
ONLINE BOOK MARKETING THROUGH CONVERSATIONAL COMMERCE USING NLP & ML

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ABSTRACT

Hiring people with experience in book marketing, communication fluency, customer friendly, availability over 24x7 knowledge in different sectors, etc. is tedious. With the advancement in growing technologies and marketing tactics the customer service should be ready to adapt the recent technologies available to achieve the market potential. Now-a-days the knowledge of the book available for marketing should be known to the customer service in marketing isn't an easy task. So, online book marketing through conversational agent through conversational commerce is an automated system for selling books through a prospective customer. Conversational commerce is proposed to overcome these difficulties. There is a direct interaction between the business and its customers through instant automation with unbiased trading. By eliminating the needs of the customer service to know the full details of each book under each sector, thus improves handling the customers in much effective and efficient manner. Instant automated conversation is achieved through message that incorporate the ability to answer customers with reviews, comments, suggestions, facts and more

Keywords: Conversational Commerce, Recommender System, Supervised Learning, Unsupervised Learning.

I. INTRODUCTION

Recommendation systems are used in hundreds of different services - everywhere from online shopping to books. Recommendation systems were developed as intelligent algorithms, which can provoke results in the form of suggestions to users. They reduce the burden associated with making best choices among the plenty. Now, Recommender systems can be executed in any domain such as E-commerce in the form of personalized services. Online book selling websites now-a-days are competing with each other by many means. Recommendation system is one of the stronger tools to multiply profit and retaining buyer. The book recommendation system must suggest books that are of buyer's interest. They provide ease to both the consumer and the manufacturer, by suggesting items to consumers, which can't be claimed until the recommendations. Every recommender system comprises of two entities, one is the user and other is the item searched for. User can be any one (i.e.) he/she can be a customer or consumer of any product or items, who get the suggestions. Here the input to the recommendation algorithm can be the user's database and items and the suggestions would obviously be the output. As in our case, inputs consist of database of books and output represents the book suggestions. This system combines the features of content filtering, natural language processing, natural language understanding and natural language generation to produce efficient and effective recommendations. However, recommendation systems have a surprisingly large impact on the materials consumers engage with over the course of their daily lives.

