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Price Negotiating Chatbot on E-commerce website

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ABSTRACT:

The rise of internet purchasing in the last few years is quite remarkable. Despite this growth, not all aspects of internet buying have been perfected. For example, unlike in physical stores, you can't haggle with vendors about prices. A chatbot for product negotiations is now live. Customers are able to acquire a good deal on product(s) with the help of the chatbot. The approach might end up hurting either the goods seller or the customer's budget, as it affects a lot of different parts of online buying. We have devised an algorithm that, in conjunction with the forecast of previously accessible data, can offer a price in order to circumvent such scenarios. Using unrelated data elements or qualities or techniques that aren't a good fit for a certain dataset might reduce the accuracy of price prediction. In light of the fact that erroneous product price predictions may lead to significant financial losses for online retailers, these companies avoid relying only on price prediction algorithms. When data becomes too large or when a characteristic that was relied on the model's prediction becomes unavailable, certain models can fail. Then, in order to keep the model's accuracy and dependability intact, such modifications must be handled. We have made an effort to address some of these concerns in our chatbot system.

INTRODUCTION :

Today's e-commerce websites use a variety of AI algorithms to learn which goods are the most popular and, in turn, make it easier for shoppers to find what they're looking for. Unfortunately, consumers often have to settle for less than ideal items due to exorbitant pricing. Additionally, there are a few other issues that buyers could encounter with inexpensive items. By allowing them to bargain on the items, these concerns may be resolved. Language and logic are two sides

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of the same coin in negotiation. The goal of every negotiation should be to find a mutually beneficial agreement that satisfies both sides. As part of the product data, the first party, the seller, will lay down the lowest possible price at which they are willing to sell the thing. Our algorithm's bounds are this price plus the product's initial, pre-negotiation price. The chatbot is integrated into the website with the use of flask APIs, which allow us to demonstrate the model in action by connecting to the user interface. A chat bot is a piece of AI software that can mimic human conversational abilities via various mediums such as messaging apps, websites, mobile apps, or even over the phone. It is unnecessary to employ a customer service executive when a chatbot can handle the majority of consumer inquiries. The bot understands the user's purpose and responds appropriately by using natural language processing algorithms. In addition to these methods, chatbots will also automate the e-commerce website negotiating process. Users will be able to freely engage with the program, post product-related inquiries and budgets, and get responses tailored to their specific queries using this system. Just like how logistics and retail firms utilize data to determine the best course of action for product delivery. The amount of people using the website and the amount of money made will be significantly affected. The availability of reasonably priced items online is likely to lead to an increase in consumers.

RELATED WORK :

"Smart Chatbot System for E-Commerce Assistance"

There are already a lot of online marketplaces that are beginning to supplant the traditional market. As a result of the high level of competition in the internet industry, several shops offer round-the-clock customer assistance. If done manually, this job would definitely cost a hefty penny. One possible approach to automate online shopping is to utilize a chatbot. After then, the bot has to be quick and precise in its responses. A smart chatbot system that can help with online purchases is suggested in this research; it is built on AIML. This chatbot is integrated into the Telegram client. Parsing, pattern matching, and data crawling utilizing AIML will be the three processes during which user input queries are handled. There are three types of user requests in

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AIML: general inquiries, computations, and stock checks. The order and payment procedure is stuck because of the computation request. With an average reaction time of only 3.4 seconds, the suggested solution successfully handles all user requests according to the findings of 300 experiments.

"E-Negotiator Chatbot for E-commerce Websites"

Sure enough, chatbots have shown to be an invaluable asset to businesses, helping companies save time and money while enhancing customer happiness. Many distinct kinds of automated negotiating agents have been created so far. The art of negotiation requires skill in both language and logic. Something has to be spoken in order for it to be done. To create a conversation agent for long-term planning, researchers at FAIR came up with the idea of dialogue rollout. All of these agents have shown effective in certain settings when it comes to negotiating with humans, but they usually don't have the linguistic chops to handle conversations like these in the real world. We provide an E-Negotiator chatbot agent that includes many research contributions to overcome this constraint. To start, we discovered that it's not enough to just add an NLP module to pre-existing agents; this is not enough to develop these agents. Agents that facilitate Natural Language should instead adhere to tactics such as issue-by-issue conversations and partial agreements. Anchoring and Aspiration Adaptation Theory provide the basis of this agent's bounded rationality (AAT). As an introductory anchor, agents often make full offers at the outset of conversations. If this offer is turned down, the agent will try to reach a partial agreement by drawing on what they know about past discussions to suggest a new subject to negotiate.

