Predication of Sales using Machine Learning

Abstract

The major challenge that any conventional store facing is to get the ball park estimate of the level of inventory needed to avoid being out of stock. Though there is a variety of vendor tools to predict sales around extreme weather events, but it's an ad-hoc and time-consuming process that lacks a systematic measure of effectiveness. On assessing the factors which prove to deeply influence the quantity of sales, we have weather as an indispensable one. As weather deeply influences the mood and the spending capability of a person, it is almost directly related to the level of sales in chain stores. The main aim of this project is to identify a suitable machine learning algorithm to predict the sale of weather sensitive products.

Current Limitations

- Difficulty in predicting the demand or sale of products because of which complexities like out of stock or over stock may arise
- Problems with old procedures where we use the historical data irrespective of their effectiveness (failure or success in prediction).
- It becomes more difficult to assess and predict the sales as the company grows both in terms of product variety and quantity.
- Seasonality issues effects a lot in the predictions which will be changing frequently for which we need to have accurate automated demand planning system
- As there is lot of data which is used in making the predictions, these data cannot be maintained in excel sheets which cost both labor and money.
- To be accurate there are lot of points to be considered like statistical forecast of the previous data trends, seasonality, calendars, and daily patterns, trade promotions, media event effect, new product introduction, web indicators / sentiment, Special event, market intelligence which will be very difficult to predict, collect and analyze.

Objectives

To build a robust model that can predict the sales accurately by including all the demand forecasting challenges.

Advantages

Forecasting sales is a common task performed by organizations to meet the customer expectations.

Manual forecasting requires vast research and input from various levels of an organization. This approach introduces bias in business volatility and the complexity of factors influencing demand is making it hard to reliably model the causes of demand variation.

Our model can help in overcoming this challenge, addressing demand-forecasting challenges by reliably modeling the numerous causes of demand variation. Machine learning is a computer-based discipline in which algorithms can actually "learn" from the data. Rather than following only explicitly programmed instructions, these algorithms use data to build and constantly refine a model to make predictions.

In our case, we build and train the model with recent data used in the Wal-Mart and can be used directly to forecast the goods in it. This model can also be used in future to forecast with other organization with little tweak of input test data.

Project planning

Project Schedule:	**Due date**
Phase 1	
Literature	06th Feb
Data Collection	11th Feb
Linear regression algorithm implementation in python	20th Feb
Gradient descent algorithm implementation in python	27th Feb
Phase 2	
Implementation of Data into the model	5th March
Build the model	10th March
Phase 3	
Live Demo	15th March
Comparison of the result from the previous	19th March
Improvements of model calibrating the parameters in and out	22th March
Project Final report submission	26th March

Time line	WE 04th Feb	WE 11th Feb	WE 18th Feb	WE 25th Feb	WE 04th March	WE 11th March	WE 18th March	WE 25th March
Literature								
Data Collection								
Linear regression algorithm implimentation in python								
Gradient descent algorithm implimentation in python								
Phase 1 comletion report								
Implementation of Data into the model								
Build the model								
Phase 2 comletion report								
Live Demo								
Comparison of the result from the previous								
Improvements of model calibrating the parameters in and out								
Project Final report submission								

Resource Profile

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Tools

- Coding language: python 3.1 and ML libraries.
- Project Documentation: Jupyter notebook
- Repository: All project details including the model will be kept in github.

References

- Online course for machine learning
  https://www.udacity.com/course/machine-learning-engineer-nanodegree--nd009t
- Internet Journal of Retailing and Consumer Services
  https://www.ualberta.ca/business/-/media/business/centres/sor/documents/murrayetal2010-theeffectofweatheronconsumerspending.pdf
- Test data -Walmart Recruiting II: Sales in Stormy Weather
  https://www.kaggle.com/c/walmart-recruiting-sales-in-stormy-weather