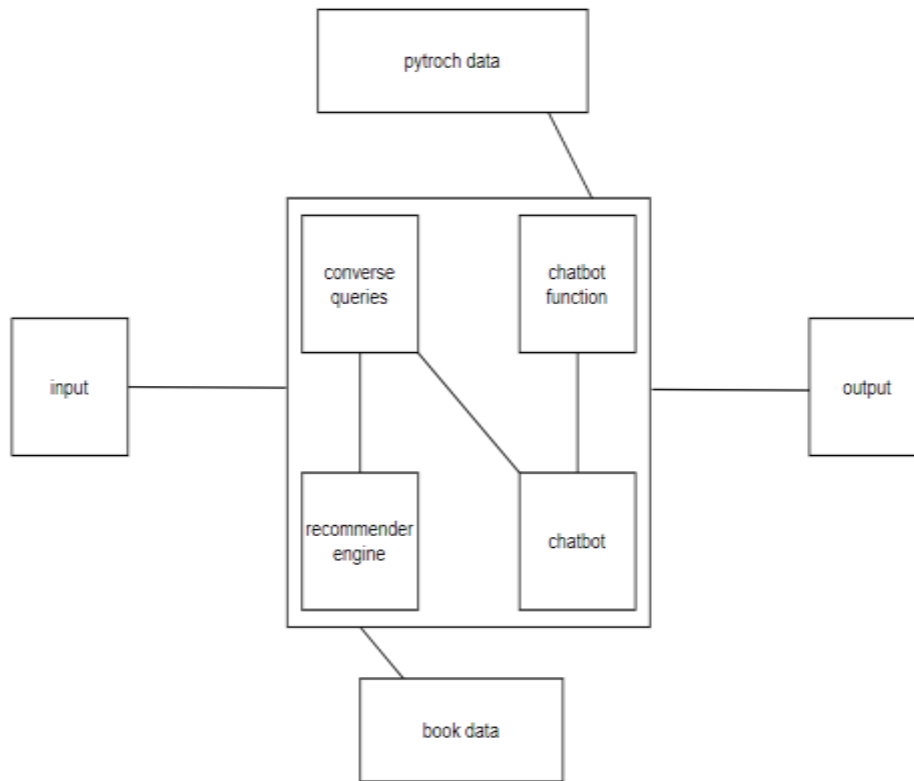


Figure 1: Block diagram of book recommendation

II. METHODOLOGY

User Interface

The book recommendation Chatbot will be working as a web integrated Chatbot. The web page will be having two functions - registration and conversation. The user can access the Chatbot only after registering themselves by providing necessary information's. These details will be stored in the database which will be further used for authenticating the user to access the chatbot. The Chatbot will converse with the user and the user will be asking the Chatbot to make recommendations of the book according to the input.

For the first function, registration part of the user will be asking the details like name and login credentials then the registration is verified by sending one time password to the user and after authentication they will be redirected to the interaction page. If the person had forget their login credentials then it will be recovered by sending the login details to the registered email using that they can login.

As for the second part the conversation, the user will be interacting with the recommender using chatbot. The Chatbot is integrated to the website using flask framework. The flask packages are able to connect with the model with the web page. The chatbot will be asking the details from the user. The user will give response to those questions then the response will be received in the flask package which will be redirected to the model where the machine learning model will generate a proper response and give it to the user through the same flask package.

Chatbot

One of the best and prevalent examples of intelligent Human-Computer Interaction and AI system is Chatbot. Moreover Chatbot interacts and comes with suitable answers to the clients if approached through text or voice which becomes capable by Natural Language Processing (NLP). Business, education, retrieval of information, e-commerce are certain areas where chatbot has placed its steps strongly. Though they are not designed with specific purposes like entertaining the users or mimicking human conversation they do help human in plenty of ways. They are also known by various names by the functions they perform as smart bots, digital assistants, artificial conversations etc.

