TrafficTelligence: Advanced Traffic Volume Estimation with Machine Learning

Track: Artificial Intelligence & Machine Learning

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Introduction:

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.

Technical Architecture:
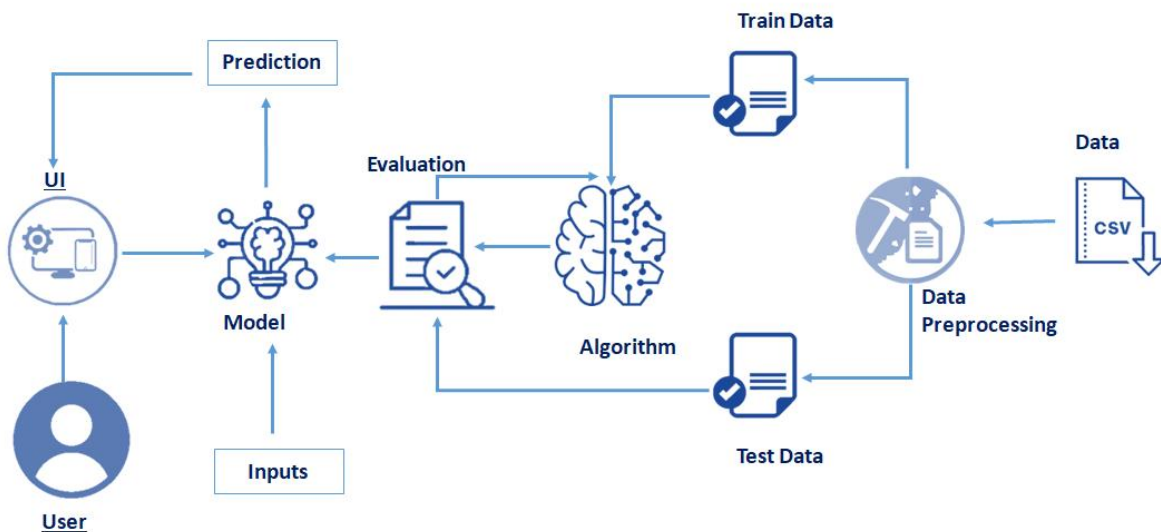
Project Flow:

- 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.

- Data Pre-processing.

- Model Building

- Application Building

Project Structure:

Name	Type	Date Modified
> .ipynb_checkpoints	File Folder	11-12-2021 13:07
∨ Flask	File Folder	10-02-2022 11:35
> templates	File Folder	10-02-2022 11:35
app.py	py File	10-02-2022 11:35
encoder.pkl	pkl File	11-12-2021 13:01
model.pkl	pkl File	11-12-2021 13:01
∨ IBM	File Folder	15-02-2022 14:58
> Flask	File Folder	31-01-2022 10:30
traffic volume_lbm_scoring end point.ipynb	ipynb File	31-01-2022 10:27
Requirements.txt	txt File	15-12-2021 10:57
Traffic volume estimation.docx	docx File	15-02-2022 15:04
traffic volume.csv	csv File	10-12-2021 11:08
traffic volume.ipynb	ipynb File	11-12-2021 13:03

Data Collection:

ML depends heavily on data, without data, it is impossible for an "AI" model to learn. It is the most crucial aspect that makes algorithm training possible. In Machine Learning projects, we need a training data set. It is the actual data set used to train the model for performing various actions.

The data set is downloaded from:

[https://drive.google.com/file/d/1iV5PfYAmI6YP0_0S4KYy1ZahHOqMgDbM/view]

Data Pre-processing:

Data Pre-processing includes the following main tasks

o   Import the Libraries.

o   Importing the dataset.

o   Checking for Null Values.

o   Data Visualization.

o   Feature Scaling.

o   Splitting Data into Train and Test.

