

Mobiles Sales Strategizer

Srish Srinivasan
Computer Science Engineering
PES University

Bangalore,India
srishwap4@gmail.com

Sriram Subramanian
Computer Science Engineering
PES University

Bangalore,India
sriramsub7@gmail.com

Abstract

This paper discusses the various methods that are employed in predicting the trends in time series data. Here, an attempt to forecasting mobile phone sales has been made. Initially, we learnt how Recurrent Neural Networks (RNN) and Long Short Term Memory (LSTM) have been used to predict the demand for electricity in a residential locality. We then saw how the application of Deep Neural Networks in building predictive models came up with some very accurate predictions. Moving on, we also looked at how Support Vector Machines have been employed in forecasting the sales of mobile phones.

yet to be completed

I. Introduction

A market place is a intermediary link between a merchant(s) and a consumer(s). It takes away the hassle of visiting different websites or visiting different malls in order to compare the pricing of a product that a consumer is interested in. So a market place, be it online or offline acts as a portal for all merchants to exhibit and sell their products to interested customers.

Customers would find it really easy to make a sound decision on their purchases given the plethora of options in terms of pricing and features. The merchants too could analyse and find out the products that seem to be really trendy and accordingly plan their sales strategy

and the investments that they would have to make in order to have a successful campaign at the marketplace.

Our goal was , given the dataset of phone sales in the first half of 2020, try and analyse how certain sales decisions such as pricing were indeed getting the optimal results in terms of sales, try predicting sales of a product and try to bring out the most influential factors that affect the sales.

The data was considerably clean when we ingested it, therefore not much of cleaning was required.

One of the issues was, that many of the columns in the dataset took unstructured values and we had to figure out a way to extract information from them or make the decision to drop the columns entirely.

Explorative analysis showed that many attributes had a skewed distrubution.Few of the attributes were considerably correlated with one another. For one, the *daily_gmv* attribute of the dataset was higly correlated with the *daily_sold* attribute.

II. Literature Review

Anupiya Nugaliyadde, Upeka Somaratne, and Kok Wai Wong Murdoch in their paper “Predicting Electricity Consumption using Deep Recurrent Neural Networks” talk us through their approach to predicting Electricity Consumption using a Recurrent Neural

Network (RNN) and a Long Short Term Memory network (LSTM). Both these models are purely dependent on the historical consumption of electricity. They observed that the analysis of time-series data through conventional approaches like ARIMA (Autoregressive integrated moving average), Fuzzy based techniques, SVM (Support Vector Machines) and a few other did an excellent job in making short-term predictions but were considerably poor when it came to making long-term predictions. RNN and LSTM based models consist of a feedback loop from their past inputs in order to learn from their previous sequences of data. Both these models were observed to minimize the RMS (Root Mean Square) error value to 0.1 for all the cases on an average. They concluded that the RNN and LSTM based models performed as good as ARIMA in making short-term predictions and outperformed all the other models when it came to making medium-term and long-term predictions with very good accuracy.

In the paper, “deep neural decision trees”, Yongxin Yang, Garcia Morillo, and Timothy M.H., discuss how neural networks are extremely powerful, but lack the interpretability of tree based models. In use cases corresponding to fields such as business and medicine, the model may require to be explainable. They incorporated both the decision tree and ANN techniques to create a custom model. This model, instead of using greedy techniques to grow the tree, uses stochastic gradient descent and can hence find the better approximate to the optimal solution.

Since the entire model is constructed like a decision tree, it would be quite easy to interpret. They tested on tabular, low dimensional data and compared the performances of a dndt, decision tree and a neural network. They concluded that the decision tree slightly outperforms the dndt as it is more suited for the type of data used, but the dndt did outperform the neural network. Maybe the dndt could provide an useful, interpretable model when analysing perceptual data.

Zekun Duan in his paper “Mobile Phone Sales Forecast Based on Support Vector Machine” discusses how he employed SVM (Support Vector Machine) in building a model for the prediction of mobile phone sales. He took in factors such as price, wear resistance, resistance to fall, charging interval, battery life, communication stability, photo effect, appearance design, memory size and the willingness to buy again as input variables and the sales foreground grade as the output variable. The reason behind employing SVM was that it was very efficient in making predictions as it overcomes the problem of local optimum and also eliminates the possibility of a long convergence time which seems to be very evident in some of the neural networks based models. On analysing the predictions that were made, he concluded that the sales forecasts were very consistent with the actual values announced by the mobile phone manufacturers.

III. Problem Statement

1. To find out the most influential independent variables in determining the value of the dependant variable.
2. To build a model that can predict the sales of a mobile phone given its parameters.
3. To estimate the amount of history to consider when making a prediction, since it is time series data.

IV. Our Approach

** work in progress**

