Pick-up method + machine learning: a proved efficient approach to forecast hotel demand

1. Introduction

**hotel revenue management is important - demand forecasting is essential**

**why rm is important?**

**why demand is essential?**

* **improving accuracy can increase xx% of revenue**
* **uncertain, can drive pricing xxx**

Hotel revenue consists of price and demand, and demand forecast is essential for successful revenue management since it has high uncertainties and has direct impact on issues such as inventory management, pricing strategies, and marketing plans. Different from industries such as retail where most of the bookings happen instantly when the clients arrive, the hotel industry usually sell the room ahead of the customer arriving, and thus generate valuable advance bookings information.

**introduce advance booking (pick up method)**

Hence, advance booking method, an approach conducting forecast based on current realized bookings and historical booking patterns, is widely used in both academic and the industry. On top of the existed bookings so far (ROH, reservations on hand), the advance booking predicts what will happen from today and the target future by estimating the incremental bookings. In practice, this method takes an average of the incremental bookings in history, or average the incremental ratios in percentage, then add on or multiple to the ROH today. This method is also called “pick-up” method since it estimates the number of incremental bookings “picked up” from today’s reservation. ***Researchers (now add more research about pick up)*** Besides advance booking method, practitioners and researcher have used other methods such as time series, combined methods to forecast hotel demand. ***(now add more research about time series and other)***

**machine learning, on the other hand…**

* **widely used in areas…**
* **why? because…**

In recent years, machine learning method has been picking up attentions among both the industry and academia. Machine learning is a statistical method (**add more definition about machine learning**) and it has the benefit of (flexible, catching patterns, etc. )

**machine learning + hotel**

* **very few research in the hotel industry due to…**

**this research serves as a bridge!**

1. Machine Learning (theoretical)
   1. brief intro of ml
   2. 6 sections to introduce each algorithm
2. Empirical Study
   1. data description
   2. methods/models
   3. results
3. Conclusion & Discussion