"Implementing E-Negotiator Chatbot for E-commerce Website"

Every real-life transaction involves some degree of negotiation. In everything from large-scale corporate negotiations to the purchase of fresh veggies, it is an essential component of closing the sale. Online stores may streamline their operations with the help of a chatbot system that acts as a price negotiator. Automating online sales and pricing negotiations is the goal of this E

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commerce Chat Bot System project. Because chatbots eliminate the need for customers to wait for customer executives to answer their questions, they assist web-based apps achieve their primary goal of customer pleasure. Without human customer service representatives being involved, chatbots can handle the majority of client inquiries. Problems with language and thinking coexist in negotiation. Something has to be spoken in order for it to be done.

"Review of integrated applications with AIML based chatbot"

An offshoot of Extensible Markup Language (XML), Artificial Intelligence Markup Language (AIML) is used to construct chatbots, or artificial conversational agents. A lot of effort has been done to create conversational agents. However, its adaptability, availability, and inexpensive price tag make it a viable option for a wide range of uses. A few applications that have made use of AIML chatbots for conversational services are briefly reviewed in this article. Adaptive modular architecture, cultural heritage, online education, online governance, web based models, dialog models, frameworks for semantic analysis and interaction, experts in network administration, and humorists are all involved in these applications. Instead of using real people to answer consumer questions and address their concerns, they are using an AIML chatbot to do just that. Therefore, this is becoming more and more popular among entrepreneurs and consumers as a means to provide effective service.

"Towards Automated Negotiation Agents that use Chat Interface"

There are many types of automated negotiating agents that have been developed so far. All of these agents have shown themselves to be good negotiators in controlled settings, but they don't have the natural language processing (NLP) tools to handle conversations like these in the real world. In this research, we investigate the necessary modifications to current agents to overcome this restriction. Our research into agent-human negotiation revealed that it takes more than just

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updating current agents to include an NLP module to make these kinds of agents. Partial agreements and exchanges based on individual issues need different approaches from the agents.

"Design and Implementation of a chatbot for e-commerce"

In this article, we present a chatbot that can offer both digital and real items and services. Both direct and indirect forms of marketing may benefit from this chatbot. Originally developed and deployed for Telegram's API, it may be easily adapted for use with any messaging platform that has an API, including Facebook Messenger. The intended function of the chatbot's design is to facilitate the sale of products and services via various online mediums such as catalogs, social media, direct email, and flyers. It is recommended for target markets where customers have little IT understanding, and the chatbot's main function is to take orders with little to no human intervention. Streamlining the conversion process is the primary objective of this purpose-built design. With the help of the customer's purchase history and other personal data, we may create highly targeted marketing campaigns. It requires little to no setup to be incorporated into any WooCommerce platform.

"Facing the challenge of human-agent negotiations via effective general opponent modeling"

To be effective, automated negotiation agents must account for the fact that humans are behaviorally varied and may bargain in a variety of ways. In order to mimic their opponent and adjust their actions accordingly, automated agents depend on an effective opponent modeling component. The KBAgent is introduced in this article. The KBAgent is a computer program that models potential opponents based on their previous negotiation sessions and conducts a single negotiation with each individual. In order to determine the possibility of acceptance and any counter-proposals, the database is queried. The KBAgent outperforms another automated negotiator that has been found to be efficient in human-to-human agreements in terms of utility

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values, according to experiments with humans. In addition, as compared to human agents in the same job, the KBAgent gets much superior agreements in terms of individual usefulness.

METHODOLOGY:

We have used the e-commerce item dataset, which includes product prices as well as their minimum pricing (known as min price) for the purpose of negotiation. Databases are created by MariaDB. Online shoppers choose the item(s) they want to purchase and then complete the purchase by submitting their payment information. We have integrated a chatbot onto our website so customers may buy products with the click of a button during negotiations. Upon their satisfaction, the offer price will be saved. They have the option to purchase the item outright or put it in their shopping basket and look for something else. There are a lot of criteria that customers use to evaluate items on e-commerce websites, including ratings, pricing, reviews, and more. However, the cost of a product is an important consideration for certain buyers. The initial negotiated price is determined by Machine Learning algorithms using the available dataset, which includes product data with pricing and discount information, when the consumer requests the negotiation. It will take into account all the database factors and provide a prediction about the product price that may be utilized for negotiations. Machine learning methods such as SVM and KNN are used. The SVM and KNN algorithms employ various dataset properties (such as minimum price, category, likes, etc.) to forecast prices. Then, the ensembled output of both algorithms is taken into account, and this price is the starting point for negotiations. The initial negotiated price is determined by Machine Learning algorithms using the available dataset, which includes product data with pricing and discount information, when the consumer requests the negotiation. Using SVM and KNN, two machine learning algorithms, it will analyze the database for various factors and then utilize those predictions to negotiate a product price. The SVM and KNN algorithms employ various dataset properties (such as minimum price, category, likes, etc.) to forecast prices. Then, the ensembled output of both algorithms is taken into account, and this price is the starting point for negotiations. Customers have the option to

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purchase the goods at the agreed-upon price or continue bargaining with the chatbot to get a better deal.

SVM:

A robust machine learning technique, Support Vector Machine (SVM) may be used for a variety of classification, regression, and outlier identification jobs, both linear and nonlinear. Classification of text and images, identification of handwriting, study of gene expression, recognition of faces, and anomaly detection are just a few of the many applications of support vector machines. Due to its ability to handle high-dimensional data and nonlinear correlations, SVMs are versatile and effective in many different contexts.

When it comes to classification and regression, supervised machine learning algorithms like Support Vector Machine (SVM) come in handy. It works well for classification tasks, but it can also handle regression issues. The support vector machine (SVM) algorithm's primary goal is to locate the best hyperplane in an N-dimensional space that can partition the feature space into distinct classes. The hyperplane strives for the largest feasible distance between the nearest points of various classes. The amount of features determines the hyperplane's dimension. The hyperplane becomes a simple line when there are only two input characteristics. The hyperplane transforms into a two-dimensional plane when three input characteristics are used. Beyond three characteristics, it gets hard to conceptualize.

KNN:

Among machine learning's most fundamental classification algorithms, KNN is among the most fundamental. Among its many uses, pattern recognition, data mining, and intrusion detection benefit greatly from its membership in the supervised learning domain.

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Since it is non-parametric and does not presume anything about the data distribution (unlike other algorithms like GMM, which require a guassian distribution of the input data), it is often considered disposable in real-life circumstances. We begin with a set of historical data, sometimes known as training data, that organizes coordinates into categories defined by some characteristic.

The key-nearest-neighbor (K-NN) technique is a popular and flexible machine learning tool because of how easy it is to use and understand. There is no need to assume anything about the distribution of the underlying data. Its versatility in handling numerical and categorical data makes it a good fit for a wide range of datasets used for regression and classification problems. It is a non-parametric technique that uses the degree of similarity between data points in a dataset to generate predictions. In comparison to other algorithms, K-NN is not as affected by outliers.

Using a distance metric like the Euclidean distance, the K-NN method finds the K closest neighbors to a certain data point. Based on the average or majority vote of the K neighbors, the data point's class or value is subsequently established. This method enables the algorithm to learn new patterns and provide predictions according to the data's local structure.

SCREENSHOTS:

Our project involves the development of an e-commerce software where users may peruse product listings, choose between text and voice chatbots, and then engage in negotiations with the bot. If a consumer isn't happy with the price after hearing the "first price" command, the chatbot will ask for the "final price," at which point it will apply a 10% reduction and serve the customer.

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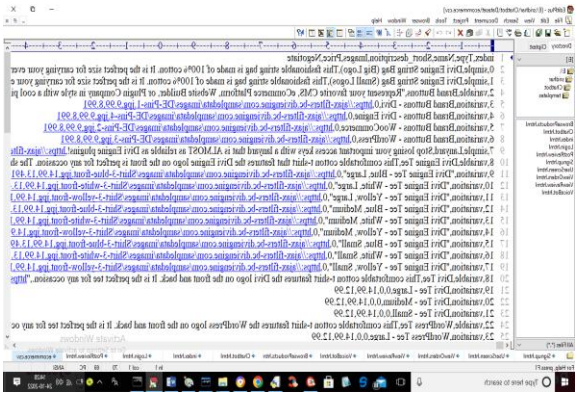
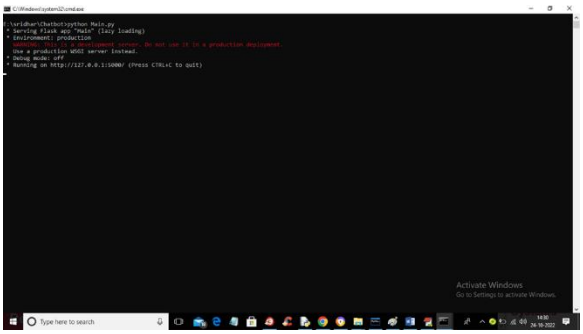
To display list of products we are using below dataset which contains list of products and prices



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.



In above result 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.

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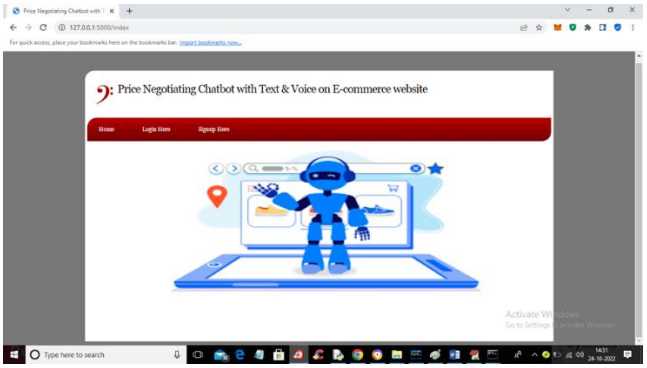
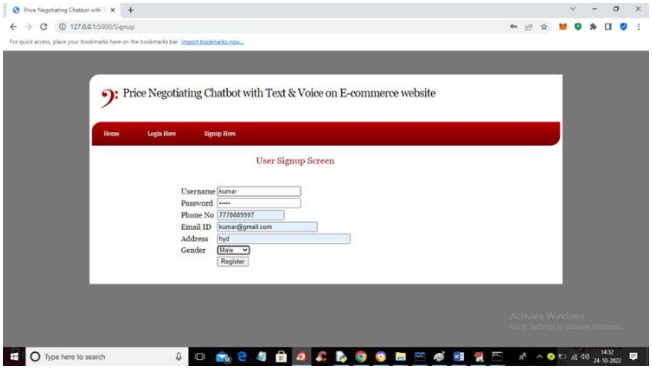
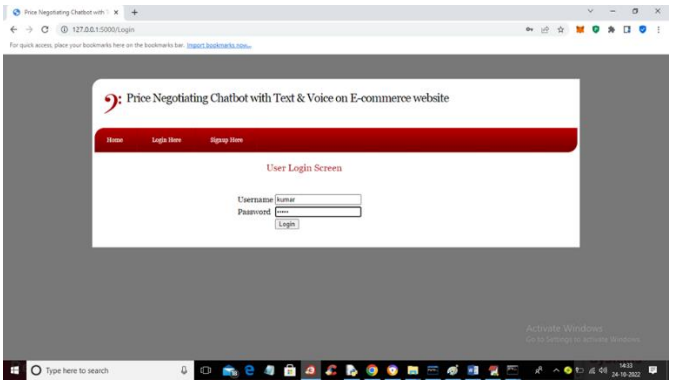


In above result click on 'Signup Here' link to get below screen.



In above result user is entering signup details and then click on 'Register' button to complete signup and get below output.



In above result user is login and after login will get below screen

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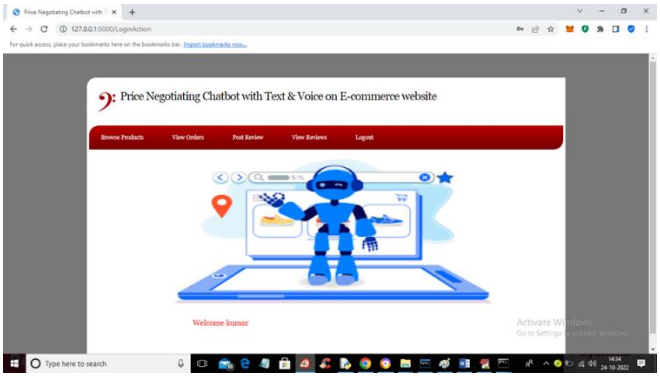
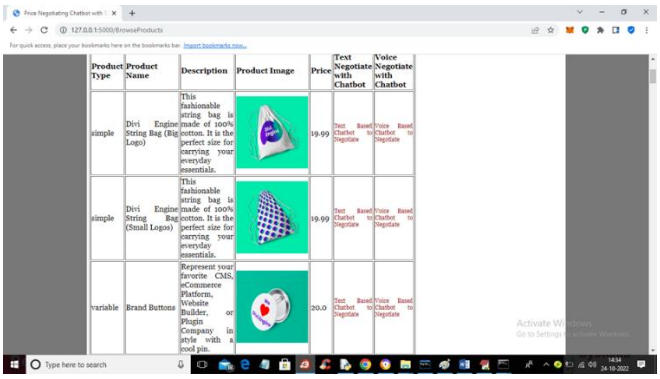


In above result user can click on 'Browse Products' link to get list of products



In above result 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

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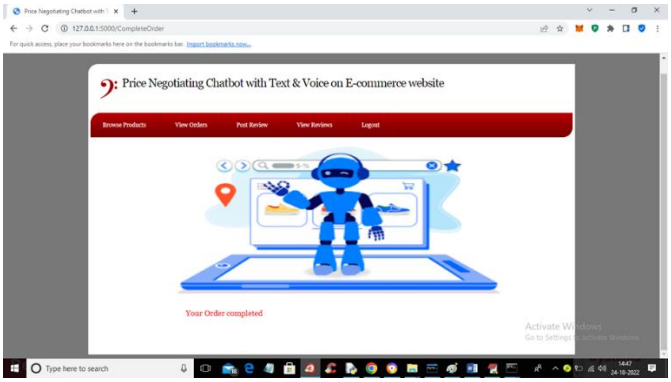
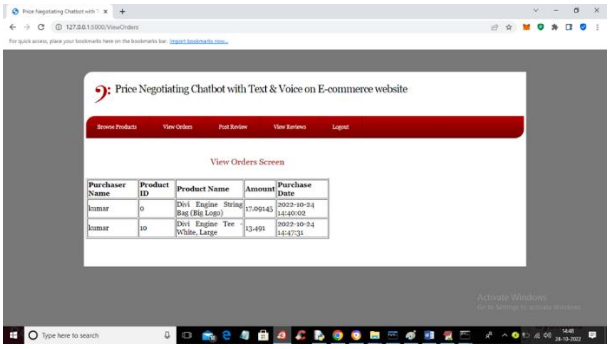
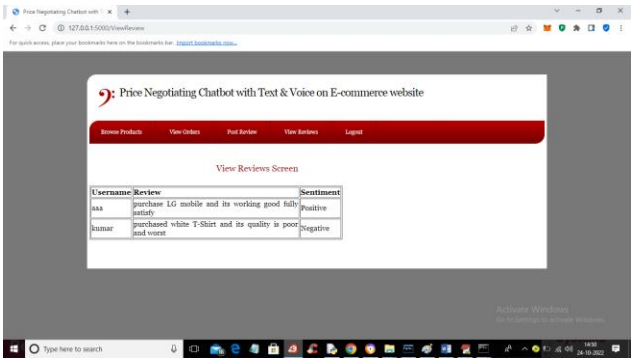


In above result order is confirmed and now click on 'View Orders' link to get below output



In above result we can see the confirmed orders from user and now click on 'Post Review' link to get below output



In above result all users can view all reviews and their sentiments.

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Similarly you can signup, login and view products list and negotiate with Chatbot using text and voice.

CONCLUSION:

When it comes to online marketplaces, product negotiations may be a real pain. Our first attempt at a chatbot was unsuccessful, despite its comprehensive coverage of negotiating topics and scenarios. Our chatbot sometimes ends up at the price clients ask for, even though it's always more than the minimum amount. This might be disastrous for the vendor if it happens to a large number of consumers. Such cases must be addressed. We utilized a number of algorithms, including SVM and KNN, however there may be more effective algorithms for price prediction in the future. illustrates how a user may • have a more fruitful conversation with a chatbot in order to get lower costs. Such matters ought to be attended to. We may include KBAgent, which is thought of as superior for negotiations, into our program. Siri, the AI from Apple, has a vast knowledge base and may provide satisfying results.

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