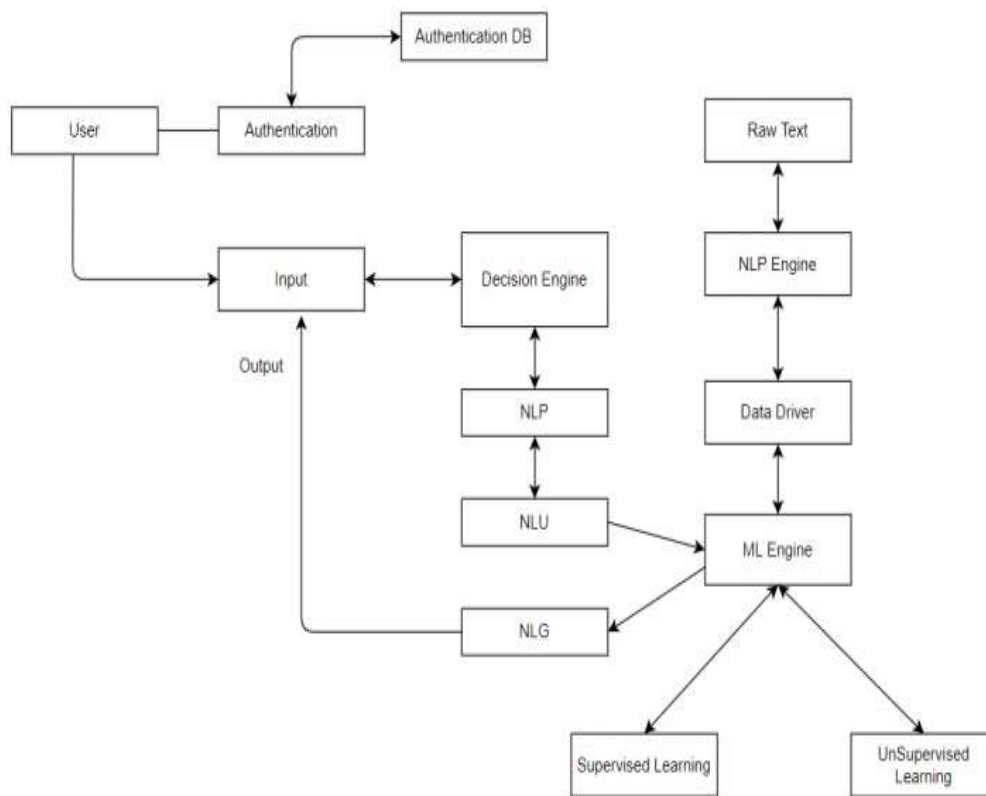


Figure 2: Data flow of the Book recommendation with chatbot

Conversational commerce

Why do users preferably use chatbots? The tremendous support, promise that chatbot gives the users is by providing them with apt answers for their queries make them highly preferable. While there exists other motives of chatbot like for entertainment, social factors etc., and productivity is the main motivation for chatbot users.

The reasons behind Chatbot becoming too popular among the business people are the ability to handle many users and also reducing the costs of customer service. Similar to human operators, the machine learning provides the capability to the customer service chatbots to easily communicate with customers. Conversational commerce is the spin-off of this amazing fusion of technology which also aids in e-commerce done via various means of chatbot. It is a new sales method of digital age providing the shoppers to directly interact with various brands through back and forth chatbot format. Instead of getting a delayed reply via e-mail etc., it is an easier mode of communication where the queries are answered instantly as part of a live chat or dialogue.

Now-a-days brands use conversational commerce as a means of communication with the customers and lead them to make a purchase. Rather than being a one-way dialogue that occurs during the buying process, conversational commerce helps out the customers by making the buying journey to be a conversation. The only way to survive, excel and thrive is staying ahead of the most recent trends, in this ever changing world which is a criterion for every industry.

Before and after clicking the checkout button customers pass on through various stages, each and every time they make out a decision of purchasing online. Need of recognition/awareness, search for information, and evaluation of alternatives available, decision of purchase and post-purchase evaluation are the five well-defined steps in the journey of purchase by a customer. But here the most time-consuming task is the process of finding numerous numbers of alternatives and finding the best choices available. Conversational commerce chatbots, which are capable of acting as personal shopping assistant to customers not only makes them to have a pleasant customer service experience, but also moves shoppers more quickly down the funnel towards a satisfied valuable customer conversation. Saving of time and resources, improvement of customer experience gained by handling various types of customers, sales increase, offering of personalized element, helping various

brands to stand unique are some of the greatest benefits that conversational commerce offers to all kinds of online stores.

Architecture Building blocks

The area of artificial intelligence (AI), that explores the manipulation of natural language text or speech by computers is known as **Natural Language Processing (NLP)**. To perform desired tasks which will make computers to understand and manipulate natural expressions, knowledge of understanding and use of human language is gathered to develop the techniques. Majority of NLP techniques have basis of machine learning.

Natural Language Understanding (NLU) is at the core, for any NLP task. They render help to conversational AI applications in determining the purpose of the user and then directing them to the relevant solutions. To implement natural user interfaces such as a chatbot, NLP is a technique. For recognizing patterns in a human language, Natural Language Understanding (NLU) is an AI-powered solution. NLU enables the AI solutions in accurately identifying the intent or idea of the user and responding to it. The critical point in Conversational AI is to understand the wants and needs of the user through the written language. So, mostly the business applications rely on NLU. The aim that underlies behind the NLU is to extract the context and meanings conveyed by the user in natural language, that might be unstructured and appropriately responding to the user's intention.

The subset of Natural Language Processing and Conversational AI is NLU that helps the computers to understand the human language through understanding, analyzing and interpreting basic speech parts, separately. The first step to reach conversational AI can be considered to be NLU, where the machine should understand what the user says or wants to say before it responds.

