Pre-Co: The Next Generation of E-commerce

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ABSTRACT

In the COVID-19 situation, most companies had to face huge losses, and many companies started to do their business online. Global users of e-commerce applications have increased during the past two years. Then lots of companies wanted a new e-commerce application that could give more facilities than the existing e-commerce applications. The main objective of this project is to create an application that can provide more functionalities to users than existing e-commerce applications. The author has identified certain requirements from a survey. This project is based on users' recommendations and suggestions. system requirements are readily accessible and easy to operate. This e-commerce application will result in a user-friendly, dependable, and efficient application. Customers of the system will be able to predict the price of the given product using a price prediction system. This application contains a voice assistant to guide users through the system. This e-commerce application will provide an efficient platform to connect sellers and buyers.

Sellers will receive a chatbot to interact with their customers. On the other hand, the previously mentioned price prediction system will help all citizens of the country to have a better idea of the variation of the price of the product.

Key Words: *Machine learning, Voice assistant, Price prediction, Chat Bot, E-commerce, Web application.*

1. INTRODUCTION

Electronic commerce involves sharing business information, maintaining business relationships, and conducting business transactions by means of telecommunication networks' commerce. Users can visit an online marketplace and place an order for goods or services and use their own equipment, and e- commerce is influenced by the internet. Most merchants and customers moved on to e-commerce platforms. E-commerce is conducted to serve a wide variety of uses, including e-mails, internet compilations, shopping trolleys; data transmission (EDI), syncing; web technologies, and wireless devices. This project will definitely help to overcome those who are facing the previously mentioned difficulties with new features. The Pre co-application introduced in the project has more functions than normal e-commerce applications. This application contains a price prediction system, voice assistant, and chatbot.

Price prediction uses algorithms to evaluate a product based on its own characteristics, demand, and trends in the market (CBSL, 2022). Then the operating system sets the price at a level it tries to predict will both attract more customers and promote sales. Price prediction machine learning is among the most effective tools in every company's toolbox. Because electronic price forecasting can allow you to stay in alignment with your industry and, finally, improve the efficiency of your sales process.

A voice assistant also named a smart personal assistant or a linked presenter, is a new type of product introduced to the market by Apple, Google, and Amazon and is known as natural language voice recognition. Chatbots are computer programs that automatically respond to messages. Chatbots can be programmed to respond the same way at all times, to respond differently to messages containing specific keywords, or even to use machine learning to change their responses to that situation.

Automating your procedures as much as possible is one way to stay competitive in modern business. Self-inspection in grocery stores and ordering in-store are examples of this trend.

This program will be very helpful because it won't just assist consumers in making purchases; the voice assistant of the system will also help users navigate the application, and purchasers of this application will have access to the price prediction system.

Although the developer of this program made every effort to reduce the likelihood of data entering errors, it is still possible for errors to occur. As a result, the developer set up error alerts for users to see if they enter erroneous data into the system. To use this service, a user needs no special abilities. The system's facts collectively demonstrate that it will be designed to be user-friendly for all system users. The Pre-co web application can help a large number of buyers and sellers do their transactions. This application will help customers to connect with sellers according to their needs. This process can be done by spending a small time period in the system.

There are various sections in this project; signup and sign in; chatting (a chatbot will respond to a buyer), searching for products, etc. Sellers can get messages and orders from buyers all over the world.

2. LITERATURE REVIEW

2.1. E-Commerce

Users can visit an online marketplace and place an order for goods or services and use their own equipment, and e-commerce is influenced by the internet. The customer's search engine will connect to the server that includes the online store webpage as the order is placed. The purchase supervisor then communicates the information to database systems that preserve stock levels, a merchant system that appears to be able to receive payment information (utilizing apps like Payment Gateway), and a financial institution laptop, before going back to the order manager (Altexsoft, 2019). This is designed to ensure that the firm's equity and customer cash can complete the purchase. The buying manager will inform the browser after the purchase has been confirmed, and the web application will also display a message informing the consumer that their sequence has indeed been properly processed. In order for the service or product to be successfully sent to the buyer, the purchase boss would then offer up customer orders to the warehouse storage or fulfillment section. A customer may obtain actual or electronic goods at this present time, or connectivity to a provider may be granted. E-commerce is conducted to serve a wide variety of uses, including

e-mails, internet compilations, shopping trolleys; data transmission (EDI), syncing; web technologies, and wireless devices. It would also involve business-to- business actions as well as community engagement, like using email for unprompted ads, widely perceived as junk mail, to clients as well as other future growth, and sending out e-newsletters to subscribers and text message texts to mobile devices. So many 21 businesses presently try to entice personal customers online using methodologies such as digital coupons, online marketing, and targeted advertisements (PricePrediction, 2022). An e-commerce framework is a tool used to manage an e- commerce business. There are e-commerce platform options for customers that vary in size, from start-ups to large enterprises. These e-commerce devices include online markets, including eBay and Amazon, which require full user registration and no IT activation. Another e-commerce platform is SaaS, which can help shoppers ``rent'' internal development as well as cloud hosting space that does not require infrastructure. Other e-commerce systems can take the form of cloud infrastructure (cloud or premises), open-source projects that require full management and implementation.

2.2. Price Prediction

Price prediction uses algorithms to evaluate a product based on its own characteristics, demand, and trends in the market. Then the operating system sets the price at a level it tries to predict will both attract more customers and promote sales (Rojewska, 2021).

Every company wants to earn a profit. And technology can help. Price prediction machine

learning is among the most effective tools in every company's toolbox. Because electronic price forecasting can allow you to stay in alignment with your industry and, finally, improve the efficiency of your sales process. In some groups, the process is called price predicting or predictive pricing.

Furthermore, some people are extremely skeptical of it (Team, 2022). That is because more experienced teams often feel they have such a firm understanding of their manufacturing prices. Technical analysis looks at historical prices, economic growth rates, and other relevant factors and sets an approximate price. Then, to get a more accurate picture of the market, the process turns to basic analysis (Kumar, 2020).

The move looks at various external and internal factors, including macro factors such as season and micro-influences such as time of day, trying to find out when a customer is most likely to make a purchase. 24 In mathematics, these methods are called regression analysis. Which would be a numerical way of predicting the relationship among variables (one variable and one — or even more — predictor variables). In price forecasting, the cost is the independent factor. And it's impacted by several response variables.

3. SYSTEM DEVELOPMENT PROCESS

3.1. Problem identification and information gathering

Because the programmer intends to create a platform that won't be suited for Sri Lankan users just, the pre- co e-commerce application is based on the thoughts and ideas of 142 citizens who are from six different countries. The author has gathered information from a variety of sources that represent many cultures and viewpoints. While addressing the sellers' commercial needs, this application can be used on a global scale. The system's requirements were obtained by the developer prior to system development using a questionnaire.

3.2. Existing Price Prediction Systems

There are a huge number of e-commerce applications that are operating at the moment. eBay, Amazon, and others are examples. However, it was found to be ineffective in meeting the demands of an expanding business. Consumers should make a plan to arrange their budget on their own The current e-commerce platform is built in a user-friendly way, but there are things that can be improved.

3.3. Drawbacks in the Existing Systems

A number of issues affected the most recent implementations. If a consumer wants to buy a product, they should reach the shop and find the product. If a customer needs to reach the shop, it will be a waste of time. When it comes to pandemic time periods, it will get worse. In the normal course, merchants should recruit more employees compared to an e-commerce platform. When it comes to the order receiving process and issuing the products, the shopkeeper should maintain a large number of records, and finding a past transaction will be a complicated process. Security of records is a huge challenge for current retail shops.

3.4. Assumptions and Limitations of the project

Statements that are presumed to be true are known as assumptions. During the project, it had to make several assumptions. This program primarily serves as a fish-selling program. The price of the product and the demand for that product has a negative relationship when one takes into account the price prediction systems that have been put in place for consumers. There are various circumstances that are difficult to categorize.

3.5. Security of the application in the project

When considering the security of the application, there are some limitations.

- Two-step verification

Two-step verification is the best security method identified. Two-factor

Authentication If someone knows the username and password of another person, that person will be able to log in as the first person. It's very important to prevent.

- Face identification/recognition

Face recognition is a good security method to validate the user, and many users expect it from

systems. This will be for future implementations of the project.

4. FINDINGS

4.1. Price Prediction Algorithm Development

Fishermen and retail sellers will give their fish quantities to the wholesalers. Then wholesale sellers sell those products and take a commission and give money to the fishermen. On a given day, there are lots of transactions that can happen. Considering a random day,

1) Small quantities will be sold to customers at varying prices.

2) Retail sellers can provide different sizes of fish.

3) Quality sizes can be obtained from retail sellers.

These variables will calculate the average of each factor. These are the inputs and calculations that the author has made to predict the price.

After calculating each factor of a day, data will be ready to import as an input to the model.

Price prediction is calculated through a polynomial regression model. Polynomial regression (HAYES, 2022) is a type of linear model named a special case of multiple linear regression which quantifies the relationship as an nth degree polynomial. Even though polynomial regression is robust to outliers, the existence of one or two exceptions can adversely affect achievement.

