Sales Forecasting

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04 & 02

4550 Analytics Programming

Project Proposal

Theyyab

Data

<https://apastyle.apa.org/style-grammar-guidelines/paper-format/title-page>

# Introduction

## General description

To carry out a project on Amazon sales forecasting, the focus would be on examining past sales data from Amazon with the aim of developing a predictive model that can anticipate future sales patterns. The ultimate objective of the project would be to support Amazon in streamlining their inventory management, production planning, and marketing efforts, by offering precise predictions on sales trends.

## Problem statement

The objective of the Amazon sales forecasting problem is to create a model that can accurately anticipate future sales patterns by analyzing historical sales data. The model needs to be able to account for various factors that may affect sales, such as market trends, competition, and customer preferences. It should also provide valuable insights to help Amazon make informed decisions, such as identifying potential growth areas, predicting demand for new products, and assessing the impact of promotional activities on sales. Overall, the aim is to optimize Amazon's sales strategies, enhance profitability, and improve customer satisfaction.

## Scope of the project

By developing an accurate sales forecasting model based on historical sales data, the project aims to provide valuable insights to Amazon for optimizing their sales strategies, improving revenue, and enhancing customer satisfaction. This will allow Amazon to make informed decisions related to inventory management, production planning, and marketing strategies. Overall, the project has the potential to offer Amazon a competitive advantage by providing them with the ability to accurately predict sales trends and adjust their business operations accordingly.

## Motivation

The driving force behind Amazon sales forecasting is the desire to optimize sales strategies, enhance customer satisfaction, and increase revenue. By accurately predicting future sales trends, Amazon can make informed decisions about inventory management, production planning, and marketing tactics, leading to improved profitability and customer experiences.

Sales forecasting also provides Amazon with the ability to anticipate demand for new products and identify potential areas for growth, giving the company a competitive edge in the market. Furthermore, forecasting allows Amazon to evaluate the impact of promotional activities on sales and adjust its marketing strategies accordingly.

In summary, precise sales forecasting is crucial for Amazon to maintain its position as a top e-commerce retailer and remain competitive in the marketplace.

## Importance of the project

The importance of accurate sales forecasting for Amazon has significant implications for the company and its stakeholders, including customers, employees, shareholders, and the broader e-commerce industry.

For customers, accurate sales forecasting can lead to better product availability and more targeted marketing, improving their overall shopping experience. For employees, forecasting can help optimize inventory management and production planning, leading to increased efficiency and productivity. For shareholders, accurate sales forecasting can lead to improved profitability and stock performance.

Beyond Amazon, accurate sales forecasting can have significant implications for the broader e-commerce industry. By accurately predicting sales trends, companies can stay ahead of the competition and better meet customer needs, improving the overall online shopping experience.

By the end of the project, the expectation is to develop an accurate sales forecasting model that can provide valuable insights to Amazon for optimizing their sales strategies and improving their profitability and customer satisfaction.

# Method

## Data Understanding

### Date Source

kaggle datasets download -d karkavelrajaj/amazon-sales-dataset

### Collecting and preparing data

### Type of data

### Dataset including data source and variable descriptions.

## Data Preparation

### Data Cleaning: remove duplicates, handle missing values, and remove unnecessary columns

### Feature imputation: fill in missing values using methods like mean imputation or forward/backward fill.

### Encoding: encode categorical variables using techniques like one-hot encoding or label encoding

### Feature engineering: create new features from existing ones to provide additional information for sales forecasting.

### Feature selection: use methods like correlation analysis or feature importance for selecting the most relevant features.

### Dealing with imbalances: use techniques like oversampling, under sampling, or SMOTE to address class imbalances.

### Exploratory data analysis (EDA): visualize the data using techniques like scatter plots, histograms, or box plots to uncover relationships or patterns.

## Modeling

### Data splitting: Split the data into training and testing sets.

### Training: Train the model to learn patterns and relationships between features and sales data.

### Choosing an algorithms: Choose an algorithm based on whether the target variable is categorical or continuous.

### Supervised algorithms

### Classification-Classification algorithms can be used when the target variable is categorical.

### Regression-Regression algorithms can be used when the target variable is continuous.

### Unsupervised algorithm: Unsupervised algorithms can be used when there is no target variable. These algorithms can be used to identify patterns or relationships within the data.

### Why?

### The choice of algorithm will depend on the nature of the data and the problem being solved. Evaluate the performance of the model using testing data and fine-tune as needed.

## Evaluation

### Test

### Evaluation

### Underfitting

### Overfitting

### Regularization

### Hyperparameter tuning

### Evaluation metrics

## Deployment

### Prediction

# Project Tools

Python libraries and packages

# Timeline

|  |  |
| --- | --- |
| Week 7-Week 8 | Collect data, observe the data and make a summary to understanding the data |
| Week 9 | Learn to program on different arithmetic with Python |
| Week 10 | Design and complete the prediction with Linear regression and Random Forest |
| Week 11 | Optimize the arithmetic to raise the accuracy |
| Week 12 | Write report about project |
| Week 13 | Prepare for presentation |
| Dec. 4th | Presentation |

# References