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Prediction and Forecasting of Sales Using Machine Learning Approach

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Abstract - *Machine Learning (ML) is an effective way for sales forecasting. Technological innovation helping to make huge changes to the organization's sales rate for securing business profitability. Implementation of Jupiter and Python are two innovative models for introducing different algorithms for secured business profitability. Uses of different models, such as GARCH, SARIMA, SARIMAX helped to promote business profitability for the management of the sales rate. Secondary data collection method will be used to complete the ML system. Findings and analysis will be mentioned to reach the conclusion. Recommended strategies such as algorithm tuning, feature selection and treating outliers are important for managing sales rate. Identification of the sales fart is important for secured business profitability.*

Key Words: Machine Learning, sales prediction, ARIMA, PYTHON, JUPITER

1. INTRODUCTION

Machine Learning (ML) is an innovative way for sales forecasting. The sales forecast is useful for recognition and incremental impact for initiation of new plans to complete projects within the allocated budget. ML is enabled to boost technological advantages for securing economic profitability by increasing sales rates in the organization. It is one of the effective solutions to prepare a complete data set for eradication of different challenging situations in the organization. The study [1] suggested that sales prediction is an innovative and modern and effective part of modern business intelligence. It is a detective to find out missing data, lack of data and complex problems for improvement of business profitability. In ML system, the uses of different models such as GARCH, SARIMA, SARIMAX helps to introduce different algorithms to understand the accuracy of business plans.

The use of ML is important to reduce the chances of uncertainty in the sales prediction. These sales 'prediction rate is important for maintenance of the supply chain management system in the organization. ML has increased in the last few decades for the maintenance of the organization's potentiality in the organization. Uses of artificial intelligence and computer algorithms help to create different programs for autonomous activities in the organization. In the work [1] detected that python and Jupyter are two innovative software that has been used for sales prediction. ML system helps in feature engineering, evaluation, data exploration and creating models to complete the project. There are four different types of algorithms, such as Random Forest, Design tree, linear regression and ridge regression. All these effective algorithms will be used to make a positive impact on sales prediction.

The aim of this research paper is to determine the impact of ML in sales prediction for the enhancement of business profitability. An authentic data preparation process is essential to determine the sales rate in the same year. The ML process is important for the vision of future sales revenues to determine the organization's profitability. Moreover, this process is required to generate innovative sales management strategies for future performances. Moreover, it is required for using monetary and human resources for sales forecasting in the organization. The use of ML helps to allocate plans for the maintenance of supply and demand in the organization. Moreover, it will be effective to build a market plan for the adaptation of appropriate decisions for securing the organization's profitability. ML is able to increase the organization's profitability by 10% to strengthen business performance. Moreover, it will be effective to develop a professional relationship with consumers and suppliers for the enhancement of business performances [2]. Apart from that, ML is essential for the arrangement of marketing campaigns for increasing sales rates in the organization. ML helps to predict the number of services and products for securing business profits. Accurate forecast, analyses of data and development of robust systems is necessary for securing business profitability.

1.1 Impact of machine learning models for sales prediction.

Uses of ***Auto-Regressive Integrated Moving Average*** (ARIMA) and Holt winters are two innovative predictive software's for forecasting. Adaptation of these software helps pin sales prediction for eradication of the organization's complexities in the organization. Uses of the Holt-Winters forecasting algorithm gives the opportunity to understand a smooth time series for focusing on the sales rate. There are three different types of Holt winters model as ***"Single Exponential Smoothing", "Double Exponential Smoothing"*** and ***"Triple Exponential Smoothing"*** model [3]. Uses of the three different types of data are required for sales forecasting for sales prediction rate in the organization. This model is essential to identify the business data, which are responsible for making a negative impact on an organization's sales rate. Moreover, it gives the opportunity to use previous years of data to predict the organization's sales rate for maintenance of business profitability.

ARIMA is an innovative statistical model for analyses of statistical data and helps forecast a series of data within a specific time period for taking appropriate decisions for the reinvention of sales management strategies in the organization.

