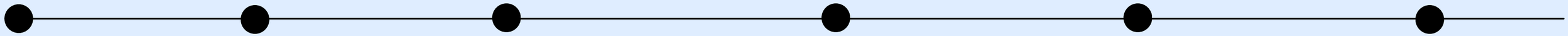
PREDICTING TRAFFIC VOLUME

TIME AND WEATHER IMPACTS

Timeline



Dataset Overview

Project Goals

EDA and preprocessing

The performance

Final Result

Future Work

DATASET OVERVIEW

The Dataset (Traffic Volume) from Kaggel, The data was collected from a highway in Minneapolis, Minnesota, USA, from 2012 to 2018.
The Dataset includes the following:
Traffic Volume: The number of vehicles passing a specific point on the highway.
WeatherData: Includes temperature, rain, snow, and cloud cover.
Time and Date: Features like the time and day of the week to capture temporal patterns.
WeatherDescriptions: Textual descriptions of weather conditions, such as "Clear," "Clouds," or "Rain."

kaggle

PROJECT GOALS

The goals: Building a model to predict future traffic volume based on time and weather-related features.

Importance: This model helps improve traffic management, reduce congestion, and enhance road safety.

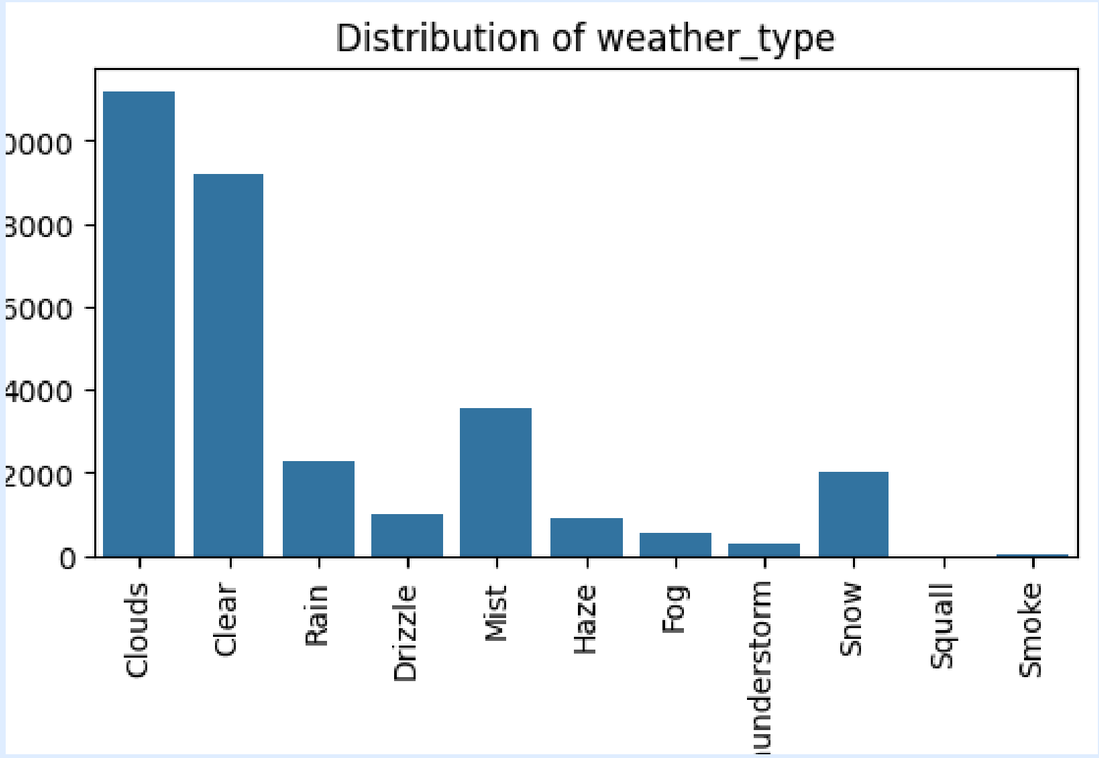
THE PREPROCESSING

Date-Time Parsing: Extracted hour, day of the week, and month from the date_time feature to capture time-based patterns.

Handling Missing Values: Used forward dropout to handle any missing data, ensuring continuity in time series data.

Normalization: Applied MinMaxScaler to normalize the features (traffic_volume and temperature), scaling them to a range between 0 and 1, essential for training the LSTM model.

