Analyzing effects of competition in hospitality industry

Anton Muratov, Atomize AB

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1 Motivation

Atomize AB is a Gothenburg-based company building an intelligent pricing engine for hospitality industry. We do this in two ways: either providing our customers price recommendations that they would then have to manually accept in our GUI, or in a fully automated fashion, taking real-time control of customers prices for them, given the restrictions they set up.

Dynamic pricing aims to answer a question: what would happen to the total revenue if the current price is changed by $\pm X\%$, and based on the answer, set the correct price. Good dynamic pricing requires a lot of sales data: it is necessary to probe the demand at different price levels against different market conditions.

Competition is one of the most impactful market conditions to take into account. It is very important to understand who the competitors are and how changes in their behavior impact the business.

2 Project scope

The goal of the project is to build a statistical model to analyze the impact of competitors pricing on the booking rate of hotel's different roomtypes. The model will be used for competitor selection, and improving the demand forecasts.

The starting point for the analysis could be a Poisson regression model for the number of reservations. Starting from the raw historical data, the student will have to find an effective data representation, do the variable selection, and build a predictive model for the demand given competition. The significance of competitors' impact would then be assessed using a formal statistical procedure. See e.g. [1] for the reference on Poisson regression and other analysis techniques on the count data.

The data analysis and modelling should preferably be done in Python 3, see [2] for a primer.

3 Data

Anonymized data from Atomize client base will be available for studying. Hotels vary in size (10 - 1000 rooms) and length of available history (typically around a year of data is available). For the historical period available, the data includes the history of price changes for the hotel's and their competitors' different roomtypes for the future stay dates up to one year ahead, as well as the change history of every reservation within the period, including the creation timestamp, price at which the room was booked, various additional costs etc. The data in Atomize storage already is purged from any sensitive guest data (we do not store names, locations, IP addresses etc.). Additionally, any variables that would allow identification of the hotel (such as location data, currency, real room names, etc.) will be removed from the study.

References

[1] Cameron, A. Colin, and Pravin K. Trivedi. *Regression analysis of count data.* Cambridge university press, 2013.

[2] Wes McKinney, *Python for data analysis: Data wrangling with Pandas, NumPy, and IPython*, O'Reilly Media, Inc., 2012