



PRICE NEGOTIATING CHATBOT WITH TEXT AND VOICE ON E-COMMERCE WEBSITE

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Abstract: Due to the central This abstract explores the concept of a price negotiation chatbot designed for e-commerce websites. The chatbot would utilize both text and voice interfaces to facilitate a more natural and interactive bargaining experience for customers. By leveraging Natural Language Processing (NLP) techniques, the chatbot would comprehend user intent and respond accordingly during negotiations. The system would employ a negotiation module to analyze historical data and predict the minimum acceptable price for a product. This allows the chatbot to engage in dynamic negotiations, proposing prices within a pre-defined range. The integration of voice interaction enhances the user experience, mimicking real-life bargaining scenarios. This approach caters to customers who prefer a more conversational method of negotiation. In recent years online shopping has gained a huge boom. With this increase, most of the features of online shopping are developed but some features like negotiating with shopkeepers are not available which is sometimes possible in offline purchasing. We have implemented a chatbot for negotiating on the products.

Index Terms – Chatbot, E-commerce, Price negotiation, Text-based chatbot, Voice-based chatbot, Artificial Intelligence (AI), Online shopping, Customer service, User experience, Natural Language Processing (NLP), Machine Learning, Customer interaction.

I. INTRODUCTION

The online shopping experience, while convenient, often lacks the thrill and flexibility of in-person negotiation. Customers crave the ability to secure the best possible price, just like they would at a brick-and-mortar store. This project aims to bridge that gap by introducing a novel price negotiating chatbot for e-commerce websites. This chatbot will leverage the power of text and voice interaction to create a dynamic and engaging experience for customers. This innovative solution addresses a crucial aspect of online shopping: price. By incorporating negotiation capabilities, the chatbot empowers customers to actively participate in determining the final price. This not only enhances customer satisfaction but also fosters a more interactive and personalized shopping experience. E-commerce websites today apply various AI techniques to determine most liked products or most sold products which eventually are calculated to provide an effortless search for customers shopping on their website. But at times when the best products are sold at high prices, customers have to compromise on their product. There are also some other problems that customers may face on low cost products. These problems can be eliminated by giving them an opportunity to negotiate on the products. Negotiation is a combination of both linguistic and reasoning problems. Negotiation is the process of exchanging the highest likelihood of satisfying the needs of both parties. The first party i.e. product seller will provide a minimum price along with the product data that he/she can afford to sell the product at. This price and the product price before negotiation (original price) are the limits for our algorithm. The chatbot is implemented on the website which uses flask APIs to connect to UI so that we can depict real life implementation of our model. A chat bot is an artificial intelligence (AI) software that can simulate a natural language conversation (or chat) with a user via messaging applications, websites and mobile apps or by telephone. Chatbots can solve most of the customer queries without need for a customer executive. The chatbot uses NLP techniques to identify the user intent and replies accordingly. Besides all these practices, chatbot will also automate the process of negotiation on E-commerce websites. Such a system will help the users to freely interact with the software and upload their product related queries and budget to get the response related to the query. Just like retail and logistics companies use data to plot the most efficient route to deliver

goods . It will bring a huge impact on sales and number of customers on the website. The customers will most likely increase due to getting online products at their fair prices.

II.LITERATURE SURVEY

The integration of chatbots with e-commerce platforms has revolutionized customer interaction, but a new wave focuses on incorporating price negotiation functionalities. This survey explores the growing field of price negotiating chatbots with voice and text capabilities for e-commerce websites.

Benefits and Applications:

- **Increased Customer Satisfaction:** Negotiation allows customers to feel valued and can lead to a more positive buying experience.
- **Improved Conversion Rates:** By offering negotiation options, businesses can attract price-conscious customers and potentially close more deals.
- **Streamlined Sales Process:** Chatbots can handle basic negotiations, freeing up human representatives for more complex interactions.
- **Personalized Offers:** Chatbots can leverage customer data and buying habits to personalize negotiation strategies.

Technical Considerations:

- **Negotiation Algorithms:** Machine learning and decision theory algorithms can guide the chatbot's negotiation tactics based on pre-defined rules and product margins. (e.g., Support Vector Machines (SVM))
- **Voice and Text Recognition:** Integrating Natural Language Processing (NLP) allows the chatbot to understand and respond to both spoken and typed customer requests.
- **Sentiment Analysis:** NLP can be used to analyze customer sentiment and adjust negotiation strategies accordingly.

Existing Research:

Several studies explore the development and implementation of price negotiating chatbots:

- **"Price Negotiating Chatbot on E-commerce website" (IRJET, 2020):** This paper proposes a chatbot that negotiates prices within pre-defined limits while considering customer satisfaction.
- **"E-commerce Chatbot for Price Negotiation" (IRJMETS, 2019):** This study highlights the importance of negotiation in e-commerce and explores the chatbot's role in facilitating customer-seller interaction.
- **"Price Negotiating Chatbot with Text & Voice on E-commerce website" (Journal of Critical Reviews, 2017):** This research emphasizes the need for accurate price prediction models to ensure profitable negotiations for both customers and businesses.

Challenges and Future Directions:

- **Balancing Customer Satisfaction and Profitability:** Chatbots need to strike a balance between meeting customer demands and maintaining acceptable profit margins.
- **Ethical Considerations:** Transparency and fairness should be maintained throughout the negotiation process to build customer trust.
- **Advanced Negotiation Strategies:** Research into more sophisticated negotiation tactics that can adapt to various customer behaviours is ongoing.

III. METHODOLOGY

This document outlines the methodology for developing a chatbot that allows customers to negotiate prices on your e-commerce website using both text and voice interfaces.

1. Requirements Gathering and Analysis

- Define the functionalities of the chatbot.
 - Can customers initiate negotiation on all products or specific categories?
 - What is the minimum discount the chatbot can offer?
- Analyze competitor solutions (if any) for price negotiation chatbots.
 - Identify strengths and weaknesses to create a differentiated experience.
- Gather user data through surveys or focus groups to understand:
 - Customer comfort level with voice and text negotiation.
 - Preferred negotiation styles (direct discount, bundled offers etc.).

2. System Design and Architecture

- Design a dialogue flow for the chatbot considering both text and voice interactions.
 - Develop branching paths based on user input and negotiation stages.
 - Include natural language processing (NLP) capabilities for voice and text understanding.
- Develop a negotiation strategy with pre-defined rules and limitations.
 - Set minimum and maximum discounts based on product category, profit margins etc.
 - Integrate with the e-commerce platform for real-time product data access.

3. Development and Integration

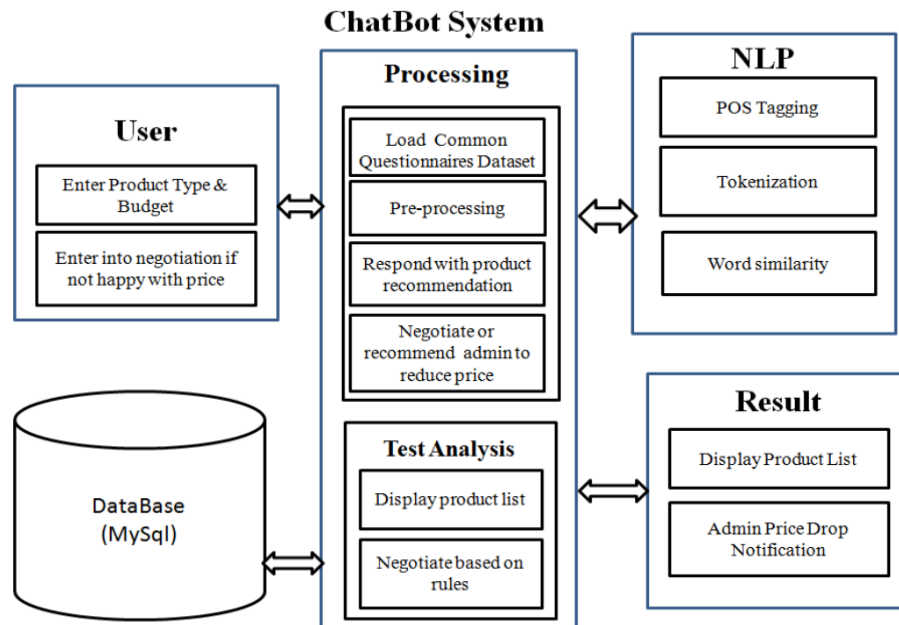
- Develop the chatbot using a suitable framework that supports text and voice functionalities.
- Integrate voice recognition and text-to-speech functionalities for seamless user experience.
- Integrate the chatbot with your e-commerce platform for functionalities like:
 - Product information access
 - Shopping cart management
 - Secure payment processing

4. Training and Testing

- Train the chatbot on a large dataset of customer dialogues related to price negotiation.
 - Include diverse negotiation styles and scenarios for improved accuracy.
 - Utilize machine learning techniques for continuous learning and improvement.
- Conduct rigorous testing with a focus on:
 - Functionality of voice and text interfaces
 - Effectiveness of the negotiation strategy
 - User-friendliness and naturalness of conversation flow

5. Deployment and Monitoring

- Deploy the chatbot on your e-commerce website with clear instructions for user access.
 - Consider offering a separate negotiation button or integrating the chatbot into the product page.
- Monitor user interactions with the chatbot and gather feedback through surveys or polls.
 - Analyze negotiation success rates and customer satisfaction levels.
- Continuously improve the chatbot by:
 - Updating the dialogue flow based on user feedback.
 - Refining the negotiation strategy for optimal outcomes.



IV. IMPLEMENTATION

1. User Management:

- **Technology:** Utilize a database like MySQL or PostgreSQL to store user information (credentials, profile details).
- **Implementation:** Develop a login/signup module using a framework like Django or Spring Security.

2. Product Browsing:

- **Technology:** Store product information (name, description, price, images) in the database.
- **Implementation:** Develop a user interface using a front-end framework like ReactJS or AngularJS to display products. Integrate with the database to fetch product details.

3. Price Negotiating Chatbot:

- **Technology:**
 - Text-based: Utilize chatbot frameworks like Dialogflow or Rasa for NLP and conversation management.
 - Voice-based: Integrate with cloud-based services like Google Cloud Speech-to-Text or Amazon Transcribe for voice recognition. Text-to-speech conversion can be achieved with similar services.
 - Negotiation Logic: Implement a negotiation strategy using pre-defined rules (minimum/maximum discounts), product information, and potentially machine learning for price prediction.

4. Order Management:

- **Technology:** Store order details (product ID, quantity, price, user ID) in the database.
- **Implementation:** Develop a system for users to add products to a shopping cart and complete the purchase. Integrate with a payment gateway for secure transactions.

5. Review System:

- **Technology:** Store reviews (product ID, user ID, rating, comment) in the database.
- **Implementation:** Develop a module for users to submit reviews and display existing reviews for a product.

6. Machine Learning Integration:

- **Price Prediction:** Train a machine learning model on historical data (sales, product features) to predict a reasonable starting price for negotiation.
- **Sentiment Analysis:** Train a model to analyze user text/voice input during negotiation and adjust negotiation strategy based on sentiment (positive, negative).

7. Audio Processing:

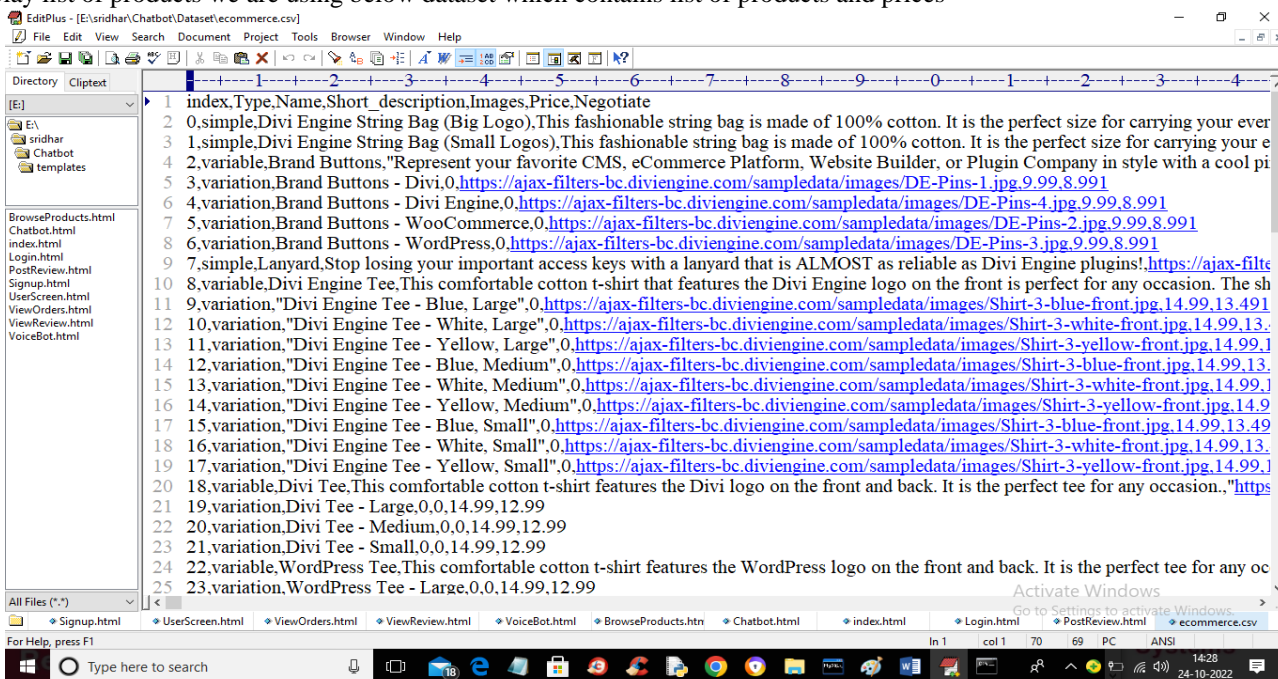
- **Technology:** Integrate cloud-based services like those mentioned earlier for real-time conversion of voice input to text for chatbot processing.

V.Experimental Results:

In this project we have designed E-commerce application where user can browse products list and then select Chatbot as Text or Voice and then negotiate with Chatbot. Chatbot will understand two types of voice command such as ‘first price’ which will give reasonable price to the customer and if customer not satisfy then it will ask for ‘final price’ and then Chatbot will add another 10% discount as final price and then serve to customer.

If say another word other than ‘first price’ or ‘final price’ then Chatbot will give error.

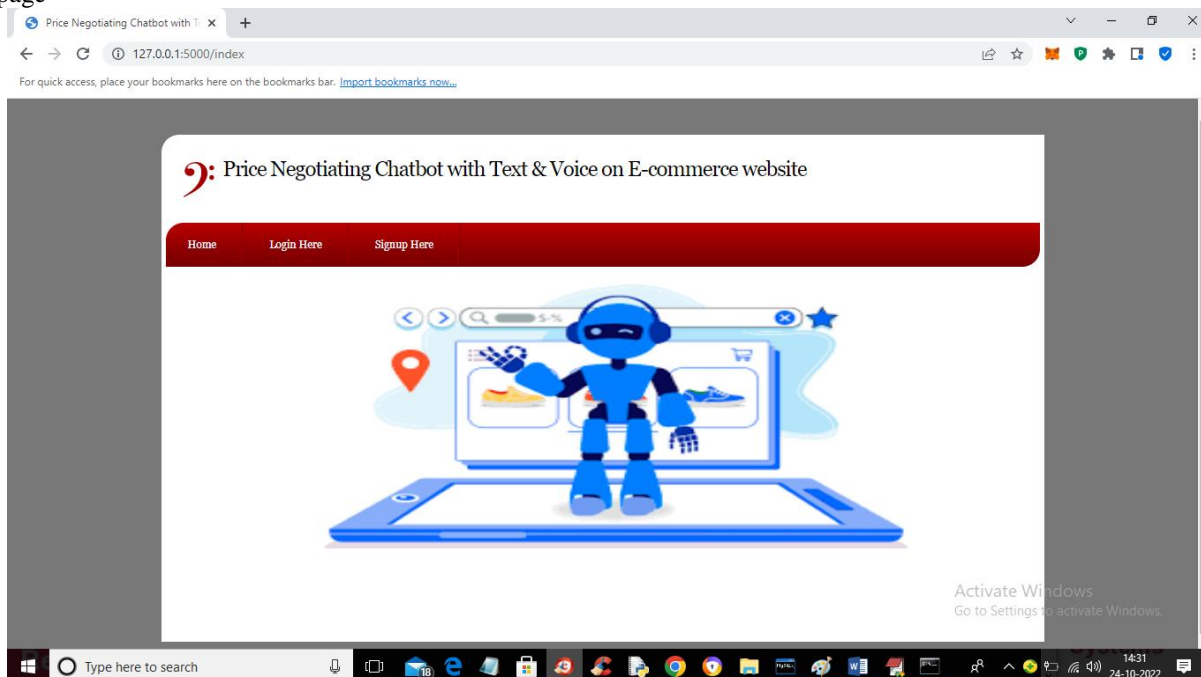
To display list of products we are using below dataset which contains list of products and prices

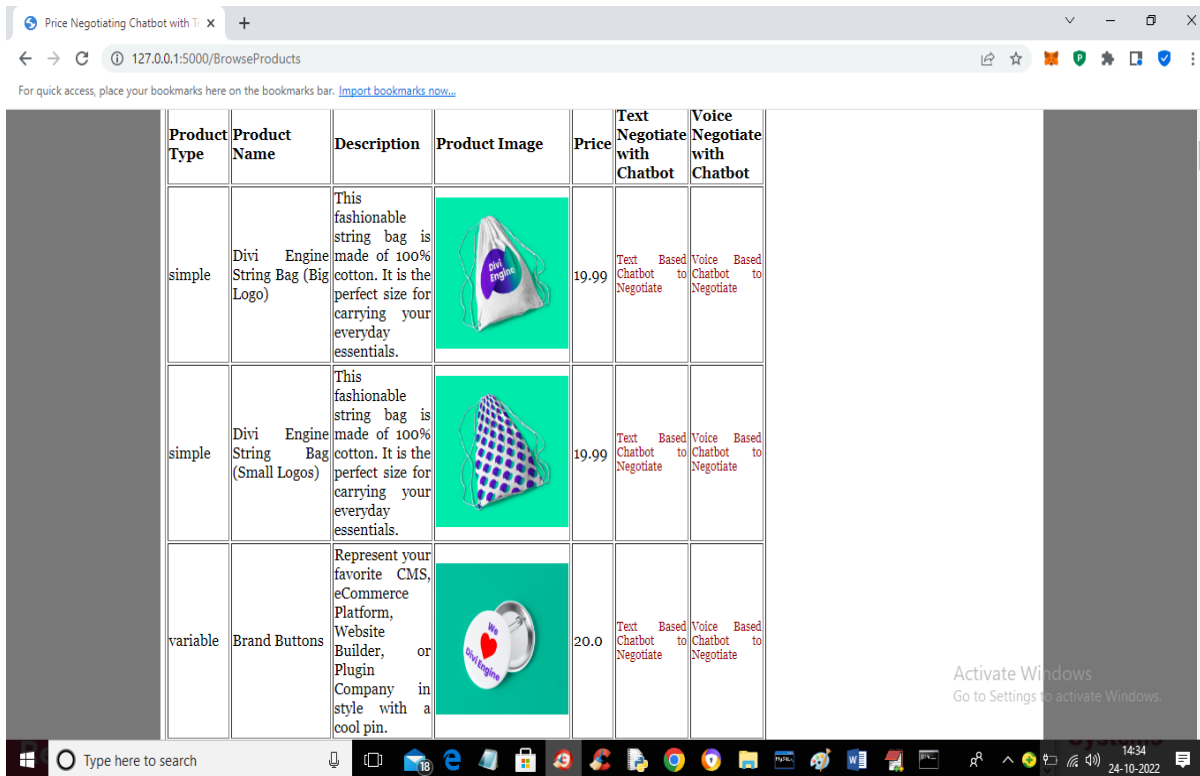


in above dataset we have list of products and its images and in last column we have Actual Price and negotiable price and using this list we will serve products to customers and Chatbot will use above dataset to get actual price and negotiable prices.

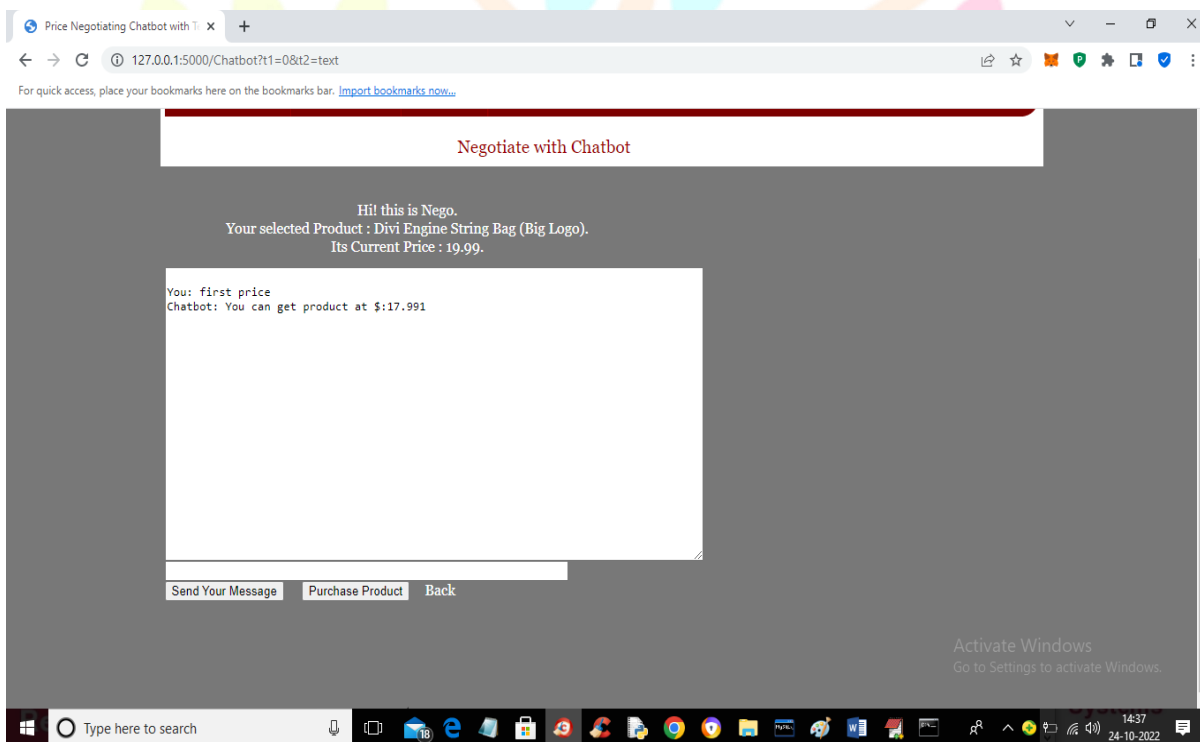
To run project double click on ‘run.bat’ file to get below screen

In above screen python Webserver started and now open browser and enter URL as ‘http://127.0.0.1:5000/index’ and press enter key to get below page

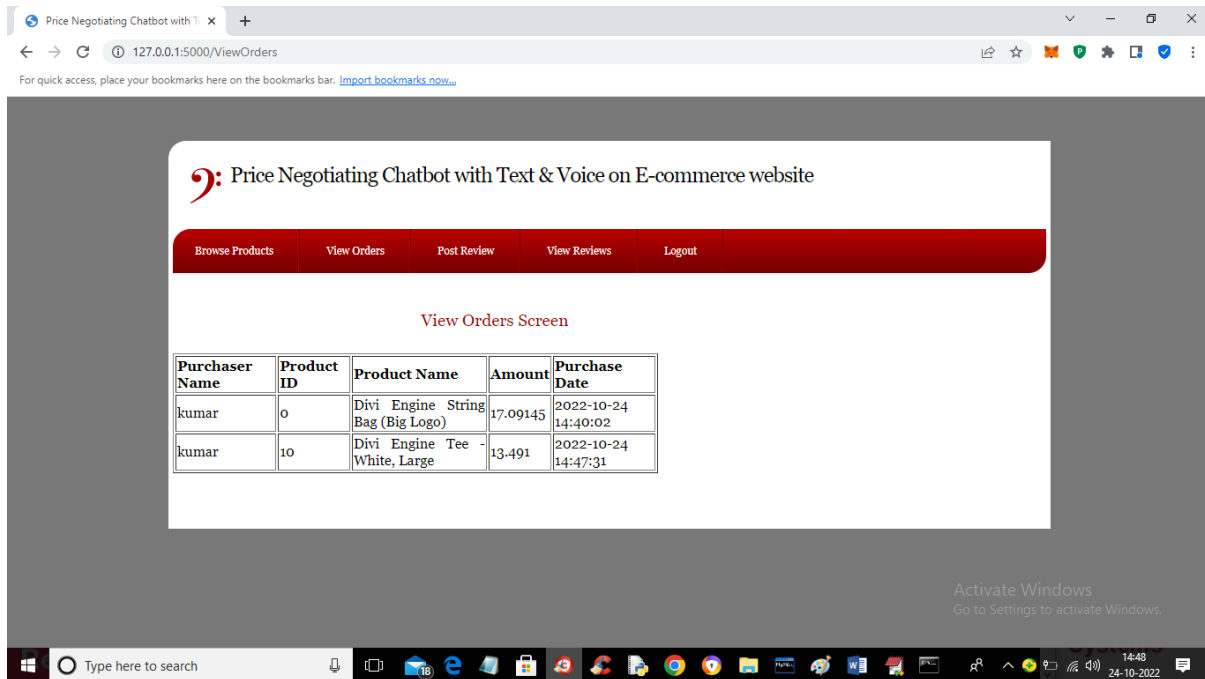




In above screen user can see list of products with actual prices and have red colour links to chat with Chatbot using text and voice and now I will click on ‘Text Chatbot Negotiate’ link to chat with text like below screen



In above screen from Chatbot we got negotiate price as 17.99 from actual price 19.99 and now ask for final price and get below output In above screen for final price Chatbot offer 17.09 and now if customer satisfy then click on ‘Purchase Product’ button to confirm order and get below output



VI. Conclusion :

In Conclusion, The negotiation on products is a challenging task when it comes to e-commerce systems. We tried a primary chatbot that covers many aspects and cases for negotiation but is not chatbot which we created sometimes falls to the price customers ask for though it is always greater than minimum price but may result in loss for seller if it goes the same for many customers. Such situations have to be as SVM, KNN but in future there may be some better price prediction algorithms which can be used the ways in which a user can better negotiate with chatbot and get cheaper is considered to be better when it comes to negotiation, this can be added to our application. An example can be Apple's Siri which has huge knowledge base to provide satisfactory outcomes The price negotiation chatbot project represents a sophisticated fusion of modern technologies to deliver a seamless and personalized shopping experience. Leveraging Flask as the web framework, the application boasts a robust architecture that enables smooth communication between users and the system. The utilization of MySQL as the backend database ensures efficient storage and retrieval of critical information such as user credentials, product details, purchase history, and reviews. This structured data management system forms the backbone of the application, allowing users to navigate through a vast array of products and engage in negotiation processes effortlessly. At the heart of the chatbot lies its machine learning algorithms, namely Support Vector Regression (SVR) and K-Nearest Neighbors (KNN), meticulously trained on historical pricing data. These algorithms empower the chatbot to accurately predict optimal prices for products, thereby assisting users in making informed purchase decisions. By harnessing the power of predictive analytics, the chatbot enhances user satisfaction by offering competitive and transparent pricing. Additionally, the integration of sentiment analysis through the VADER SentimentIntensityAnalyzer adds another layer of sophistication, enabling the chatbot to analyze user reviews and gauge sentiment accurately. This capability aids in providing personalized recommendations and addressing user concerns effectively. Furthermore, the application's comprehensive feature set, including user authentication, product browsing, order management, and review submission, ensures a holistic shopping experience. Through an intuitive and user-friendly interface, customers can effortlessly navigate the platform, negotiate prices, explore product offerings, and share their feedback. This seamless integration of advanced technologies and user-centric design principles underscores the project's commitment to delivering a cutting-edge solution that caters to the evolving needs of modern consumers. Overall, the price negotiation chatbot project exemplifies innovation and excellence in leveraging technology to redefine the retail landscape and elevate the online shopping experience. user has limited control over the style or musical elements of the generated music

VII. Acknowledgement:

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