Fish prices are changing day by day due to several factors. This equation is true if the price of fish doesn't change day by day.

$$y=k \quad (1)$$

(Y-Fish price, K-constant)

If fish prices change due to one reason only, this equation is true.

$$y=mx \quad (2)$$

Y-Fish price, m-Coefficient, x–Factor affects fish price)

In this system Price prediction will be given using multiple linear regression. Multiple linear regression is a technique that can give a prediction after studying multiple independent data sets. This technique can be considered as an extension of simple linear regression. Fish prices can be changed due to the variation of different factors.

$$y=m1*x1+m2*x2+m3*x3+\ldots+mn*xn \quad (3)$$

(y-Price (Dependent variable), m-Coefficient, x-Factors affecting the fish price (Independent variables))

Price will be predicted according to this equation but there can be error when prediction is happened,

$$\acute{y}=m1*x1+m2*x2+m3*x3+\ldots+mn*xn \pm E \quad (4)$$

(ý-Actual price of a given date, E-Error of the prediction)

4th equation will give the actual fish price of the date. 3rd equation to 4th equation,

$$\acute{y} =y\pm E \quad (4)$$

When E (Error of the prediction) =0,

$$\acute{Y}=y \quad (5)$$

Actual price=Predicted price.

4.2. Price Prediction system

The price of a kilogram of (yellow-finned) tuna will be predicted using this technique. The author spent five days conducting research at the fish market before putting the price prediction technique into action. The goal of the project's real-time data collection and analysis was to pinpoint the variables that influence fish pricing. After then, two months' worth of data were collected and processed to reach the goal. The forecasts made by this price prediction system will be based on user-inputted historical data. With the help of a voice assistant and a machine learning model, this system will forecast prices. The prediction will come from the system after it

has examined the variables influencing fish pricing.

The price prediction system was implemented by Python. Several Python libraries were required by the project to create the system for price prediction.

Table 1: Python libraries used in price prediction system

Python Library	Reason for using the library
Pandas	Pandas' library will help to analyze data. Author has used the pandas library to read the csv file which contains all processed data.
sklearn.linear_model (package)	The sklearn machine learning library was commonly used for statistical modeling. Author has used this package to implement multiple linear regression models.
pyttsx3	This library will convert text to speech. Author has used this library to speak to the user.
matplotlib.pyplot (package)	matplot library is mainly used to draw charts. This library has been used to draw charts showing independent

4.3. Voice Assistant

Voice assistant was implemented by python. Author had to use several python libraries to implement voice assistants.

Table 2: Python libraries used the voice assistant

Python library	Reason for using that library
pyttsx3	This library will convert text to speech
speech recognition	This library will be used to recognize the user's voice and to convert the user's voice command to a text.
datetime	This library is mainly used with date and time. Author has used this library to tell the time to the user according to the user's preference.
pywhatkit	Pywhatkit was used to play background music. Author has used this library to redirect to youtube and play the music.
subprocess	A Python subprocess was used to close the system.

4.4. Chatbot

Python was used to construct the chatbot. The project implemented chatbots using a number of Python packages.

Table 3: Python libraries used the chatbot

Python library	Reason for using that library
pyttsx3	The author has used this library to greet buyers by voice.
	The author has used this library to reply to buyers' voices.
datetime	The author has used this library to check the time. The Bot will check the time and send the greeting according to the time.

5. CONCLUSIONS AND FUTURE APPLICATIONS

This project's primary goal is to build an e-commerce platform that will provide more features than current e-commerce applications. All country residents are having a very difficult time right now. There are many travel restrictions and lockdowns during this time. Due to this, the majority of firms tended to conduct these transactions online. As a result, more people are using e-commerce platforms. The facilities' expectations may rise along with the number of accounts, which will be increased. Information was acquired by the author from questionnaire surveys that were carried out in six different nations. 95.8% of the responses to the poll indicate that more facilities are desired than are offered by the current e-commerce software. This e- commerce platform contains a price prediction system. The prediction system will give a prediction after considering several factors. This price prediction system, which has been implemented using machine learning, will help users in several ways.

- Consumers will get to know future prices accurately. This will help them to make arrangements.
- This price prediction system can analyze multiple data points and accurately predict the price.
- Pre-co is operated as an e-commerce platform. There are several implementations that can be done in the future. Developers should definitely think of that also.

These are the future implementations that the author has proposed.

Currently, pre-co is operated as a web application. In the future, mobile applications and desktop applications will be released.

The following system contains a price prediction system to predict the price of fish. In the future, it will be implemented to predict the price of other food items.

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