

Chapter 28

Forecasting Hotel Occupancy Rates With Artificial Neural Networks in the COVID-19 Process

Arzu Organ

 <https://orcid.org/0000-0002-2400-4343>

Pamukkale University, Turkey

Cansu Tosun Gavcar

 <https://orcid.org/0000-0003-2750-0112>

Pamukkale University, Turkey

ABSTRACT

In the tourism sector, accommodation business demand forecasting provides a great benefit for tourism professionals, especially hotel managers, in the strategic decision-making process. For demand estimation, the artificial neural networks (ANN) method, which works similar to a human brain cell and makes realistic predictions, has been preferred. The aim of this study was to develop an eight input and output variable of the feedforward radiated back an ANN is in a specially certified hotel room occupancy rate in Turkey to investigate the applicability of the method to predict. Four different alternative network structures were created from the data set with the K-fold cross validation method. As a result of the test simulation, it was determined that the estimated and actual occupancy rates of the network with the lowest error were close to each other. According to this designed model, the monthly occupancy rate for the years 2019 and 2020 has been estimated. As a result, the effect of COVID-19 was revealed by comparing the hotel occupancy rate with the actual rates.

DOI: 10.4018/978-1-7998-8231-2.ch028

INTRODUCTION

Forecasting is the knowledge and art that predicts what will happen in the future in the present. When making predictions, there should be historical data and information. Historical data and information are behaviors that occurred in various situations at that time in the past (Wardani et al., 2019: 1). Forecasting is about predicting the future as accurately as possible, given all of the information available, including historical data and knowledge of any future events that might impact the forecasts (Hyndman and Athanasopoulos 2018: 14).

Knowing better about the future has affected many people for thousands of years. Estimation methods vary widely. The estimation methods will depend on the availability of data, the quality of existing models, and the types of assumptions made, among others. Overall, it's not an easy task to guess. Therefore, exploring this topic is very attractive for many researchers. Artificial Neural Network has an increasing importance in prediction theory. ANN can learn from examples (historical data). ANN can recognize a hidden pattern in historical observations and use them to predict future values. In addition, it can cope with missing information or noisy data. It can be very effective, especially when it is not possible to define the rules or steps that lead to the solution of a problem (Shamsuddin et al., 2008: 1-2).

Forecasts serve a variety of purposes in the hotel industry; It provides vital inputs for marketing and pricing strategies, routine budget planning and capital investment decisions. In particular, demand forecasts play an important role in revenue management strategies commonly used in the hospitality industry. Accurate estimation of future demand is particularly important for hotels as services cannot be stocked (Walke and Fullerton Jr, 2019: 179-180). Occupancy rate estimation in the accommodation sector is of central importance in planning and decision making. Because anticipating the demand allows managers to plan on issues such as inventory, workforce, materials, financial budgeting and pricing. All of these are used to maximize revenue and minimize costs (Caicedo-Torres and Payares, 2016: 201). An accurate occupancy rate estimation will assist hotel managers, especially managers in budget-constrained hotels, in their strategic, tactical and operational planning. Accurate estimation of room occupancy rates will facilitate strategic planning and improve decision-making processes of hotel management companies (Law, 1998: 234).

When the studies on tourism demand forecasting in our country are examined, it is seen that the tourism demand of countries or cities is mostly focused. In fact, the accurate demand forecast of the accommodation businesses will ensure that the demand forecasts of countries or regions are so consistent. Hospitality businesses are the primary source of income in the tourism industry (Ulucan and Kızıllırmak, 2018: 90).

There are studies of Çuhadar and Kayacan (2005) and Ulucan and Kızıllırmak (2018) regarding the occupancy rate of accommodation establishments in our country.

When the studies on the occupancy rate of accommodation establishments in foreign literature are examined; Law (1998), Du et al. (2007), Caicedo-Torres and Payares (2016), Desa and Marzuki (2019), Walke and Fullerton Jr (2019).

In this chapter, in order to predict in a specially certified hotel room occupancy rate in Turkey to investigate the feasibility of Artificial Neural Network Method. First, Artificial Neural Networks, Artificial Neural Cell, Artificial Neural Network Elements, Feed-Forward Back Propagation Artificial Neural Networks will be defined and explained. Then, tourism demand forecasting studies with Artificial Neural Networks method in the literature will be included. The chapter concludes with the application of the Artificial Neural Network Method.

18 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:
www.igi-global.com/chapter/forecasting-hotel-occupancy-rates-with-artificial-neural-networks-in-the-covid-19-process/284026

Related Content

Peace: A Roadmap for Heritage and Tourism

Fabio Carbone and Luiz Oosterbeek (2021). *Role and Impact of Tourism in Peacebuilding and Conflict Transformation* (pp. 1-15).

www.irma-international.org/chapter/peace/259261

Death and Resurrection on the If Island: Revisiting Episodes of The Count of Monte Cristo

Adriana Coelho Florent (2022). *Global Perspectives on Literary Tourism and Film-Induced Tourism* (pp. 70-86).

www.irma-international.org/chapter/death-and-resurrection-on-the-if-island/292591

Climate-Friendly Hotels and the Promotion of Sustainability in Tourist Destinations: A Study in Algarve From Hotel Management Perspectives

Margarida Arraes Viegas (2020). *Handbook of Research on Resident and Tourist Perspectives on Travel Destinations* (pp. 24-40).

www.irma-international.org/chapter/climate-friendly-hotels-and-the-promotion-of-sustainability-in-tourist-destinations/258642

COVID-19: The Way Luxury Hotels Deal With the Pandemic

Sara Sarwari, Samina Huq and Tanvir Ahmed Minar (2021). *International Journal of Tourism and Hospitality Management in the Digital Age* (pp. 1-13).

www.irma-international.org/article/covid-19/279316

A TAM-Based Model of Technological Factors Affecting Use of E-Tourism

Ghazi Alkhatib and Sinamis Tahsin Bayouq (2021). *International Journal of Tourism and Hospitality Management in the Digital Age* (pp. 50-67).

www.irma-international.org/article/a-tam-based-model-of-technological-factors-affecting-use-of-e-tourism/264882