

Data Collection and Preprocessing Phase

Date	20 June 2025
Team ID	LTVIP2025TMID41281
Project Title	Traffictelligence-Advanced-Traffic-Volume Estimation-With-Machine-Learning
Maximum Marks	6 Marks

Data Exploration and Preprocessing Template

Identifies data sources, assesses quality issues like missing values and duplicates, and implements resolution plans to ensure accurate and reliable analysis.

Section	Description
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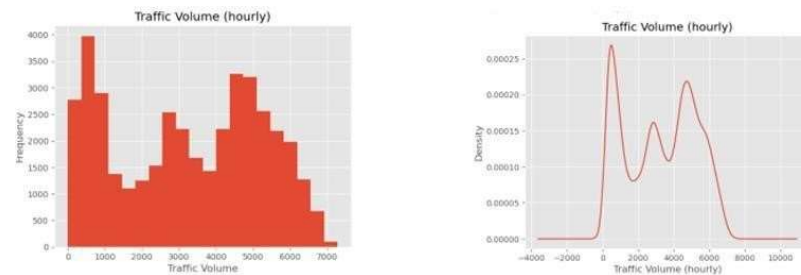
Data Overview

Dimension:- 40632 rows*12 columns

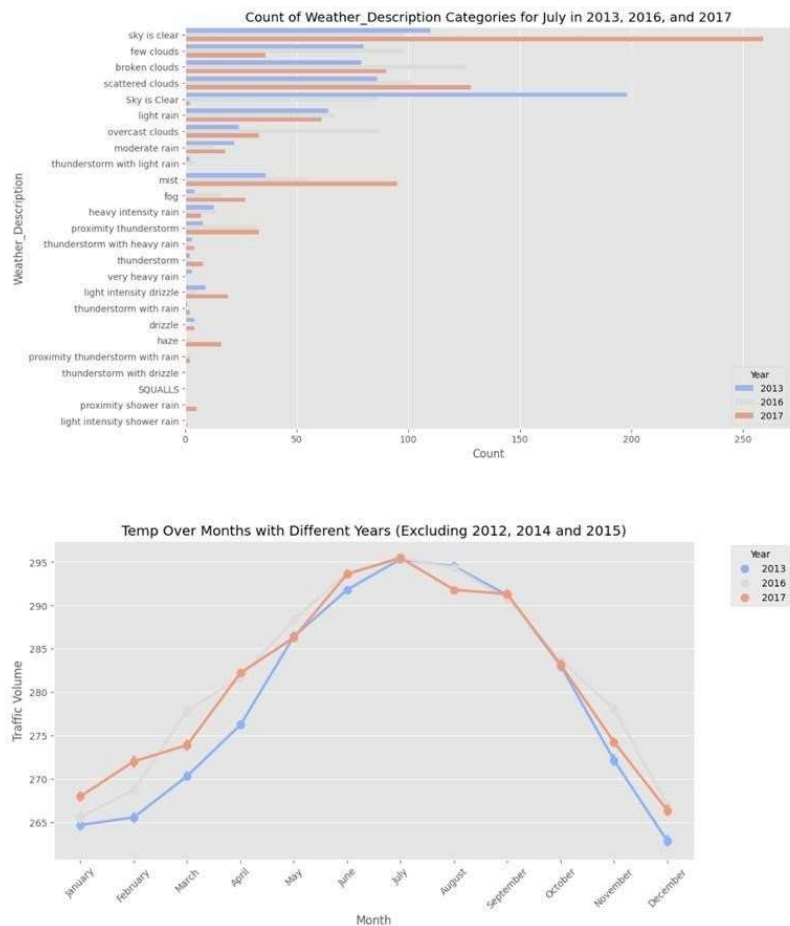
	Holiday	Temp	Rain_1h	Snow_1h	Clouds_All	Weather_Main	Weather_Description	Date_Time	Year	Month	Day	Traffic_Volume
580	NaN	289.06	0.0	0.0	90	Mist	mist	2012-10-24 19:00:00	2012	10	24	3118
6421	NaN	289.06	0.0	0.0	90	Clouds	overcast clouds	2013-05-26 15:00:00	2013	5	26	3588
6605	NaN	289.06	0.0	0.0	1	Clear	sky is clear	2013-06-02 01:00:00	2013	6	2	787
6870	NaN	289.06	0.0	0.0	92	Mist	mist	2013-06-11 00:00:00	2013	6	11	576
6902	NaN	289.06	0.0	0.0	8	Mist	mist	2013-06-12 01:00:00	2013	6	12	377
17564	NaN	289.06	0.0	0.0	75	Clouds	broken clouds	2015-08-19 19:00:00	2015	8	19	3318
17677	NaN	289.06	0.0	0.0	90	Clouds	overcast clouds	2015-08-23 23:00:00	2015	8	23	1041
17747	NaN	289.06	0.0	0.0	40	Clouds	scattered clouds	2015-08-26 21:00:00	2015	8	26	2812
23850	NaN	289.06	0.0	0.0	90	Clouds	overcast clouds	2016-06-01 10:00:00	2016	6	1	4831
23851	NaN	289.06	0.0	0.0	90	Clouds	overcast clouds	2016-06-01 10:00:00	2016	6	1	4831
26108	NaN	289.06	0.0	0.0	90	Fog	fog	2016-08-28 07:00:00	2016	8	28	1228
26109	NaN	289.06	0.0	0.0	90	Mist	mist	2016-08-28 07:00:00	2016	8	28	1228
26110	NaN	289.06	0.0	0.0	90	Rain	light rain	2016-08-28 07:00:00	2016	8	28	1228
26297	NaN	289.06	0.0	0.0	1	Clear	sky is clear	2016-09-04 04:00:00	2016	9	4	360
26972	NaN	289.06	0.0	0.0	12	Clouds	few clouds	2016-09-29 12:00:00	2016	9	29	4484

