

E-COMMERCE WEBSITE WITH CHATBOT, SALES ANALYSIS AND PRICE OPTIMIZATION

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Abstract— It is critical in today's rapidly changing business environment to be able to respond to clients' needs in the most efficient and timely manner possible. Online Shopping is a lifestyle e-commerce web application that sells a variety of fashion and lifestyle products if your customers want to see your business online and have instant access to your products or services (currently menswear). This project allows users to view various available products and allows registered users to instantly purchase desired products and place orders using an instant payment processor. This project allows administrators and managers to easily view orders placed. To create an e-commerce website, a number of technologies must be studied and understood. A few features of the proposed system include product demand forecasting, which allows administrators or owners to forecast product demand and make decisions based on it. The following feature is price prediction, in which the admin can pass some parameters to the model and the model can predict the price to set. Following that, we construct a chatbot based on a neural network to aid in the resolution of the user's query. The proposed system aims to create an appropriate neural network algorithm that can be used to forecast demand for outgoing distributed products, and then to evaluate the performance of the chosen algorithms by conducting an experiment to investigate the possibility of using long-term forecasts in transportation planning. Price prediction is included in the proposed system.

Keywords—Demand Forecasting, price prediction, Neural Network Algorithm

I. INTRODUCTION

E-commerce has become a part of our everyday lives because technological advancements have allowed people to sit in the comfort of their homes and shop online without having to go to a physical store. This project is divided into two major categories: administrators and customers. As administrators, store managers and employees can add, edit, update, or remove products. They can also change product names, prices, and add or remove products. The customer can search for products, add items to their cart, remove items from their cart, and pay at the store. They can also update their information such as names, addresses, and other details.

Understanding the wider context of e-business is essential because it has a growing impact on our world and has revolutionised many aspects of human activity. The literature review attempts to explore this impact and come to useful conclusions about where the project should focus in order to be successful. The success and failure factors of e-business are also explored, as are some cases of companies that have successfully implemented e-business into their operations.

II. LITERATURE SURVEY

A. *An optimized model using LSTM network for demand forecasting*

Author name: Hossein Abbasimehr, Mohsen Yousefi, Mostafa Shaban

In this paper, we propose a demand forecasting method based on multi-layer LSTM networks. The proposed method automatically selects the best forecasting model by considering different combinations of LSTM hyperparameters for a given time series using a grid search method. It has the ability to capture non-linear patterns in time series data while accounting for the inherent characteristics of non-stationary time series data. Using demand data from a furniture company, the proposed method is compared with some well-known time series forecasting techniques from both statistical and computational intelligence methods. These methods include autoregressive integrated moving average (ARIMA), exponential smoothing (ETS), artificial neural network (ANN), K-nearest neighbors (KNN), recurrent neural network (RNN), support vector machines (SVM), and single-layer LSTM. The experimental results indicate that the proposed method is superior among the tested methods in terms of performance measurement.

B. *A Sales Prediction Method Based on LSTM with Hyper-Parameter Search*

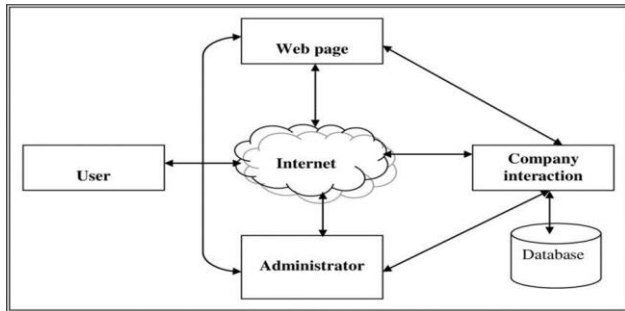
Author name: Yun Dai and Jinghao Huang

In this paper, the LSTM model with a special loss function and hyper-parameter search is proposed for overcoming challenges in the real-scene sales forecast. When compared to traditional methods, we find that the proposed model outperforms others in terms of providing reliable predictions. The flaw of this model is that it cannot solve the cold start problem of new product prediction. Our future focus will be on how to modify the model so that we can apply new products. The experiment results show that, compared with a series of machine learning models using the AutoML (Automatic Machine Learning) tool, the proposed method significantly increased the performance of prediction on sparse data. Besides, it can reasonably overestimate or underestimate sales forecasts based on user preferences that meet actual business demands..

III. IMPLEMENTATION

Existing System of E-commerce Portal

Ecommerce portals are online platforms where buyer-seller trading transactions are conducted. Manufacturers and distributors launch ecommerce portals to transit their buyers to an online channel. An ecommerce portal helps marketers turn leads into sales. The platform manages the interactions between customers and suppliers for your business. Ecommerce portals function as a merchant service for online retailers. Modern platforms come with a variety of features and pricing options. Ultimately, the goal is still to process payments securely and efficiently.



