



Article Title

Dynamic Pricing for Hotel Revenue Management Using Price Multipliers

Citation

Bayoumi, A. E. M., Saleh, M., Atiya, A. F., & Aziz, H. A. (2013). Dynamic pricing for hotel revenue management using price multipliers. *Journal of Revenue and Pricing Management*, 12(3), 271-285.

Abstract

In this paper it is proposed a new dynamic pricing approach for the hotel revenue management problem. The proposed approach is based on having “price multipliers” that vary around “1” and provide a varying discount/premium over some seasonal reference price. The price multipliers are a function of certain influencing variables (for example hotel occupancy, time till arrival, etc). We apply an optimization algorithm for determining the parameters of these multipliers, the goal being to maximize the revenue, taking into account current demand, and the demand-price sensitivity of the hotel’s guest. The optimization algorithm makes use of a Monte Carlo simulator that simulates all the hotel’s processes, such as reservations arrivals, cancellations, duration of stay, no shows, group reservations, seasonality, trend, etc, as faithfully as possible. We have tested the proposed approach by successfully applying it to the revenue management problem of Plaza Hotel, Alexandria, Egypt, as a case study.

Conclusion

In this work, we propose a new hotel room dynamic pricing system. The proposed model uses the concept of price multipliers that provide a varying discount/premium within some bands over some seasonal reference price. The transparent way of designing such system, including the knowledge of the variables that affect the pricing, will allay the hotel’s concerns regarding the uncertainty of system’s outcome. Hotel managers can start out with fairly tight bands for the allowable premium/discount until they gain enough confidence about the system’s performance. Moreover, some of the relations regarding the four influencing variables (hotel capacity, time till arrival, length of stay, and group size) can be adjusted or removed, according to the hotel’s request. Of course having custom made pricing systems (rather than off-the-shelf) should be the better strategy. However, this is not practical and too costly, so a middle ground could be a good compromise. This middle ground could be achieved using the model

proposed. The proposed model utilizes a Monte Carlo simulator, which provides a faithful emulation of the hotel's processes. So, it is based on a realistic simulation of the hotel's processes, and therefore does not necessitate any simplifying approximations, as is frequently done in other work in order to obtain tractable formulas. The application of the proposed model on the case study indicated a successful and a large improvement of the revenue. Moreover, the improvement is robust to statistical estimation errors, such as errors in computing the price elasticity.