Model Building:

The model building includes the following main tasks

o   Import the model building Libraries

o   Initializing the model

o   Training and testing the model

o   Evaluation of Model

o   Save the Model

Application Building:

In this section, we will be building a web application that is integrated into the model we built. A UI is provided for the uses where he has to enter the values for predictions. The enter values are given to the saved model and prediction is showcased on the UI.

This section has the following tasks
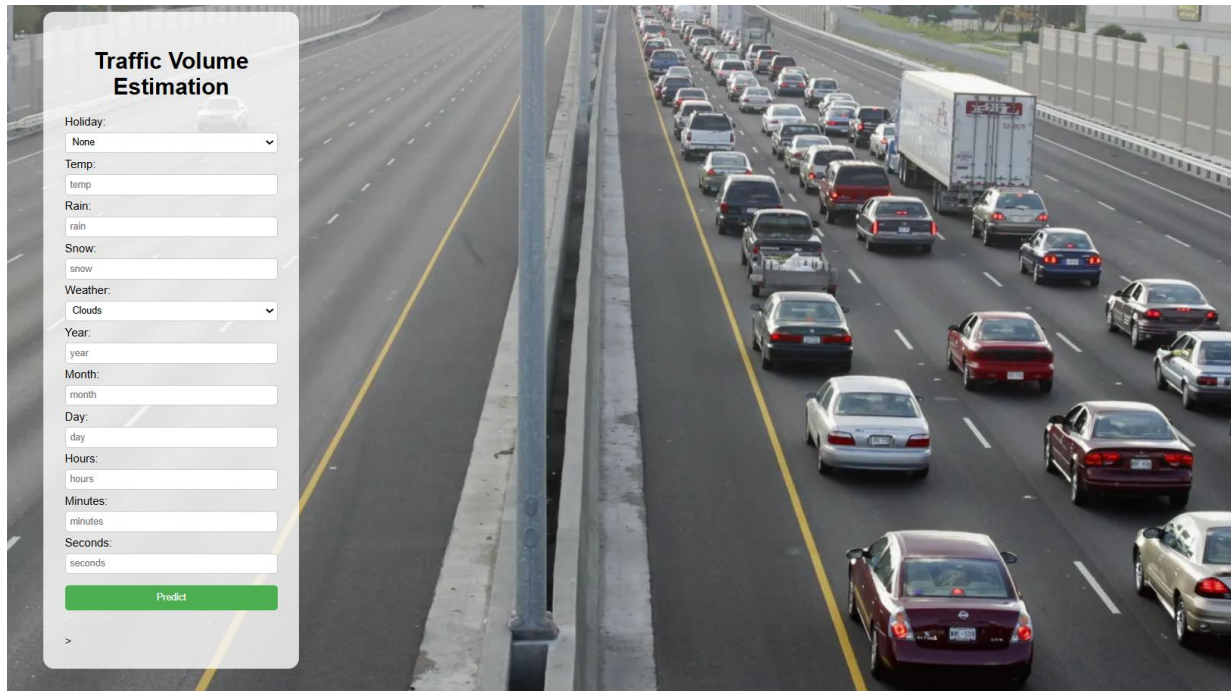
·   Building HTML Pages

·   Building server-side script

Output:

Boxplot for temp, rain, snow, traffic_volume
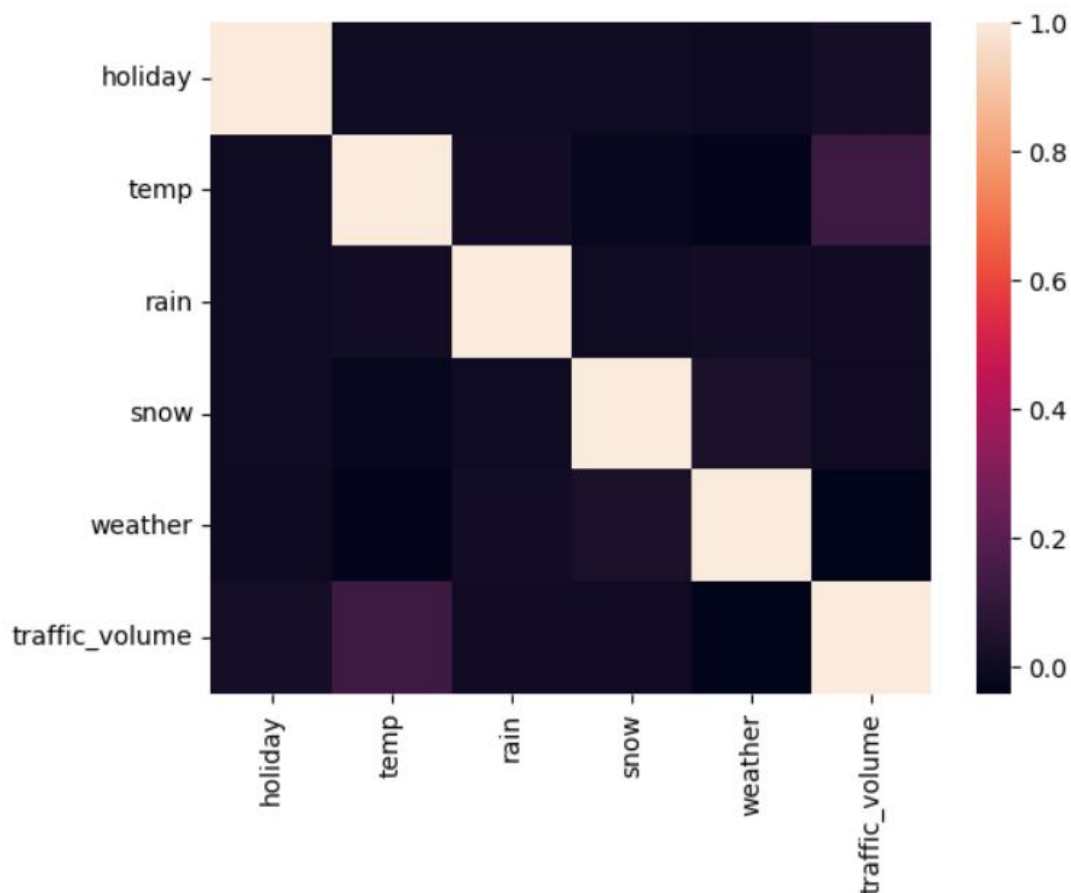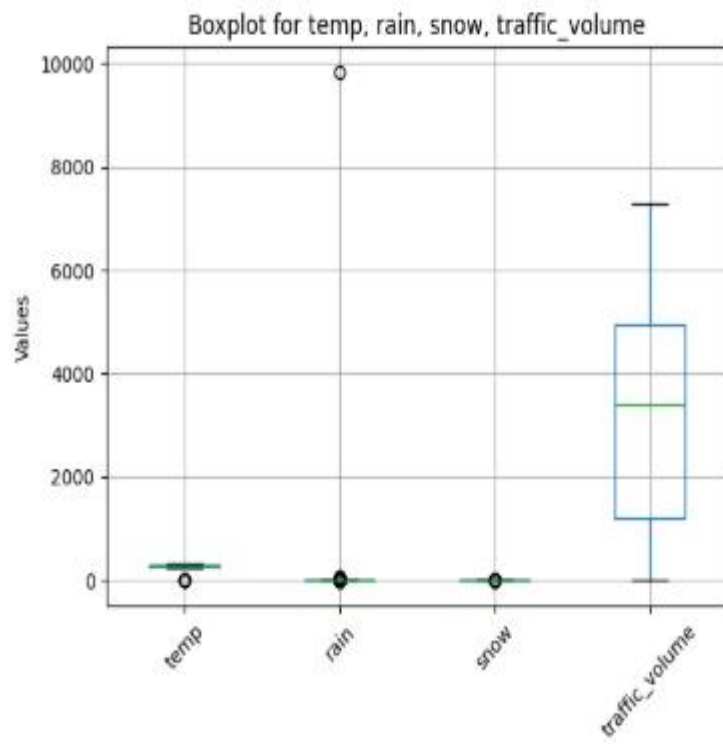