***the unit of input\_chunk\_length is hours, meaning that an input\_chunk\_length of 12 uses the previous 12 hours of data, and an input\_chunk\_length of 7 uses the previous 7 hours of data.***

**The model will use data from the previous 24 hours to make a prediction for the next hour. For instance, if you want to predict the passenger count for 2023-01-02 00:00, the model will consider data from 2023-01-01 00:00 to 2023-01-01 23:00.**

**Daily Patterns**: Capturing daily trends and patterns that repeat every 24 hours.

1. **2018**
2. The graph covers a three-month period from October to December 2018. The x-axis represents the time, specifically days and months, while the y-axis represents the "Passenger Count."
3. Both the actual and backtest data exhibit a daily periodic pattern with significant fluctuations within each day. This suggests a strong daily cycle in passenger counts.
4. there are noticeable deviations at certain points, indicating areas where the model's predictions are less accurate.
5. Given that the graph includes data from October to December, the periodic dips and spikes might be influenced by specific events such as holidays. The encoding of features like 'Is\_Holiday' and 'Holiday\_Type' in the data preprocessing step suggests that the model attempts to account for these seasonal variations.
6. **2019**

* Similar to 2018, there is a strong daily periodic pattern.
  + The model appears to perform better during periods with lower fluctuation.

**2020**

1. The daily periodic pattern persists, but there are more significant drops in passenger counts.
2. The data shows complete drops to zero on several occasions, possibly due to external factors like lockdowns.

 The backtest predictions show a periodic pattern that follows the overall trend but misses the extreme drops to zero.

1.  The deviations between actual and backtest values are more pronounced during the drops and spikes.
2. **Explanation of Polynomial Interpolation**
3. **Polynomial interpolation** is a method of estimating unknown values that fall between known data points. It fits a polynomial function to the data points, allowing for the estimation of intermediate values. In simpler terms, it draws a smooth curve through the points on a graph to fill in gaps where data might be missing.

**2021 :**

1. There are some deviations, particularly during peak times, but overall the model captures the general trend well.

The data for 2021 shows consistent daily periodic patterns, similar to previous years.

**2022 :**

* The model tends to underpredict high peaks and overpredict low peaks.
* The model is relatively stable, but there are consistent gaps indicating systematic prediction errors that need addressing.

**2023:**

* Although improved, some discrepancies remain, especially during sudden spikes or drops in the actual values.

**2024 :** The model tends to lag slightly behind the actual values during sudden peaks and troughs, indicating a potential delay in the model’s response to sharp changes.

The model’s performance appears consistent over the month, with no significant degradation in prediction quality. This suggests that the model is stable and reliable over the observed period.