Descriptive Statistics:-

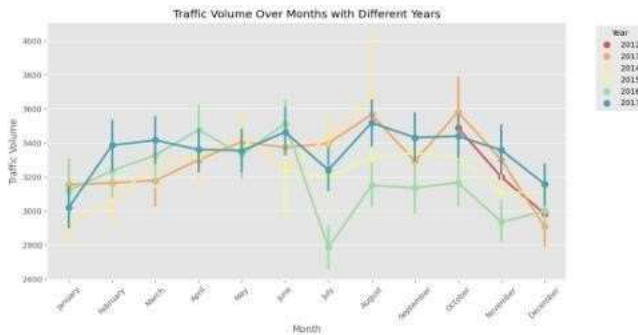
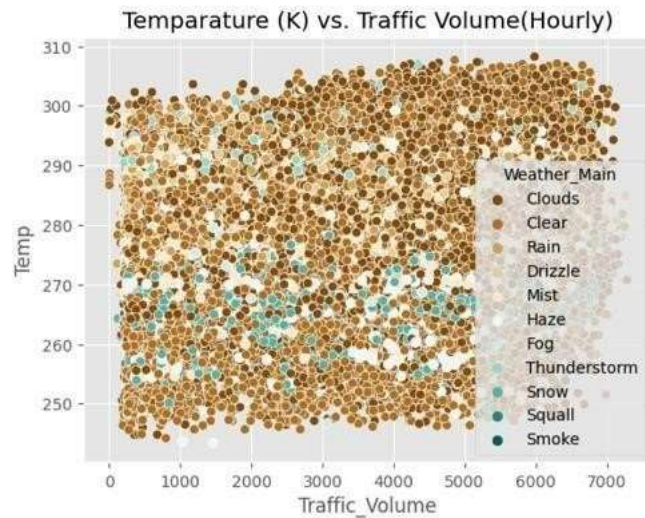
Univariate Analysis



Bivariate Analysis



Multivariate Analysis



Outliers and Anomalies

extreme weather, special events, accidents, data errors, or unusual traffic patterns

Data Preprocessing Code Screenshots

Loading Data

```
df = pd.read_csv('C:\Users\bhart\OneDrive\Desktop\Model Deployment\Metro_Interstate_Traffic_Volume_test (2).csv')
df = pd.read_csv('C:\Users\bhart\OneDrive\Desktop\Model Deployment\Metro_Interstate_Traffic_Volume_train.csv')
```

1. UNDERSTANDING THE DATA

```
df.shape
```

```
(40255, 14)
```

```
df.head(5)
```

Unnamed: 0	holiday	temp	rain_1h	snow_1h	clouds_all	weather_main	weather_description	date_time	year	month	day	hour	traffic_volume	
0	0	NaN	288.28	0.0	0.0	40	Clouds	scattered clouds	2012-10-02 09:00:00	2012	10	2	09:00	5545
1	1	NaN	289.36	0.0	0.0	75	Clouds	broken clouds	2012-10-02 10:00:00	2012	10	2	10:00	4516
2	2	NaN	289.58	0.0	0.0	90	Clouds	overcast clouds	2012-10-02 11:00:00	2012	10	2	11:00	4767
3	3	NaN	290.13	0.0	0.0	90	Clouds	overcast clouds	2012-10-02 12:00:00	2012	10	2	12:00	5026
4	4	NaN	291.14	0.0	0.0	75	Clouds	broken clouds	2012-10-02 13:00:00	2012	10	2	13:00	4918

Handling Missing Data

```
df = pd.read_csv('traffic_volume.csv')
print(df.head())
print(df.shape)
print(((df.isnull().sum())*100)/len(df))
```

	holiday	temp	rain	snow	weather	date	Time	traffic_volume
0	NaN	288.28	0.0	0.0	Clouds	02-10-2012	09:00:00	5545
1	NaN	289.36	0.0	0.0	Clouds	02-10-2012	10:00:00	4516
2	NaN	289.58	0.0	0.0	Clouds	02-10-2012	11:00:00	4767
3	NaN	290.13	0.0	0.0	Clouds	02-10-2012	12:00:00	5026
4	NaN	291.14	0.0	0.0	Clouds	02-10-2012	13:00:00	4918

```
(48204, 8)
```

```
holiday          99.873454
temp              0.109949
rain              0.004149
snow              0.024894
weather          0.101651
date              0.000000
Time              0.000000
traffic_volume    0.000000
dtype: float64
```

```
# Delete column 'holiday'
# delete the rows wit null values in 'temp', 'rain', 'snow', 'weather'
#-----Handling NULL values-----
```

```
df=df.drop(columns=['holiday'], axis=1)
df.dropna(inplace=True)
print(df.shape)
print(df.isnull().sum())
```

Data Transformation

```
print(((df['rain']==0).sum()*100)/len(df))
print(((df['snow']==0).sum()*100)/len(df))
#delete column 'snow' as it has 99% of data as zero
df = df.drop(columns=['snow'], axis=1)
from sklearn.preprocessing import LabelEncoder
le=LabelEncoder()
df.weather = le.fit_transform(df.weather)
```

Feature Engineering	Attached the codes in final Submission
Save Processed Data	<pre>df.to_csv('transformed_traffic_volume.csv', index=False)</pre>