Proposed System of E-commerce Website with Sales Analysis and Price Optimization

E-commerce is based on the client-server architecture. A client can be an application, which uses a Graphical User Interface (GUI) that sends request to a server for certain services. The server is the provider of the services requested by the client. In E-commerce, a client refers to a customer who requests for certain services and the server refers to the business application through which the services are provided. The business application that provides services is deployed on a Web server. In client-server architecture, a machine can be both a client as well as a server.

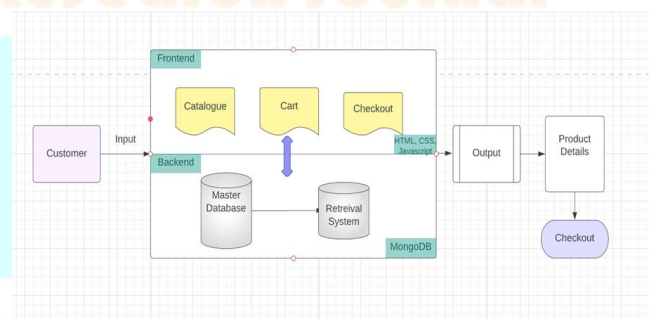
In this project, we have demonstrated a user friendly website as well as dedicated application for Ecommerce. The application helps the customer for online shopping in best way possible as well as the price Optimizer helps as a proper price decider. We have proposed a system where we are going to add various features in our existing system :

Sales analysis : A sales analysis is a detailed report that offers a more profound understanding of a business's sales performance, customer data, and the revenue. In essence, you can quantify and get insights on metrics like current and past sales, emerging trends, and so many others that matter to your business. A sales dashboard is a visual representation of your sales data. It provides an ocular overview of your KPIs so that your team can get an at-a-glance understanding and make data-driven decisions based on these visual insights. Presenting analytical findings in this way is achieved through business intelligence. It is done for better understanding of the Store Insights. This includes a graphical representation of various things such as Inventory stock management, Active Users as well as total revenue collected by sales.

Price optimization : Price optimization [7] is the use of mathematical analysis by a company to determine how customers will respond to different prices for its products and services through different channels. It is also used to determine the prices that the company determines will best meet its objectives such as maximizing operating profit. Price optimization helps businesses strike the right balance of efficient pricing, achieving profit objectives, and also serve their customers. Firstly, we use a demand prediction model to predict the next day demand for each product at a certain discount percentage. Next step, we use the concept of price elasticity of demand to get the multiple demand values by varying the discount percentage. Thus we obtain multiple price demand pairs for each product and we have to choose one of them for the live platform. Typically fashion e-commerce has millions of products, so there can be many permutations.

Payment gateway : Use to accept payment via debit card and credit card from the customers. We are using the payment gateway of PayPal. PayPal Invoicing enables you to send your buyers a professional invoice through our easy-to-customise templates. Featuring both mobile and desktop capabilities, you can conveniently create an invoice on your smart device or laptop and send it via email or by using a shareable link. What's more, setting up recurring billing is a breeze — simply create scheduled or recurring invoices to be delivered to your customers and PayPal invoicing will do the rest. Easily integrated into our webstore, PayPal Checkout accepts more than 10 local payment methods in over 100 currencies from more than 200 countries around the world, as well as credit or debit cards, PayPal or PayPal Credit.

Chat feature : Offering live chat support is the most effective way to respect your customers' time. It doesn't require your customers to leave their shopping experiences to get answers, and they don't have to get on the phone or to wait for someone to respond to an email. A friendly chat box offers instant support from a real person, which feels more like a traditional store experience than just having a phone number customers can call or an email address to contact. So the chat feature will make strong relationship between customer and seller



IV. METHODOLOGY

Product demand Forecasting: Forecasting is the process of predicting what will happen in the future by assaying literal data. It helps entrepreneurs plan for the query based on history and current patterns in the data. A time series is a sequence of observances, generally ordered in time. These in turn are divided into univariate and multivariate time series according to the number of dependent variables recorded over time. The colourful reasons that affect the values of an observation in a time series are called the constituents of the time series. These fall into four tiers.

1)Trend: In time series analysis, a trend is a movement to fairly advanced or lower values over a long period of time. When a trend pattern in data shows a general upward direction (advanced highs and advanced lows), it's called an uptrend. When a trend pattern in the data shows a general direction that goes down (lower highs and lower lows), it's called a downtrend. When there's no trend, it's called a vertical trend.

2)Seasonality Time series: data that shows a repeating pattern at a fixed time interval within a given time is known as seasonality. This is a common pattern seen in numerous time-series datasets.

3)A cyclical pattern: It is when the data shows rises and falls that aren't part of a fixed period of time.

4)Irregular inconsistencies: These are the residual series left over after detrending and the cyclic fluctuations of a data set, which may or may not be arbitrary. These changes are changeable.