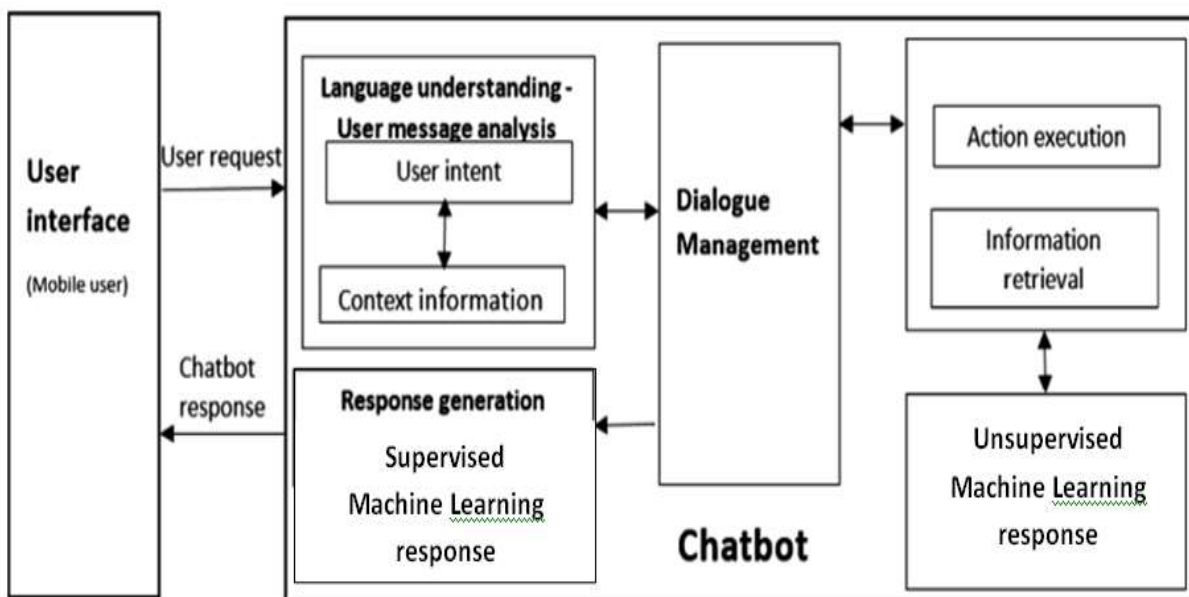


Figure 3: Architectural design of online book marketing

III. MODELING AND ANALYSIS

The Language Understanding component parses the user's request to infer the user's intention and the associated information which starts with the User's request from where the implementation process starts.(intent: "enquiry" entities: [word: "thriller", "fiction"...]).

The chatbot must determine the methods of proceeding, once it reaches the best interpretation, it can. It then acts upon the information directly, remembers whatever it understood and waits to see what happens next, to see whether it requires more context information or ask for clarification.

The action, execution and information retrieval takes place once the request is understood. The data source, which is a dataset known as the Knowledge Base of the chatbot stored in XML format, is one from where the chatbot retrieves the data of interest or performs the requested actions. By using the cosine similarity, the appropriate responses are produced on retrieval.

Machine Learning

Preprocess data and user query

It's now the time for the pre-processing of the training documents and user-query, where the transformation of text using an approach called bag-of-words should take place and each and every text should be represented by its words regardless of the order in which they are being presented. The important task of cleaning of data has to be done after getting the user query and book description so that we can do proper analysis on it. To get it into a clean state there are quite a few steps to be taken, since the text data isn't in the structured state as that of the numerical data which we have been working with before in hand. We have utilized the NLTK package for Python for cleaning of our text data, in most of the processes, like the process of tokenizing, normalizing and removal of stop words. By this process the misinterpretation and misrepresentation of words if spelt in lower or upper case letters is avoided.