EDA

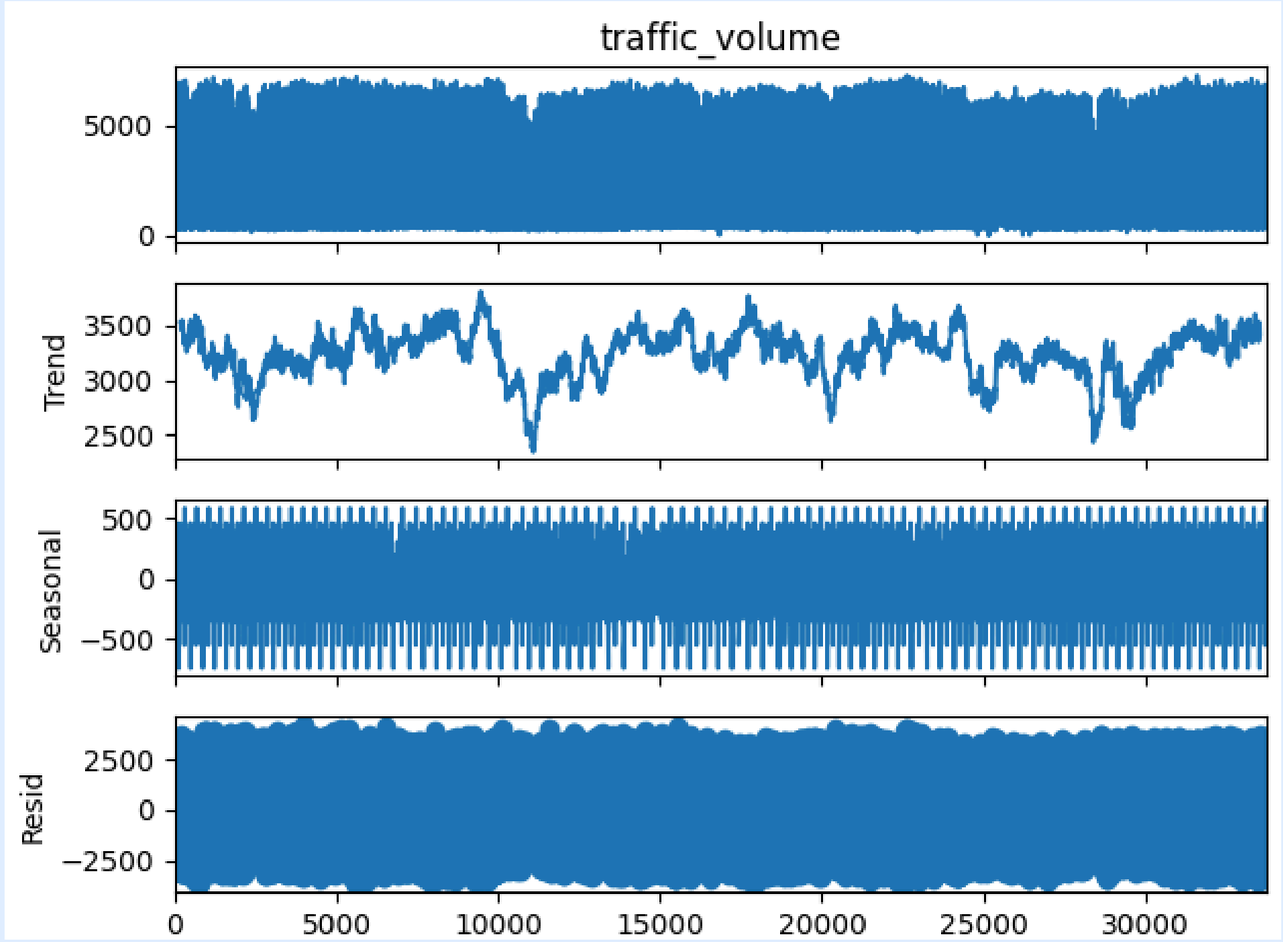


THIS BAR CHART SHOWS THE DISTRIBUTION OF DIFFERENT WEATHER TYPES OBSERVED IN THE DATASET.