LSTM, as an extension of RNN, has an excellent ability to predict time-series data. The main difference between RNN and LSTM is that LSTM can store temporary information over long distances and correctly map input and output data. The structure of an LSTM network differs from the traditional perceptron architecture in that it contains cells and gates that control the flow of information. As shown, an LSTM includes an input gate, a forgetting gate, an internal state (cell memory), and an output gate. In general, the LSTM is learned through the following steps: Calculate the output of the LSTM using equations (direct learning). For each layer, calculate the difference between the output data and the input data. The error is returned to the front door, the cell, and the oblivion door. Based on the error term, the weight of each gate is updated by an optimization algorithm. The above four-step process is repeated for a given number of iterations, and the optimal values of weights and biases are obtained.

Product price forecasting: Predicting a product's price is a delicate task because certain products with minor differences, such as distinct brands, new specifications, quality, demand for the product, etc., can cost significantly different amounts. When there is a wide range of products available, as is typical for the majority of online shopping platforms, price prediction becomes more delicate. The app allows merchandisers to list almost anything. Predicting the price of almost anything that appears on online platforms is extremely difficult. Product order names, brand names, and item conditions were all included in the text descriptions that the proposed system provided to users. A model that accurately predicts the price of a product listed in the proposed system must be developed using this data. It appears to be a standard regression issue

here. Due to its significance and fashionability among the general public as well as businesses of varying sizes due to its financial benefits and low risk, "Future Forecast" is the content in product pricing research that is growing at the fastest rate. A significant portion of the GPA is made up of the e-commerce sector, which has the potential to have a direct impact on consumer consumption patterns and the economy as a whole. As a result, accurate product pricing not only benefits the customer and the dealer but also serves as the foundation for steady, profitable growth. We proposed a framework to further develop precision by tending to the downfalls of customary styles of comparison such as subjectivity and observation. The product's price can be predicted using the proposed system's OLS regression method. Using dependent and independent variables, the OLS regression system analyses and estimates price. The sum of places in the difference between the factual and predicted values can be reduced using this system. OLS regression is discussed in the context of a bivariate model, i.e., in this paper. of a model with only one independent variable (X) and one dependent variable (Y) that predict each other. Nonetheless, the multivariate model, in which there are two or more independent variables, makes full use of OLS regression. The given data provide the basis for this estimated number of locations; each data point's distance from the regression line is squared, and any squared errors are added.

Rasa Chatbot: Chatbots are programmes that simulate human conversation. These can range from simple rule-based chatbots, where the user is limited to clicking on buttons or suggested replies that the bot provides, all the way to fully-fledged bots that can handle context, chitchat, and other complex things that are otherwise very common in human conversation. Rasa is an open-source framework to build text- and voice-based chatbots. It's working at Level 3 of conversational AI, where the bot can understand context. A level 3 conversational agent can handle things like the user changing their mind, handling context, and even unexpected queries. This rasa has three types.

1) Intent: Intent is for the user, such as what types of questions the user can ask; rasa refers to this as an intent. If the user wants to ask some questions regarding wash, then we can add all the queries under "product-wash intent." When Rasa receives a similar question or query from a user, it will classify it as belonging to the product-wash intent and respond to it.

2) Entities: This is the list of data that is extracted from the sentence. As an example, if a user inquires about a product called "wash," the bot should respond with relevant information. The bot is trying to figure out what the user is trying to say.

3) Stories: This contains a mapping of user queries and bot answers. So, while training the rasa chatbot, we must tell it what type of answer it should provide if a user asks a question about any of the intents.

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REFERNCES

- [1] Dynamic Price Optimization for the Future of E-commerce by Anusha.B, Sangeetha H.S, Riyanka R., Sushmitha N., Chitra R.
- [2] Price Optimization in Fashion E-commerce by Sajan Kedia, Samyak Jain, Abhishek Sharma
- [3] Analysis and Optimization of Online Sales of Products by Dr.Zainab Pirani, Anuja Marewar, Zainab Bhavnagarwala and Madhuri Kamble
- [4] A sale-oriented product management method for e-commerce by Yoshitaka Sakurai, Takashi Kawabe, Takahiko Sakai, Kouhei Takada, Setsuo Tsuruta and Mizuno Yoshiyuki
- [5] Developing an E-Commerce Website by Syed Emdad Ullah, Tania Alauddin and Hasan U. Zaman
- [6] Growth of E-commerce in India by Madhurima Khosla, Harish Kumar
- [7] Price Optimization, Retrieved December 22, 2021, https://en.wikipedia.org/wiki/Price_optimization
- [8] OLS, Retrieved October 9, 2021, https://en.wikipedia.org/wiki/Ordinary_least_squares
- [9] Graph, Retrieved January 29, 2022, <https://en.wikipedia.org/wiki/Chart>
- [10] Existing Block diagram of E-commerce, Retrieved September 11, 2021, <https://present5.com/e-commerce-website-development-by-indicsoft-technologies-e-commerce>.