Abstract

Data and Data Science, both are playing a pivotal role in creating business intelligence. Machine learning became buzzword technology in data processing and analytics. Retailors in an unorganized sector take decisions intuitively whereas organized retail concerns use business intelligence for their business decisions. Retail sales prediction is common in the organized retail sector, which is highly useful for in time and strategic competitive decisions. In general, sales predictions are made based on past data using statistical and mathematical techniques, etc. The present paper is an attempt to predict retail sales using machine learning algorithms and to present the accuracy of results to the retailors, managers, and policymaker in the retail industry. In this paper three machine learning algorithms k-Nearest Neighbour regression model, Multinomial regression model, Ada Boost regression model were implemented on the training dataset. Multinomial and Decision Tree with Ada Boost regression models work with 100% accuracy. Decision Tree with Ada Boost regression model was implemented on the test set to predict the outlet sales. The regression model predicted the sales of a particular item indicated with the item identifier in a particular outlet indicated with the outlet identifier on the test set. The implications for retailers, managers, and policymakers in the retailing sector are provided based on the results.

Keywords: Retail, Sales, Prediction, Machine Learning Algorithms

1. Introduction

Business intelligence became a buzzword in the 21st century. Intuitional decision making is replaced by business intelligence in the Industrial evolution 4.0. Most of the economic decisions are happening to take into consideration data, data processing, results, and analytics. Information Technology plays a pivotal role in reducing data processing time and assurance of precession, reliability, and accuracy of results, which is highly useful for valuable predictions and business decisions. The retail sector is a combination of unorganized and organized concerns. Most of the unorganized retail concerns take decisions intuitively or based on the experience of proprietors whereas organized retail concerns prefer to make decisions based on data/information process results. Organized Food and grocery sector is playing a dynamic role in penetrating/occupying into

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more and more unorganized food and grocery market. Organized food and grocery sector concerns are using contemporary technology for processing data to get better results in less time and applying data science for analytics for transforming the data into business intelligence for using a competitive advantage. In this scenario, academicians, researchers and practitioners contributions for retailers knowledge are: sales prediction in super markets.

Machine learning applications in data science are increasing day-by-day due to its capability of quick, precise, and accurate processing of data using mathematics, statistical and econometric applications, and providing business intelligence for business strategies development and execution. The present study is an attempt to efficiently predict retail sales using machine learning algorithms. The secondary objective of the study is to explore state-of-art tools, techniques, methods, and models used in sales prediction organized retail outlets. The primary objective is to predict organized retail sales using machine learning algorithms and comparing the results from implemented models. The scope of the study is limited to Big Mart sales prediction using machine learning algorithms. The study is expected to useful for retailers, decision-makers working for retail concerns, and policymaker for development, regulation, and control.

The work is organized by the identification of state-of-art technology for predicting sales in organized retail outs with precession. It follows methodology, data pre-processing, and building prediction model, implementing the prediction model on the training data set, identifying the best model for prediction, and implementing that model on a test set to predict outlet sales. Finally, it concludes the findings and implications.

Machine learning applications are increasing day-by-day in business data processing and analytics

area. In this work the results derived from the machine learning based algorithms are more precise, accurate and confidently use for decision making than other models. Compared to three models the last two models are giving hundred per cent accurate results. The results of this study can boost confidence of retailers to implement machine learning in their business data processing and analysis. It also useful for the managers associated with retail sector for developing suitable competitive marketing strategies. Last but not least it helps the policy makers to make different estimations and make suitable policies relating to retail sector.