EDA

THE FOLLOWING CHART SHOWS HOW TRAFFIC VOLUME IS BROKEN DOWN INTO:

1. **OBSERVED: THE ORIGINAL TRAFFIC VOLUME DATA.**
2. **TREND: THE LONG-TERM MOVEMENT IN TRAFFIC VOLUME.**
3. **SEASONAL: REGULAR, REPEATING PATTERNS IN TRAFFIC VOLUME.**
4. **RESIDUAL: THE RANDOM NOISE AFTER REMOVING TREND AND SEASONAL COMPONENTS.**

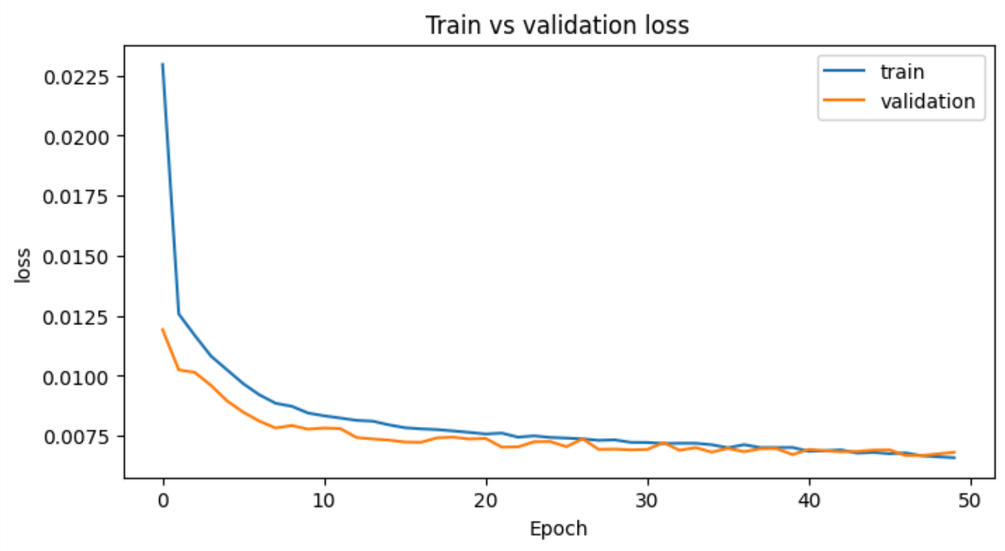


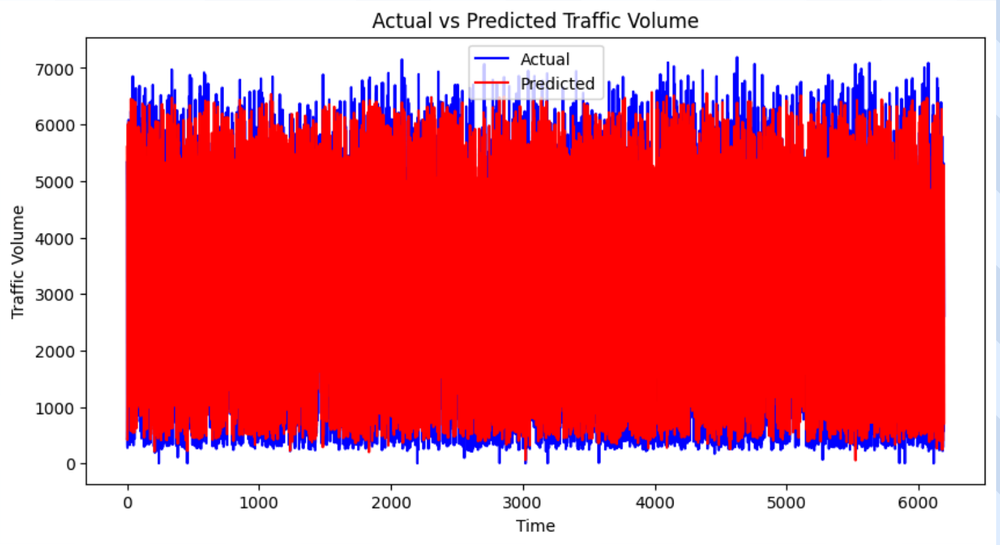
THE PERFORMANCE

LSTM MODEL

Why LSTM? LSTMs are ideal for capturing temporal dependencies in time series data, making them suitable for traffic forecasting.

FINAL RESULT





FUTURE WORK

- Additional Features: Integrate more weather data, traffic incidents, or holiday information.
- Deployment: Consider deploying the model in a real-time environment for continuous traffic monitoring and prediction.

THANK YOU

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