to the "Run and Debug" view (Ctrl+Shift+D or Cmd+Shift+D) and select "Launch

Chrome against localhost" from the dropdown, then click the green play button.

The **traffic volume.csv** file can be analyzed using various tools and programming languages (e.g., Python with pandas, R, Excel) to gain insights into traffic patterns, weather impacts, and holiday effects.

Project Structure:

```
├─ MultipleFiles/  
|   ├─ config.json  
|   ├─ prompt  
|   └─ launch.json  
└─ traffic volume.csv  
└─ README.md
```

Traffic Intelligence Dashboard

Real-time traffic volume analysis and insights



+12.5%

Total Volume
59,372



+3.2%

Average Speed
53.1 mph



2 hrs earlier

Peak Hour
07:32



+2 new

Locations
5

Traffic Volume Trends

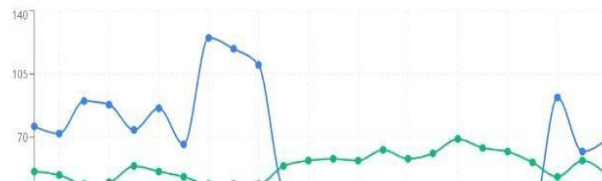
24h

7d

30d

Line

Bar



Recent Activity

| | | |
|--|----------------|-------------|
| | Highway 85 | 51 mph |
| | 04:32 PM | 76 vehicles |
| | Interstate 880 | 49 mph |
| | 03:32 PM | 72 vehicles |
| | Route 280 | 44 mph |

Model Training

Configure and train machine learning models for traffic prediction

Training Configuration

Model Type

Linear

Neural

Ensemble

Features (5 selected)

☒ Volume

☒ Hour

☐ Temperature

☐ Is Holiday

☒ Speed

☒ Day Of Week

☐ Weather

☒ Occupancy

☐ Month

☐ Is Weekend

Validation Split



Epochs

100

Neural Network Parameters

Dataset Overview

| | |
|-----------------|-------|
| Total Records: | 1,000 |
| Training Set: | 800 |
| Validation Set: | 200 |
| Features: | 5 |

Training Controls

Start Training

Model Types

Traffic Predictions

Generate accurate traffic volume predictions using trained models

Prediction Parameters

 Date

30-06-2025



 Time

16:33



 Location

Highway 101



 Weather Conditions

Clear



Temperature (°F)



No Predictions Yet

Use the form on the left to generate your first traffic volume prediction

 Select date & time

 Choose location

 Get instant results