Supervised Learning

Supervised learning identifies the User's intent and then extracts the domain-specific entities. To be more specific the aim is mapping between what the user tries to say or what he tries to convey and what has to be done by the chatbot in response to the query. The actions correspond to the steps that the chatbot will take whenever specific intents are triggered by the user as inputs which might have parameters specifying certain detailed information about it. The process of keen detection is generally formulated as sentence classification for each and every sentence where sole or numerous labels are predicted.

An entity is the tool for extracting the parameter values from a natural language input. For example, let us take a sentence, "What is the best thriller book?". Here the user's aim is to get know the best book in the field of thriller. The entity value here is thriller. Consequently, the user asks for the thriller genre. Entities can either be system-defined or developer-defined. For instance, the system entity 'best book' checks to the list of standard books either under best title or under bestselling book of that corresponding year or that month. Based on the user's enquiry, the domain entity extraction is often referred to as a slot-filling problem, which is formulated as a problem of sequential tagging where the parts of a sentence are extracted and tagged with the domain entities in retrieving the results.

Unsupervised Learning

The process of retrieving relevant content from a text file or a text paragraph is known as Text Extraction. When doing this process of extraction of the sentence from the text file or text paragraph relating to the content of book description, we first break the description about the book into multiple sentences. Then all the words that cover the partial answer are found or traced out from each and every broken sentence of the text file or text paragraph. We append the sentence into a string array that is created, once all the words get matched. The same process is followed for all the broken strings.

To find the exact final answer, the partial answer is compared with the array of strings and using cosine similarity it is filtered. The measure of similarity between two vectors is known as Cosine similarity. The dot product divided by the product of the norms of two vectors returns a value which is computed by the cosine similarity.

$$\text{Cosine Similarity (a, b)} = \text{Dot product(a, b)} / ||\mathbf{a}|| * ||\mathbf{b}||$$

The metric used to determine how the documents resemble irrespective of their size is the Cosine similarity. Here the cosine of the angle between the two vectors projected in a multi-dimensional space is calculated. The integer array that contains the count of words that is provided in the description and the user's request from the question to be answered (that includes the static list of keywords listed for the book genre) are the two vectors.

The Cosine similarity value is larger when the angle is lesser or in other words smaller. Even if the two vectors (user query and book description) are different and far apart due to the size and length, they could still have a very small/minute angle between them, which make ultimately the Cosine similarity to be a useful one. The similarity is higher when the angle is smaller. Using the string extraction to our partial answer we compare each vector that is retrieved and then compare the Cosine similarity between them. The book's title is displayed as the output for the user's query when the two vectors with high cosine similarity is our answer. Query reformulation is done when all the words in the partial answer doesn't exist in the description of the text file and we find

stemming of answer's words here instead of finding the exact words in the description of text file that matches the words from our partial answer. The normalization of words of a sentence into its base root form is known as **stemming**. All the words "likes", "liked", "liking", originate from a single root word like. By removing off the last or beginning of the word and taking into account only the list of common prefixes and suffixes stemming programs are often referred to as stemming algorithms. The text description using NLTK, a word database for English is also tried here to find the synonyms of all the words in partial answer, which is done in addition to stemming. Commonly it is used to find the synonyms of the words found in the partial answer. For book genres we added the static keyword while using the static analysis which proved to be much useful one. While formulating the answer string we add all the noun synonyms to the partial answer.

IV. RESULTS AND DISCUSSION

The availability of a knowledgeable person with all the details and updates of the various sources and materials available on whatever topics may be is a rare case. As all the sources won't be available at all places, moving on to a shopping place where the books related to the customer's search are available also pose to be a difficult task. This conversational commerce has provided the customer with an easier mode of search where the customer can interact with the CA easily and have a well-defined search which would provide the customer with sources completely satisfying his needs.



