

**ANALYTICAL MODELS FOR HOTEL REVENUE  
MANAGEMENT: A CASE STUDY**

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## **Abstract**

In this research, aim was to forecast daily number of guest arrivals for a boutique villa and to use machine learning methods to predict the room sell rate and to find most robust models for each task. Historical daily data of 3.5 years of a boutique villa was used to carry out the study.

The arrival numbers were forecasted using univariate time series models such as naïve, moving average, exponential smoothing, ARIMA, Poisson and Negative Binomial models. For the Poisson and Negative Binomial models, which are specifically used to handle count time series data, intervention effects were added which could represent the drastic changes in arrivals in the past. Negative Binomial model proved to be the most robust model giving lowest error rates out of all the models.

For predicting room sell rate, machine learning techniques such as Multiple linear regression, Random Forest, k-Nearest Neighbor and Support Vector Machine models were used. The findings showed that Negative Binomial model is the most robust in forecasting arrivals and k-Nearest Neighbor method proved to be the best to predict the sell rates of the villa. Also it uncovered that traveling season and lead time (booking window) significantly affects the sell rates of the property.