Shopping guide

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ABSTRACT

The main objective of this project is Sales prediction, which is forecasting the future sales of a product. The attributes used as an input is weekly sales and dates of sale. This paper proposes a machine learning model to predict the sales of a product. The machine learning technique used is linear regression. The successful prediction of sales will maximize the shopkeeper's gains.

Keywords— *Linear regression, Sales forecasting, Android app development*

1. INTRODUCTION

In today's world, where competition is fierce, making the right business decisions is extremely important. Being able to accurately predict the sales of a certain product in a particular country can be exponentially beneficial to the shop owner. In this project, we have tried to predict the sales of a particular product which will tell the shop owner how many of those products should he buy to maximize the profit. Sales forecasting uses previous sales data and predicts the future sale which will help the shopkeeper to make decisions regarding the number of a certain product he needs to refill or the number of products he needs to produce to incur as lees loss as possible.

In our machine learning model, we have used the price of the product, and its weekly sales to predict the future sales of that product. In statistics, linear regression is a linear approach to modelling the relationship between a scalar response and one or more explanatory variables. Our model has used a training data set of one year, and a test data set of one month. We have used machine learning technique of linear regression to successfully predict sales movement with high accuracy.

2. DESIGN

The objective of the project is to build a model that will predict the future sales of products in a shop. We will be basing our predictions on the weekly sales of the product in history. The result obtained will be shown in the app created for the shopkeeper which will help him/her in determining future stocking or production.

The algorithm is implemented on Python 3.6 running on Spyder in the Anaconda distribution. The results are displayed on the app using TensorFlow on Android Studio.

(a) **Android Layout:** Layout is a special class of View Group used to display its widgets that is the arrangement of the view hierarchy. There are the most common Layout objects used in applications such as follow types.

(b) **Linear Layout:** A Linear Layout aligns all children in a single direction — vertically or horizontally, depending on what property you set on the Linear Layout. All children are stacked one after the other, so a vertical list will only have one child per row, no matter how wide they are, and a horizontal list will only be one row high (the height of the tallest child, plus padding).

(c) **Relative Layout:** Relative Layout is more flexible and suitable for implementing complex UI. Relative Layout lets children specify their position relative to each other (specified by ID), or to the parent. So software engineers can align two elements by the right border, or make one below another, or centred in the screen.

(d) **Absolute Layout:** Absolute Layout enables children to specify exact x/y coordinates to display on the screen, where (0, 0) is the upper left corner, and values increase as move down or to the right.

So various layouts in the android studio can be used to design the UI as per requirement.

3. METHODOLOGY
3.1 Working
3.1.1 Importing data sets
The data set comes from the [1] Kaggle Platform and consists of data from an American Retail Organization, Walmart. The data

set has 2, 82,452 entries that will be used for training the models. Each entry has attributes as follows:

(a) The associated Store
(b) The corresponding Department
(c) The date of the starting day in that week.
(d) The departmental weekly sales
(e) The store size
(f) Boolean value specifying if there is a major holiday in the week

Along with the above-mentioned attributes, are features, comprising for each entry, which includes:

- Customer price index
- Unemployment rate
- Temperature
- Fuel price

The training data will be split into testing data for cross-validation and algorithm implementation.
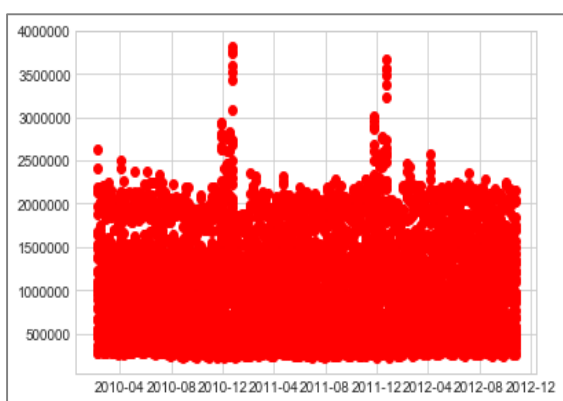

3.1.2 Building computational graph using Linear Regression: Linear Regression fits a linear model with coefficients w=(w1,w2,...,wn) to minimize the residual sum of squares between the observed responses in the dataset, and the responses predicted by the linear approximation. Mathematically it solves a problem of the form:

$$Min\ w\ ||Xw - y||2$$

The algorithm of linear regression is implemented by using the SciKit Learn library.
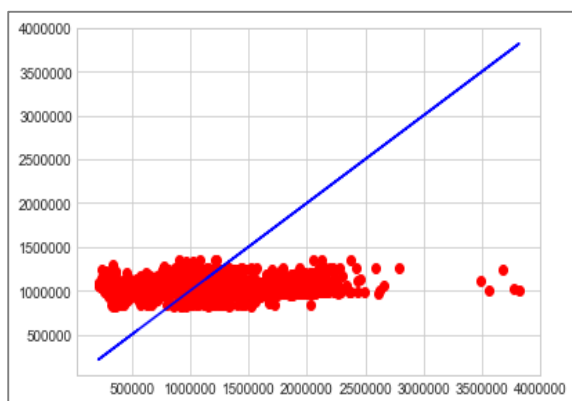
The lasso model estimates sparse coefficients and effectively reduces the error in the solution.
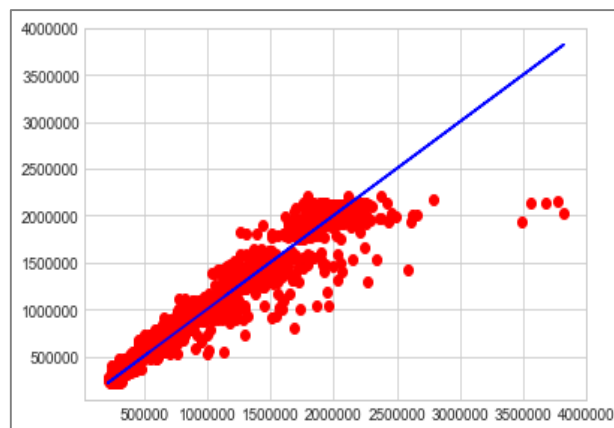
3.1.3 Android Application: The shopkeeper will be able to see the results of sales prediction on an android application. For establishing this task, we have used TensorFlow, which is an open source computational framework for building Machine Learning models. To store the data in the android application, we have used the Firebase real-time database as our backend.

4. CONCLUSION
The aim of this project is to predict the sales of a given product for a particular shop which will, in turn, lead to better decision-making. The result of this forecasting will be directly shown to the shop owner using a mobile application. The shop owner can easily know the sales predictions of various products directly through the mobile application. This will benefit from reducing the loss incurred due to that product.

5. ACKNOWLEDGEMENT

6. REFERENCES
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