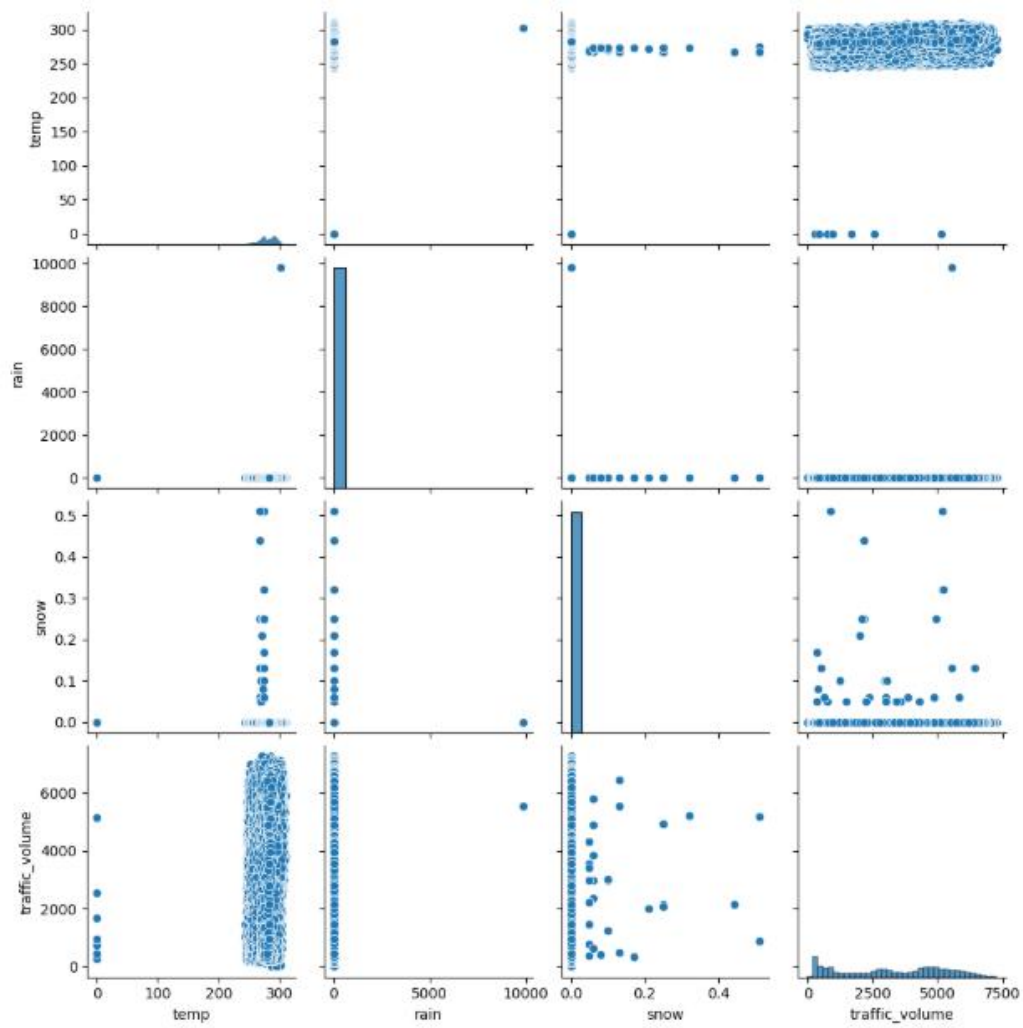
```
MSE = mean_squared_error( p3, y_test)
np.sqrt(MSE)

np.float64(797.3448745774152)
```

Input Page:

Output Page: