



AI-Driven Negotiation Chatbot for Dynamic Pricing in E-commerce Platforms

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ABSTRACT: *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. The Chatbot interacts with customers and assists them to get a satisfactory price on product(s). With such a system, which impacts on major areas of online shopping there are possibilities in which either the seller of the product or customer's budget gets compromised. To avoid such situations, we have developed an algorithm which works along with prediction of old available data to provide a price. Price prediction has less accuracy at times because either irrelevant features/attributes of data are used or some algorithms are not suitable for a particular dataset. Due to this, Ecommerce business does not directly rely on price prediction systems since even a wrong prediction of a single product can result in business losses. Some models also fail when data scales or some feature is unavailable after time on which model prediction was dependent. Then those changes are to be managed to maintain the accuracy and reliability of the model. In*

our Chatbot system we have tried to resolve some of such issues.

Keywords: Accuracy, reliability, Chatbot, prediction, possibilities, compromised, developed, ecommerce, compromised, business, linguistic.

I. Introduction

In recent years that means after pandemic (Covid-19) most of the businesses are running in online, for making the shopping process easy and simple to the customers. In this e-commerce there is more chances to sell the product for high cost, which is not a reasonable price for the customer. For this reason, we are introducing a "Chatbot " to negotiate the price of the product, without having any loss to customer as well as the seller.

A Chatbot is nothing but a computer program or a robot which will be respond to the customer in the form of messages. Chatbot is designed to resolve customer query at the moment, also visually impaired people to purchase the product. It is very helpful for the visually inspired people to purchase the product with the help of Chatbot.

E-commerce website to determine most liked products or most sold products which eventually are calculated to provide and effortless cells per customers shopping on

their website. But at this time when the best products are sold at high prices customer must compromise on the product and there are also some other problems that customer may face on low-cost products. To eliminate these problems by giving them an opportunity to negotiate the price of the product.

Negotiation is a combination of both linguistic and reasoning problems. Negotiation is the process of exchanging the high likelihood of satisfying the needs of both parties. The first party that is product seller will provide a moment price along with the product data that he/she can afford to sell the product at. This price and the product price before negotiation are limits from our algorithm.

This intuitive Chatbot is designed to expertly navigate the negotiation process providing you with tailored strategies and real time feedback by leveraging advanced algorithms and market data our assistant enables you to make informed decisions, and build confidence in your negotiation skills and ultimately drive better outcomes.

Chatbots for e-commerce are typically designed to:

1. Complete the buyer's purchases.
2. Offer the buyers product recommendations.
3. Provide customer support.
4. Gather feedback from the customer based on their experience.
5. Interact with the customer regarding shipping and return information.
6. Gather the product information from the seller.

II. Challenges

In the process of designing Chatbot we may face the challenges like handling ambiguity and nuances, accents dialects and speech variations, complex sentence structures, context management and real time processing.

When understanding the entered behind user into specially in voice conversations where tone and intonation can add layer of meaning. Voice recognition accuracy can be

significantly affected by different accents, regional dialects, and speech impediments. Both voice and text input can contain complex sentence structure and understand accurately. For maintaining context across multiple terms of negotiation numbering previous offers and understanding references to earlier parts of conversation this is partially challenging in longer voice conversation analysing and responding to the user into with minimal latency is crucial for your natural conversation flow in both voice and text delays can lead to user frustration.

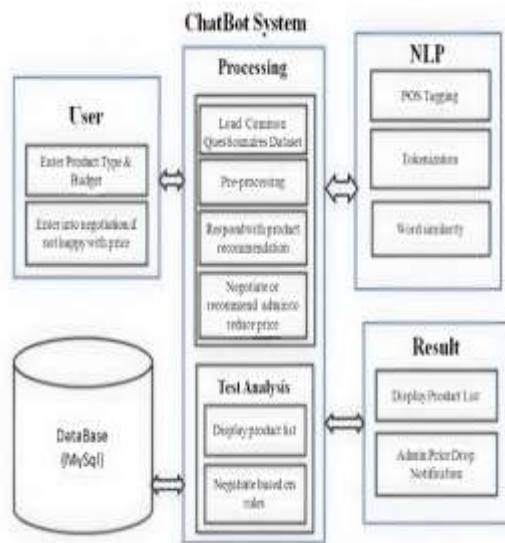
Machine learning and decision theory algorithms can guide Chatbot's negotiation tactics based on predefined rules and product margins. Integrating NLP (natural language processing) allows the Chatbot to understand and respond to both spoken and typed customer requests and the sentiment analysis can be done by analysing the customer sentiment and adjust negotiation strategies accordingly.

III. Modules

- **NLP Engine:** For understanding user intent in both voice and text to use NLP engine.
- **Negotiation Logic Engine:** The negotiation logic engine contains the rules strategies and algorithms for handling price negotiations.
- **Voice Interface:** It integrated speech to text on text to speech capabilities.
- **Text Interface:** The text interface provides a chat window for text-based interactions.
- **Session Management:** It tracks the state of negotiation for each user.
- **Escalation mechanism:** it allows for seamless transfer to a human agent when necessary.
- **Analytics and Reporting:** It tracks negotiation outcomes and user behaviour and Chatbot performance.

V. Architecture and working of Chatbot

The above architecture will explain the working of the Chatbot.



Initiation: First, the customer browses the products from the initiation point that is the “Price Negotiation Chatbot” which should be accessible for product pages where negotiation is allowed. This could be a button like “Negotiate Price” or an option within the existing “Chatbot” interface.

The product context is when the user initiates negotiation from a product page, the Chatbot needs to automatically understand which product the user contains to negotiate the price for. This context is crucial for negotiation logic and the information retrieval will be done by the Chatbot it will need to access product details like name description current price potentially cost information from the browser products module to inform its negotiation strategy.

Ordering: To give the order post order negotiation might consider not allowing price negotiation on already placed orders this can be led to logistical complications and customer dissatisfaction if the price exists after purchase. In some scenarios pre order inquiry might allow negotiation before the order is finalized, even if items are in the “cart” stage the Chatbot would need to access the cart contents in this case. If a negotiation related to a past order in escalation to human agent, the agent will

need to access the view order module to understand the order details.

Chatbot: The Chatbot would integrate negotiation functionality which can be a specific skill or intent handled by our main “Chatbot”. When the user expresses interest in negotiating price the conversation can be routed to the dedicated price negotiation logic within the same chat for interface or specialised sub-bot. Clearly differentiate between general customer service inquiries the price negotiation. Where the Chatbot should focus specifically on price discussions. The price negotiation Chatbot might escalate to a human agent who is part of Central Bank customer service team if the issue extends beyond price.

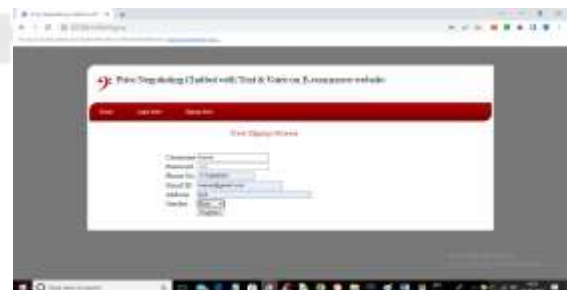
Then review will be submitted in two forms:

1. Potential feedback channel
2. No direct interaction

And logout from the session i.e., session termination.

V. Result Screenshots

1. Login/Signup screen





2. Browse the products



3. Price negotiation



VI. Conclusion

The integration of a price negotiation Chatbot into E-Commerce plus forms offers a more personalized and interactive

experiences bridge in the gap between online and offline purchasing. By utilizing NLP (natural processing language), machine learning algorithms and real time data analysis, the Chatbot enhances customer satisfaction through dynamic price and discussions without compromising seller margins. While challenges like voice accuracy, dialect hanging and contextual understanding exist, our system addresses many of these issues through their fully designed margins and architecture. This innovation not only empowers customers but also builds trust and transparency in digital transactions. As e-commerce continues to evolve, intelligent negotiation Chatbot s could become a standard component, transforming how consumers and sellers interact in the online marketplace.

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