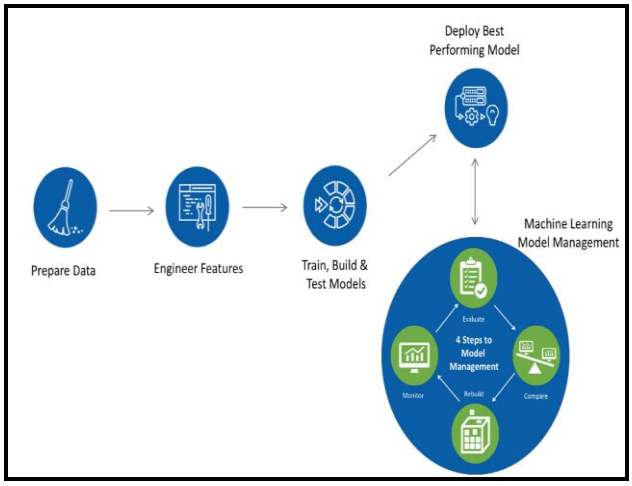

Figure 1: Machine learning model for sales Prediction

1.2 Uses of python and Jupiter in sales prediction

Sales prediction is a type of regression issue rather than any serious complication in the sales prediction rate. Uses of Python help to identify complicated issues. Uses of supervised ML or sales dynamic is required to introduce an algorithm for boosting ML algorithms in the sales rate. Uses of different data predictive models are needed to explore effective data to determine the sales growth rate in the organization.

	ID	CONSOLE	YEAR	CATEGORY	PUBLISHER	RATING	CRITICS_POINTS	USER_POINTS
0	2860	ds	2008	role-playing	Nintendo	E	2.833333	0.303704
1	731	wii	2012	simulation	Konami Digital Entertainment	E10+	13.200000	1.640000
2	495	pc	2019	shooter	Activision	M	4.562500	0.006410
3	2641	ps2	2002	sports	Electronic Arts	E	4.181818	0.326923
4	811	ps3	2013	action	Activision	M	2.259259	0.032579

Figure 2: Process of using python and Jupiter in sales prediction.

Apart from this, data pre-processing is essential for predictive models in the organization. Evaluation of different data is essential for the maintenance of the sales growth rate in the organization [4]. Python is used to calculate data to focus on different external factors, such as pricing, competitor's behaviour and promotion for enhancement of sales rate in the organization. Python is essential for Random Forest, linear regression, and design tree algorithms for deradicalization of complexity in the sales management rate [5].

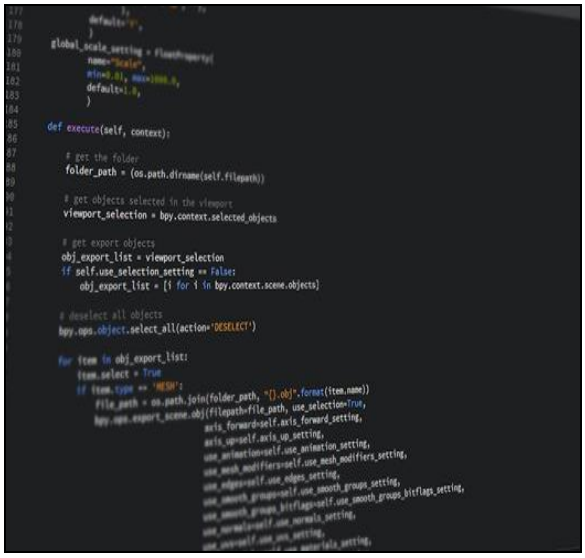

Figure 3: Python programing in Machine Learning

Jupiter is effective software for the maintenance of the sales prediction rate. The uses of different algorithms are important for the management of the sales prediction rate in the organization. Selection of data, data cleaning, data construction, and data integration is important for the identification of the sales rate in the organization [6]. Uses of this software help to identify the missing values for spatial clustering in the sale management strategy. Moreover, it helps in data set construction, to differentiate the sales rate between previous years and current years. Forecasting the market capabilities or market share rate is important for the prediction of sales rate.

2. MATERIAL AND METHODS

The methodology is the utmost section to reach the conclusion. The authentic methodology is essential for the reduction of research limitations. Positivism research philosophy has been used to increase the uses of ML for better sales prediction. Effective sales prediction rate is essential for securing business profitability [7]. A secondary data collection method has been used to collect authentic information on the researched topic. Google scholar database has been used to collect information from peer-reviewed journals. Qualitative data provides non-numerical data on the uses of ML for sales prediction. Uses of descriptive data help to acquire detailed knowledge on ML for sales prediction. Non-probability sampling methods will be used to save time to get accurate results on ML for sales for castigation. All inclusion and exclusion factors have been considered to use authentic resources to complete the research paper. Qualitative data analysis processes will be used for ML for sales prediction [8]. Nearly ten years of journals have been used to collect information on the researched topic.

