SALES FORECASTING USING TIME SERIES

PROJECT REPORT
Abstract

This project aims to provide accurate sales forecasts using time series analysis, enabling businesses to make informed decisions and improve their overall performance.

Kanchan Chowdhury

Introduction:

Sales forecasting is a crucial aspect of business planning and decision-making. It involves predicting future sales based on historical data and other relevant factors. Time series analysis is a powerful technique used in sales forecasting, which allows us to analyse and predict future values of a target variable based on its past values. In this report, we will explore the methodology of sales forecasting using time series analysis and its application in various industries and businesses.

Methodology:

1. **Preparing the Time Series Dataset:** The first step in the data preprocessing process is to prepare the time series dataset for analysis. This involves cleaning and organizing the data to ensure its suitability for time series analysis.
2. **Testing for Stationarity:** Stationarity is an important assumption in time series analysis. It refers to the statistical properties of a time series remaining constant over time. In this step, we will test the stationarity of the time series using statistical tests such as the Augmented Dickey-Fuller (ADF) test and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test.
3. **Determining the Order of Differencing:** If the time series is found to be non-stationary, the next step is to determine the order of differencing required to achieve stationarity. Differencing involves subtracting each observation from its previous one to eliminate the trend component of the series.
4. **Finding the Order of the Autoregressive and Moving Average Terms:** Once the time series is determined to be stationary, we need to determine the order of the autoregressive (AR) and moving average (MA) terms in the ARIMA model. This can be done by analysing the autocorrelation and partial autocorrelation functions of the time series.
5. **Fitting the ARIMA Model:** After determining the order of differencing, AR, and MA terms, we can fit the ARIMA model to the time series data. The ARIMA model combines the AR and MA components to capture the underlying patterns and dynamics of the time series.
6. **Model Diagnostics:** Once the ARIMA model is fitted, it is important to assess its performance using diagnostic tests. This involves checking for the adequacy of the model assumptions, such as the normality of residuals and absence of autocorrelation.
7. **Forecasting:** The final stage of sales forecasting using time series analysis is to generate forecasts based on the fitted ARIMA model. Various metrics, such as mean absolute error (MAE) or mean squared error (MSE), can be used to assess the accuracy of the forecasts.

Conclusion:

Sales forecasting using time series analysis is a crucial tool for businesses to make informed decisions, optimize operations, and improve performance. This method uses historical data, machine learning models, and promotions to predict sales, resulting in more accurate forecasts and driving growth and success in various industries.