BUAN 5201 01: Group Project Report

Airline Demand Forecast Model

Introduction:

Accurate demand forecasting is critical for the aviation industry's effective resource management and revenue control. In this study, we aim to develop a forecasting model that provides the best forecast comparing four models: Additive Model, Multiplicative Model, Additive Model with Day of Week, Multiplicative Model with Day of Week. Our goal is to enhance accuracy and reliability in predicting future booking demands.

Data Processing:

The forecasting model makes use of booking data from the past, which contains data about the departure date, booking date, and the number of bookings in the booking date for that particular departure date.

The following analyses were performed in the original training data:

- Days Prior: the number of days prior the booking was made for each departure date.
- Day of Week: the day of the week in which the bookings were made.
- Final Demand: the total demand for each departure date
- Remaining Demand: based on the final demand, the number of remaining bookings to be made as of the booking date.
- Booking Rate: measures the proportion of the total available seats that were booked as of the booking date.

Naive Forecast:

A baseline model, known as the naive forecast, serves as our initial benchmark. It provides a baseline for comparing the forecasts from our models and highlights the need for more sophisticated models.

Additive Model:

The average remaining demand for days prior (0 day to 60 days) for all departure dates is calculated. The additive model relies on the assumption that the demand can be expressed as a sum of cumulative bookings and average remaining demand for the days prior the booking was made. This model is effective when the remaining demand tends to have a consistent pattern.

Multiplicative Model:

The average booking rate for days prior (0 day to 60 days) for all departure dates is calculated. We utilized the proportions of the cumulative bookings and the average booking rate for that days prior the booking was made to forecast future demand.

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Additive Model with Day of Week:

The formula used for predicting the demand is the same as the standard Additive Model, but the average remaining bookings are calculated by grouping by two factors: the day of week the booking was made and the number of days prior the booking was made to the departure date.

Multiplicative Model with Day of Week:

The average booking rate is calculated by grouping by two factors: the day of week the booking was made and the number of days prior the booking was made to the departure date. The formula used for predicting the demand is the same as the standard Multiplicative Model.

Evaluation Metric - Mean Absolute Scaled Error (MASE):

MASE is used as the evaluation metric as it assesses forecast accuracy in comparison to a naïve forecast. The formula for calculating it is to divide the mean absolute error of the forecast model in consideration by the mean absolute error of the naïve forecast. The model with the lowest MASE is chosen as the best model and the results of forecast from that model is provided.

Conclusion:

To sum up, precise demand predictions are essential for effective airline operations. Based on historic booking data, the models that have been put into place offer a reliable framework for forecasting demand. By considering both additive and multiplicative models, along with variations based on day of the week, we strive to capture the nuanced patterns in booking behaviors.

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