Figure 4: Website Main Page

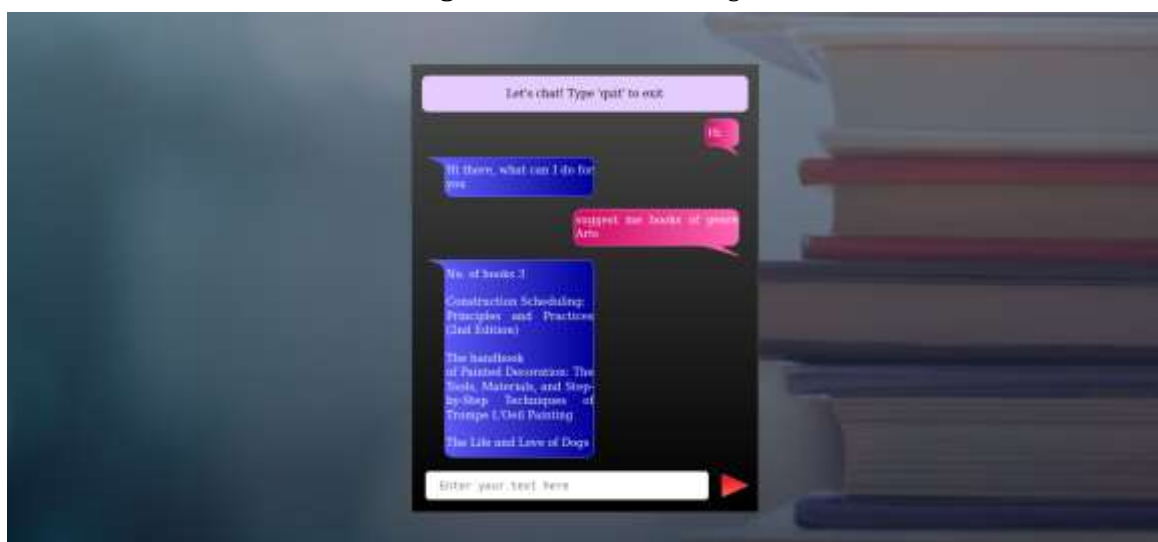


Figure 5: Chat Window

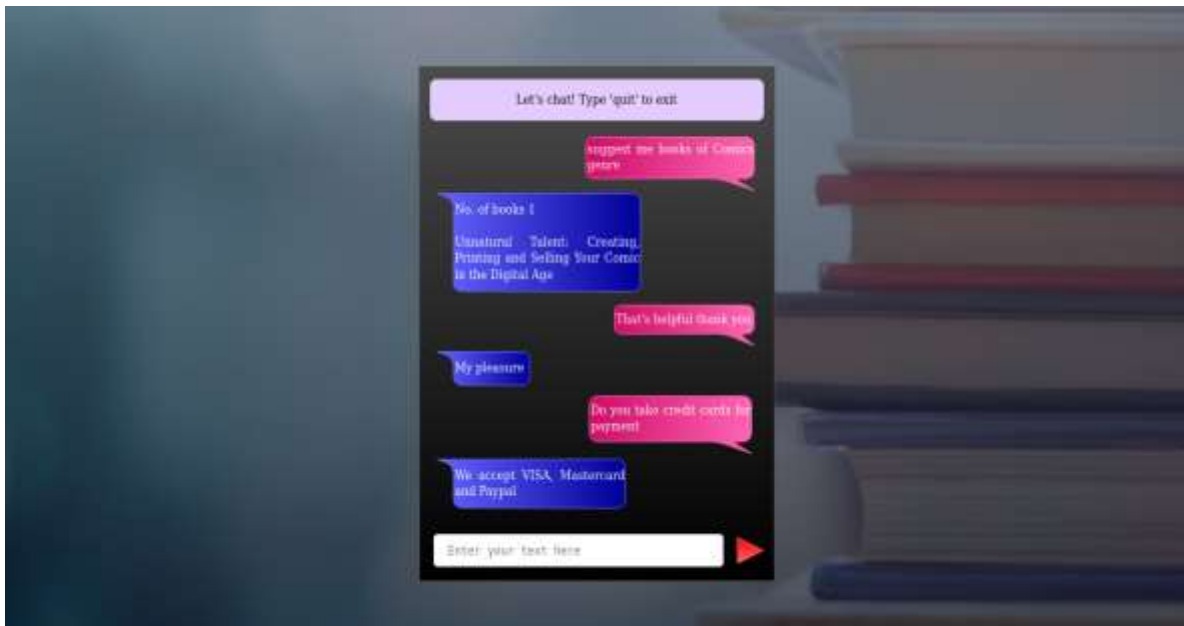


Figure 6: Chat Window (Continuation)