3. Results and Discussion

3.1 Concept of data management for sales prediction

In order to conduct strong and sustainable strategies for sales forecasting, gathering proper knowledge about this system is one of the most important objectives for the company manager. Sales prediction is a method that directly supports estimating the future sales through an efficient manner by providing structure goals and better decisions [13]. In the current global market, machine learning and A.I. technologies are the most effective and attractive adoption of the company that supports the organizations to attract more customers through an efficient manner. In this case, by the support of machine learning a company can gather proper information of the future sales. On the other hand, in this current global market situation, a short time-consuming process is one of the most common customer requests and in this case, machine learning simply supports the conduction process of sales prediction within less time.

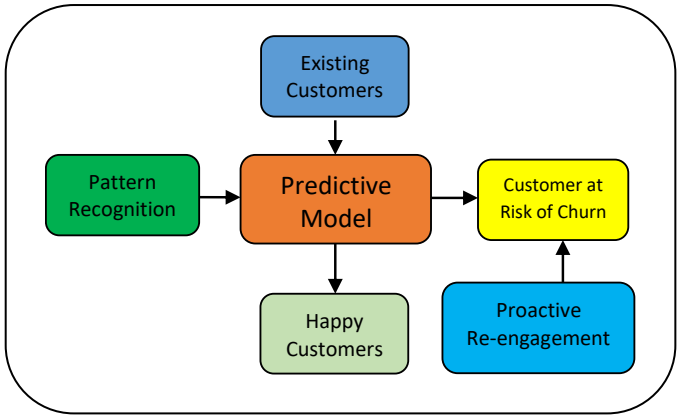

Figure 4: Steps and challenges of data management for sales prediction

According to the importance of sales prediction or sales forecasting, it allows a company to make proper measurements for the products and services based on the current marketplace situations. The sales prediction process includes many different types of benefits for the company such as strong goals, informed investors, suitable budgeting, and many more others [14]. In order to support the company goals, there are many factors that need to be rectified by the company such as upcoming next five years annual income's assumptions, yearly capital cost's calculations and many other objectives. In this case, machine learning and other types of A.I. technologies also can support the process through an efficient manner as it also supports the company to attract more customers.

3.2 Result Analysis

Positive and negative impacts of Machine learning techniques for sales prediction.

Table 1: Positive and negative impacts of Machine learning [16]

Positive impacts	Negative impacts
1.By the support of machine learning a program will simply be able to achieve an efficient way to identify trends and make patterns [15]. 2.As automation is one of the most attractive and common technological attachments in the global market, machine learning can simply rise as an important aspect for the company. 3.By the support of machine learning, a company is able to conduct continuous Improvement, such as low time-consuming services. 4.Machine learning includes an efficient way called Wide Applications as it supports the business providers through an efficient many through many ways such as mail, phone call and many other ways.	1. As a negative impact Data Acquisition is one of the most common factors here as it must need to be rectified by the programmers through an efficient manner. 2. Machine learning's are simply conducted by huge arte of data set plans and in this current pandemic situation it become one of the most difficult objectives for the pro gamers to execute this task [16]. 3. Time and Resources management is one of the most important objectives here as the casualties during this task can affect the whole sale's calculations in a huge manner.

4. CONCLUSIONS AND RECOMMENDATIONS

ML is an innovative way to predict sales rate for enhancement of business profitability. Technological innovation and the use of Python and Jupiter software helped to make huge changes to the organization's performance. Technological innovation helps to get a complete data set for eradication of the data complexities for sales prediction. The introduction section is introduced with the aim of this research paper. The uses of different software and algorithms made huge changes in the conduction of effective resource plans in the organization. A secondary data collection method has been used to identify the impact of ML on sales procrastination. Findings and analysis helped to share detailed information on sales prediction. The recommendation section helped to reinvent the computing algorithms for making huge changes in the sales rate.

Recommendation

Algorithm tuning

An algorithm running or adding more data in the software application is important for authentic sales prediction. Increasing data size could be effective for the enhancement of business profitability. Adding more data is important for the maintenance of data competition for the reinvention of an innovative strategy for increasing the sales rate in the organization. Algorithm thinking will help to maintain data accuracy for sales prediction [9].

Feature selection

Feature selection is an innovative way to get appropriate attributes for a better explanation of all targeted variables in ML. [10] suggested that proper visualization and collection of domain knowledge is required to select appropriate features for the reinvention of ML in the sales prediction [11].

Outlier's value

Identification of the outliers or missing values is important for the maintenance of accuracy in the ML system for sales prediction. Moreover, it can be effective for accurate prediction of sales rate. Treating outliers and missing value is necessary for getting effective results from the ML system [12].

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