**TECHNICAL REPORT FOR TIME SERIES ANALYSIS.**

**TASK-1: KEY INSIGHTS OF THE DATA**

* Insight 1:

Checked the given Time series data is stationary data or non stationary data

**Used Test :** ADF Test ( Augmented Dickey Fuller Test) using library -statsmodels.tsa.stattools form that import adfuller module

**Goal:** Finding the data has **Unit-Root** or not

1. Set the hypothesis ,Run test statistic by Calculating p-value , based on comparison with significance result will be shown.

* Insight 2:

Using Time decomposition EDA concept . I analyzed the data with Time decomposition components for Identifying patterns and understand the trend .

**Used Library:** statsmodels.tsa.seasonal library is used to find Trends and seasonality components of Time decomposition. **Module**- Seasonal Decompose

* Insight 3:

Executed residual component analysis by removing the Trend and seasonal component . **Module:**statsmodels.tsa.seasonal

Executed Autocorrelation to identify Lags for the Arima model.

**Goal:** Looked for the random left-over noise to make sure there is no unpredictable fluctuations. Autocorrelation to understand how past values relate to current values, providing insights for accurate forecasting and analysis.

* Insight 4:

The analysis of monthly usage trends of services provides valuable insights into the performance and patterns of various public transport services over time.

**TASK-2 : FORECASTING**

* Used Arima model (Auto regressive Integrated Moving Average) to forecast the data for next seven days.
* Executed Autocorrelation to determine the Lags and relationship between past values.
* **Why Arima** : By using ADF test we determine given dataset consists of stationary data . Arima is one of the best model for stationary data .
* Incase the data is Non stationary . We execute different technique to make it stationary . for instance :Techniques like Differencing and Log transformations can be used.