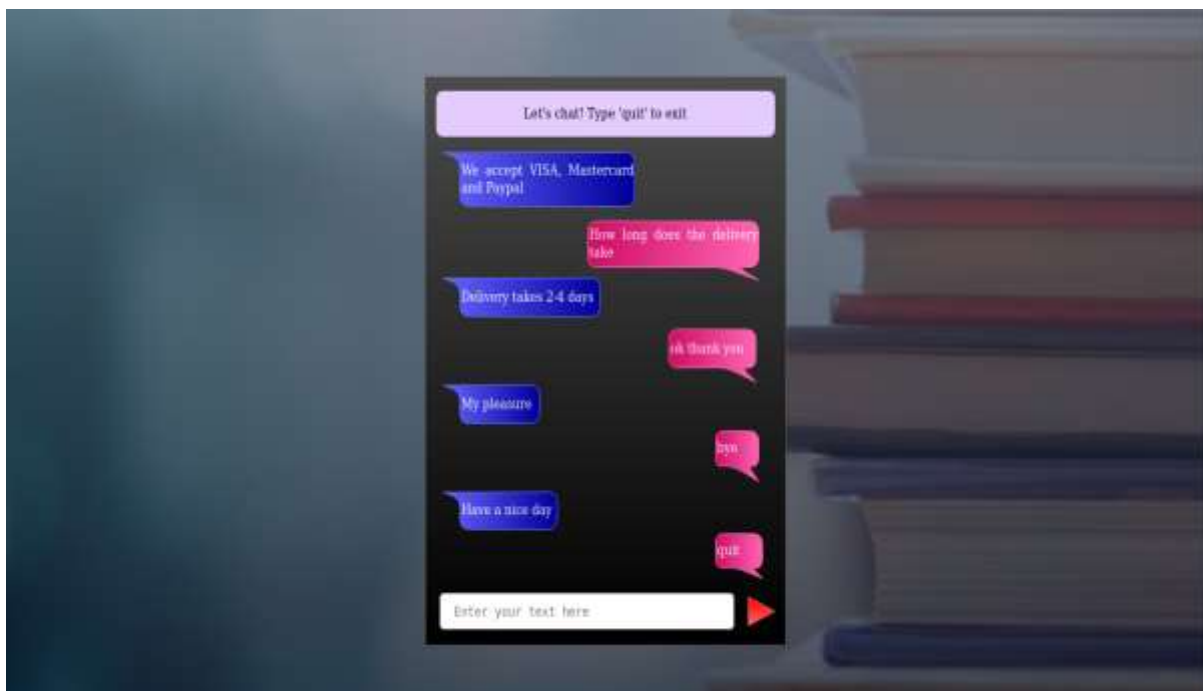


Figure 7: Chat Window (End of Conversation)

V. CONCLUSION

In this paper, recommender systems are an extremely potent tool utilized to assist the selection process easier for users. The implemented book recommendation engine is a competent system to recommend books for e-users. Apart from the technical point of view, this study also proposed several suggestions in understanding chatbot and CA and for future research on them. The website with chatbot pays attention to remind people who have been interested in books but do not know what to read. The text processing algorithms are used in smart reply and smart suggestions in various applications to reduce the user's workload and time giving appropriate and efficient output. This content recommender is more accurate and efficient as it combines the features of various recommendation techniques. Among the books available in plenty, the conversational commerce for book marketing helps the customer by reducing the overhead associated with making the best choice of books.

VI. REFERENCES

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