



Article Title

Application of Online Booking Data to Hotel Revenue Management.

Citation

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Abstract

This paper presents an application of online booking data, comprised of big data crawled from a hotel booking website to hotel revenue management. It is important to build a quantitative revenue management method for online hotel booking systems incorporating overbooking strategies, because of increasing numbers of bookings through online booking websites and last-minute cancellations, which cause serious damage to hotel management. We construct a quantitative overbooking model for online booking systems combined with customers' choice behaviors estimated from the data. Firstly, we present the overbooking model for online booking systems.

Secondly, we estimate the choice behaviors of the customers from the online booking data by a discrete choice model. Thirdly, combining the estimated discrete choice model with the theoretical overbooking model, we investigate the expected sales maximization problem where we numerically solve the optimal overbooking level and room charge. Finally, we provide numerical examples of the optimal overbooking strategies and room charges using online booking data of two major luxury hotels in Shinjuku ward, Tokyo. This method, which utilizes online booking data available by crawling from booking websites, helps hotels obtain an optimal room charge and overbooking level maximizing the expected sales.

Summary

In this study, the application of online booking data is presented and in which big data is crawled from a hotel booking website, to hotel revenue management. Combining the choice behaviors of the customers estimated from the data by a discrete choice model and a quantitative overbooking model for online booking systems, we have investigated the optimal room charge and overbooking level that maximize the expected sales of the hotel. A revenue management for online booking systems that considers overbooking is particularly important since increasing last-minute cancellations can cause serious damage to revenues.

Specifically, the results of the study indicate concrete levels for the room charge and the overbooking, which cannot be obtained from the qualitative observation. For instance, when the over-sale cost per room and the cancellation rate are both high, the result exhibits the explicit trade-off between the over-sale cost and the compensation for the sales loss by the overbooking. In such a case, the model largely helps determine the overbooking level and the room charge. What is also observed is that the prices converge to lower levels compared to the original room charges and the expected sales accordingly drop.