SALES FORECASTING AND PREDICTION IN SUPER MARKETS: A META SURVEY

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ABSTRACT

Deep learning is constantly gaining popularity in sales forecasting and is one of the most inspiring research fields. Forecasting product demand is crucial for for-profit optimization and beneficial to all stakeholders in this industry. Forecasts are important, especially when deciding how accurately to predict future demand for items and inventory stock levels. This is important, particularly in the grocery or retail industry. The various approaches to maximize the profit include the arrangement of the items, the interest people have in them, and the profit from often selling items. We can use practical deep-learning algorithms to extrapolate future revenues using annual sales data. This approach impacts predicting product availability in stores to ensure they have the proper amount of inventory at the right time. The proposed review paper will explore the Product forecasting techniques used for owners to analyse Customer Intelligence in Purchasing products.

Keywords - Sales forecasting, deep learning, LSTM, Profit optimisation.

I. INTRODUCTION

Sales forecasting uses previous sales data from a company to predict future short- or long-term sales performance. This is one of the cornerstones of good money management. All operations involving predictions, like sales forecasting, are inherently risky and uncertain.

Machine learning algorithms can assist organisations in anticipating sales by predicting consumer behaviour using data from previous transactions and demographic data. With little human work, ML enables firms to develop more accurate forecasting models that use previous data collection. By adding machine learning algorithms to their data, businesses can enhance their goods and services depending on consumer demands. Additionally, they can more correctly predict consumer behaviour, which will improve their planning.

Marketing, planning, and sales forecasting are some business activities where machine learning is most clearly used commercially. For instance, a salesperson can precisely predict a potential customer's behaviour using predictive analytics. The retail sector is another place where machine learning is being commercialised. Before each consumer makes their next purchase, machine learning algorithms estimate what stock they will acquire and how many things they could need. As a result, the company can manage its cash flow more effectively, manage its inventory better, and complete sales cycles more quickly, all of which contribute to increased revenue and profit.

Before producing predictions, machine learning analyses millions of data points using various techniques, including grouping and regression. Demographic details, behavioural patterns, and historical transactions are examples of data points. By examining this data, machine learning can forecast what number of customers will finish a task.

This paper is organised as follows section I gives the Introduction, section II presents the Literature Review, section III provides the Proposed System, section IV describes the Conceptual Framework, and section IV. Concludes this paper.

II. LITERATURE REVIEW

According to Yasaman Ensafi et al.,[1] Neural networks are

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one of the most powerful tools used for sales forecasting. Detrending and depersonalising are two data pre-processing procedures that can reduce outcome variation and increase accuracy. The vital scientific contributions of this work are the use of SARIMA, one of the most essential classical time-series forecasting approaches, to forecast future sales. Artificial neural network-based advanced forecasting techniques are also used, including Prophet, LSTM, and CNN. Utilising accuracy measurement techniques like RMSE and MAPE, the findings are compared.

By Javad Feizabadi [2], ML-based forecasting methods such as ARIMAX and NN are used. Here observed that the first method performed to identify demand, whereas the second method produced more accurate and "smoothed" predictions. This study's findings have supported two research hypotheses; the first is that a hybrid approach to demand forecasting is created by fusing time series models with machine learning-enabled leading indicators, and the second is that Research shows how much performance may be improved by using sophisticated predicting techniques.

As related to Tonya Boone et al [3], Examine the effects of the data explosion on item projection and how it is enlarged. This will emphasize time series information. This research also Examines the importance of such data on organizational forecasting and how it might be used to gain insights into consumer behaviour.

As stated by Robert Fildes et al., [4] This paper says that many forecasting problems are faced by retailers from lower levels to higher levels. Sales forecasting helps retailers store a definite amount of stock at the right time. Forecasting helps to take the correct decision at the proper time. This article also evaluates the accuracy of the comparative study.

As reported by A. Lasek et al., [5] Demand forecasting, according to the researcher, is one of the crucial components of a successful restaurant yield or revenue management (RM) system. Both independent restaurants and restaurant chains need to be able to predict their sales.

In accordance with P. J. Harrison [6], The number of short-term sales forecasting approaches published and used is reviewed in this research. Two critical methods for seasonal sales forecasting have also been used. The first is a non-seasonal forecasting method called Brown's one-parameter. Forecasts provide the necessary information to the owners for efficient production control and form manufacturing planning and stock control.

As stated by Donna F. Davis et al. [7] Discuss, forecasting techniques more clearly imitate market situations. This paper suggests a process model for sales forecasting management made up of several elements. This study gives forecasting professionals a methodology for estimating and tracking the effects of organizational characteristics on sales prediction performance.

In accordance with Douglas J. Dalrymple [8], The survey was conducted to learn how business enterprises create sales estimates, and the findings are presented in this report. The study revealed that American business enterprises frequently employ subjective, extrapolation, and naive methodologies in various forecasting circumstances. Additionally, some companies are reducing predicting errors by utilizing computers and more frequent seasonal adjustments. What techniques do they like, and how well do they predict? Are explained in this paper.

