Time Series Forecasting for Airline Passengers: Recent Advances and Novel Approaches

Overview

This study aims to improve the accuracy and robustness of time series forecasting for airline passengers by applying advanced machine learning and deep learning techniques.

INTRODUCTION:

Time series forecasting is still a very significant activity for many industries, including finance, economics, and transportation. In the airline industry, the successful forecast of passengers' demand is crucial to optimize resource allocation and manage capacity, which, in turn, has a direct impact on customer satisfaction. Therefore, the review aims to comprehensively review recent achievements in the forecasting of airline passengers' time series and point out the research gap and novelty of the problem.

LITERATURE SURVEY

There are many research papers in the literature that have explored time series forecasting with different techniques presented and tested. The most popular of the traditional methods used for time series forecasting are the ARIMA and Exponential Smoothing methods. The former, however involve linear and non-stationary handling of the time series data.

The techniques of machine learning and deep learning have started to be widely applied in time series forecasting today. For example, work on forecasting airline passenger demand by using Recurrent Neural Networks (RNNs) and Long Short-Term Memory (LSTM) networks was recently represented [2]. These methods result in superior performance compared to traditional methods but only at the high cost of huge volumes of data and computational power.

RESEARCH GAP AND NOVELTY

Despite such progress in time series forecasting, there still exists a research gap in handling the complexity and non-stationarity of airline passenger data. What is novel about this study is that advanced machine learning and deep learning techniques are applied to the improvement of accuracy and robustness in the time-series forecasting for airline passengers.

OBJECTIVES

The objectives of this study are as follows: To review recent advances in time series forecasting for airline passengers

To identify the research gap and novelty of this area

Develop and test a new time series forecasting model for the passengers of airlines using advanced techniques of machine learning and deep learning.

METHODOLOGY

Methodology of this work is divided into the following steps:

Data collection: Largely collecting data of airline passengers from a dataset

Data preprocessing: Handling the data by finding missing values, outliers, and seasonality

Model development: New time series model development and evaluation with advanced machine learning techniques or deep learning models to forecast Model evaluation: Implementation of the proposed model along with its ability in terms of mean absolute error (MAE) and mean squared error (MSE).

Conclusion:

In this study, we reviewed recent advances in time series forecasting for airline passengers and identified a research gap in handling the complexity and non-stationarity of airline passenger data. We proposed a new time series forecasting model using advanced machine learning and deep learning techniques, which was developed and tested using a dataset of airline passenger data.