As reported by Ankur Jain et al., [9] This study demonstrates a practical application of data mining to forecast sales and demand in the retail sector. A projection model is created using the Extreme Gradient Boosting method to accurately project likely sales for a significant European pharmacy retail firm's retail sites. Several temporal and economic variables include previous sales data, store promotions, retail rivals, state and federal holidays, business location and accessibility, and the season.

As related to Samaneh Beheshti-Kash et al. [10] discuss that sales forecasting is a crucial responsibility in the retail industry. Fashion and electronics are two customer-focused businesses with fluctuating consumer demand, short product life cycles, and a lack of historical sales data, all of which

make it more challenging to produce accurate forecasts. Modern techniques for sales forecasting research are presented in this review study, focusing on predicting future product and fashion trends. This study also investigates several methods for estimating the worth of user-generated content and search queries.

As stated by Na Liu et al. [11], The Researcher explains that for many retail businesses, sales forecasting is essential. It is crucial for the industry of fashion retailing services, in which Product demand is highly erratic and product lifespan is brief. This paper thoroughly analyses the literature and chooses several studies on a particular area. Several analytical methods for forecasting fashion retail sales are reviewed, along with their advantages and disadvantages. It is revealed how each forecasting technique has changed over the past 15 years. Crucial future research directions and issues about fashion retail sales forecasting models are explored.

As reported by Shaohui Ma et al. [12], The modeller frequently has to choose essential variables from a wide range of options in marketing analytics. To solve the issue, a four-step methodology approach is presented. One example is investigating utilizing intra- and inter-category SKU-level promotional data to increase forecast accuracy. The process includes locating potentially influential categories, creating an explanatory variable space, choosing variables, using a multistage LASSO regression to estimate the model, and using a rolling scheme to produce forecasts.

Accordance to Juan Pablo Usuga et al. [13] States, One of the essential components for leveraging a business's success is supply chain management (SCM). Companies must modify their supply chains to take advantage of modern tools and methods if they want to perform better, save money, and offer better services. Many of these recent innovations were made possible by machine learning, which resulted in complicated issues that were previously challenging to resolve or improved the outcomes of earlier techniques. This study aims to demonstrate when firms should invest in cutting-edge forecasting methods rather than more traditional ones. It will first highlight the most recent ML developments used in D&SF.

Chih-Hsuan Wang et al. [14] stated that demand planning (DP) and sales forecasting (SF) are two significant problems for the implementation of supply chain analytics to be successful. Calculating the overall demand for a shared component or subassembly required by several final goods is known as demand planning (DP). Contrarily, SF is used to estimate the firms' sales revenue. SF is mainly based on historical data, unlike DP, which historically focused on resource allocation optimization. In reality, the company's projections of the sales volumes of the downstream computer products rely primarily on DP and the upstream motherboard and SF.

As related to Rising Odegua [15], many supermarkets today need an accurate yearly sales forecast. This is mostly due to a need for more information, tools, and skills for estimating sales. Most supermarket chains employ ad hoc methods and technologies to analyse and forecast sales for the upcoming year, at best.

II. PROPOSED SYSTEM

The suggested approach makes use of notions from sales forecasting. Businesses may successfully allocate resources for future expansion and manage their cash flow by using sales forecasting. Companies can predict their short- and long-term success thanks to sales forecasting, which helps them estimate costs and revenue effectively. Decision-makers use these estimates to plan for corporate growth and determine how to support the company's progress. Therefore, sales forecasting has an effect on every employee within the organization in a variety of ways.

Any business can utilize a sales forecast to aid in decision-making. It enables budgeting and risk management as well as planning for the entire company. Using sales forecasting, sales teams may see early warning signs in their pipeline and change their course before it's too late.

III. CONCEPTUAL FRAMEWORK

1. Obtain the real customer sales transaction dataset from various sources.
2. To pre-process the real data to implement the LSTM Model on the pre-processed data.
3. Analyze the results obtained from the Model and propose modifications to provide customized service.
4. Build the appropriate model.
5. Measure the accuracy of the predicted model

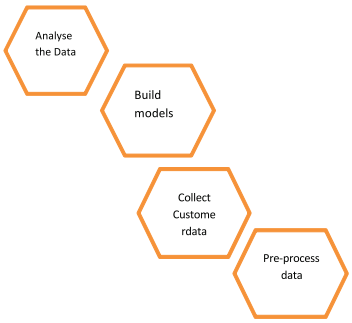

Fig.1 Conceptual Framework

IV. CONCLUSION

Sales forecasting is the critical element for organization to predict the future sales and also store the items in advance. This will help to avoid the unwanted storage of the item. Sales forecasting is used to avoid over production in manufacturing field. Several methods are used to predict the demand of an item.one of the method used to predict the time series forecasting is LSTM Model.

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