

A Conversational AI Chabot for Shopping Assistance and Product Recommendations

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Abstract— Due to the ease of being able to shop anything, anytime and from anywhere, Online shopping has grown in popularity in the current digital era. Nevertheless, customers may find it difficult to identify the ideal products for their needs given the abundance of possibilities. Our research work aims to create a Conversational Artificial Intelligence (AI) Chatbot to assist the customers in shopping and also to provide product recommendations that helps customers in making decisions about their purchase. In addition to monitoring savings and expenses, our model also keeps track of wishlist. Our chatbot will be deployed on the e-commerce platform as a web application.

Using Natural Language Processing (NLP) and Machine Learning (ML) techniques, the chatbot will be able to interpret customer input in natural language, gather pertinent data, and provide tailored product recommendations based on the customer's preferences and previous purchases. By informing customers about product availability and assisting them with the checkout process, the chatbot will be able to help them complete their purchases in a better and more effective manner.

Keywords— AI chatbot, Natural Language Processing, Machine Learning Techniques, recommendations.

I. INTRODUCTION

In the early days, people had enough time for each and every work of their daily life. They had time to prepare food and have food together with their family. They had both time and interest to go out for shopping to purchase necessary things especially during festivals. But, now everything has changed drastically that all are occupied with some or the other works. People are busy in their office works, business, house works etc. They don't have time and interest to visit the stores to purchase the required products. Even though they make themselves free to visit the store, they will be having limited access to the products they are looking for. Moreover, they have to visit the stores only during working hours of the stores. With the boom of internet, it has become lot more easier to access any kind of information from anywhere around the world.

In recent years, electronic commerce has become a significant trend on the internet. The ease and accessibility of online purchasing is contributing to its growing popularity.

But still it can become very difficult for the customers to choose the better product of their preference because of the availability of lots of options. To address this issue, our work focuses on developing a conversational AI chatbot that leverages advanced technologies such as natural language processing (NLP) and machine learning (ML) algorithms.

The chatbot's powerful features allow it to evaluate and comprehend customer preferences, previous purchases, and other pertinent data. It offers customized product recommendations based on this analysis that suits specific customer requirements and reduces their searching time and efforts thereby providing the customers with better shopping experience.

II. LITERATURE SURVEY

We have surveyed lots of research papers to know the current state of art in the chatbot design and its applications. In this section, we will provide a brief overview of different chatbot designs which we have found in the referred research papers. These research papers have given most of the information needed for the design of our Conversational AI chatbot which can be used as an online shopping assistant and product recommender.

In paper [1], authors focus on their chatbot which is developed for a messaging platform so that the users can communicate with it in natural language and receive recommendations. They have used rule-base and maximum likelihood as a method in NLP and content-based filtering for the recommendation process. For the recommender system interaction, the chatbot is built using Dialogflow and implemented on the Telegram.

An AI-based CollegeBot management platform designed for professional Engineering colleges is described in paper [2]. The chatbot provides automatic response to college queries regarding the college's basic information, class schedules, and academic examination schedules. The system is built with Dialogflow which is supported by the Google API.

In paper [3], a chatbot designed for college is discussed. Natural language processing is used to process the user's query and generate automatic response. The chatbot analyses user's question using an Artificial Intelligence algorithm and generates response using Naive Bayes' algorithm. The system designed is a Web Application and it reduces the workload of college administration and staff in answering to the queries of the students.

A Virtual Personal Assistant which is developed as a mobile application is discussed in paper [4]. For the implementation of the software application, creators have used Google Dialogflow. Flutter is used for the user interface design of the application.

In paper [5], the authors have provided the design of a chatbot which can be used by any University/Institution to book resources like auditoriums, seminar halls, projectors etc. The chatbot is built using Dialogflow, Nodejs, and PostgreSQL.

III. PROPOSED WORK

A. Motivation

In today's fashion era, there are lots of e-commerce websites such as Amazon, Ajio, Flipkart etc., for the customers to find their required products. The customers can use the filter options to search their desired product. But, we want to ease the purchase process by designing a chatbot which can interact with the customers and also recommend the products which the customer is looking for. So, we are developing a web application which includes chatbot to recommend products based on the customer requirements using NLP and ML.

B. Problem Statement And Objectives

To develop a Conversational AI Chatbot to assist customers in shopping and provide product recommendations. The main objectives are as follows:

- To develop a web application which includes a conversational chatbot to assist customers in shopping.
- To make chatbot provide personalized recommendations to assist customers in finding better products.

C. Proposed System Implementation

The chatbot is implemented using Natural Language Processing (NLP) and machine learning (ML) algorithms provided by DialogFlow. The chatbot is integrated with the e-commerce platform to access product information and availability.

Dialogflow

Various tools and features are available from Dialogflow to create and implement chatbots, which are also known as virtual agents, which can converse with users in natural language. The developed chatbot benefits from sophisticated NLU by utilizing Dialogflow's features, which enables it to precisely evaluate and interpret user inputs. With the use of Dialogflow's machine learning algorithms, entities and intents can be extracted from user speech, assisting the chatbot in comprehending the user's requests. In order to structure the conversational flow

in the chatbot design, Dialogflow CX is used which enables hierarchical organization through flows, pages, and intents. While flows reflect the overall structure, pages represent individual steps, and intents specify the inquiries or actions of the user. A Dialogflow agent can be summarized as a sequence of (request, response) pairs where

- User sends a request to the Dialogflow agent
- Dialogflow agent which is a NLU module handles the user request
- User finally receives response from the Dialogflow agent

Figure 1 shows the process involved in Dialogflow.

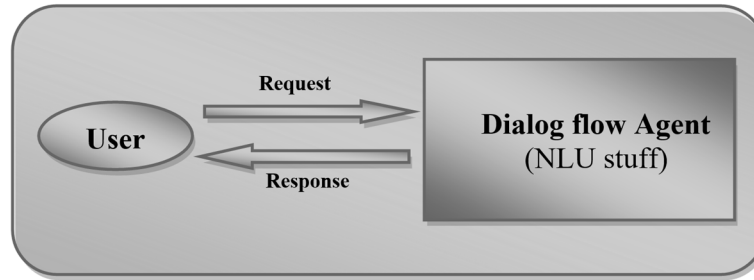


Figure 1: Dialogflow overview

- **Intent Mapping:** The Dialogflow agent will attempt to map the user's request to a list of predefined intents after receiving it. The bot developer creates intents to communicate to the Dialogflow service. After Dialogflow maps the user's request to one of the pre-defined intents, it will send a response back to the user which is also determined by the bot creator.
- **Fulfillment:** Before responding, Dialogflow may need to carry out some business logic after mapping the user's request to one of the pre-defined intents. Rather than building LEGO blocks for business logic, the Dialogflow team opted to utilize the concept called Fulfillment. This is how it functions:
 - Dialogflow comprehends the request made by the user and extracts structured data from the message.
 - The code known as a webhook receives the structured data and is executed on a web host that is maintained by the bot creator.
 - The webhook carries out the required business logic.
 - It will provide Dialogflow agent with a response in a particular format.
 - Dialogflow will parse the response, extract pertinent data, and apply it to the user's response.
- **Integration:** You can send queries to your Dialogflow agents programmatically with this API. Similar to typing the request message into Dialogflow's terminal, the request will be mapped to an intent and the API caller will receive the proper response.

Figure 2 shows the flow of Conversational AI Chatbot.

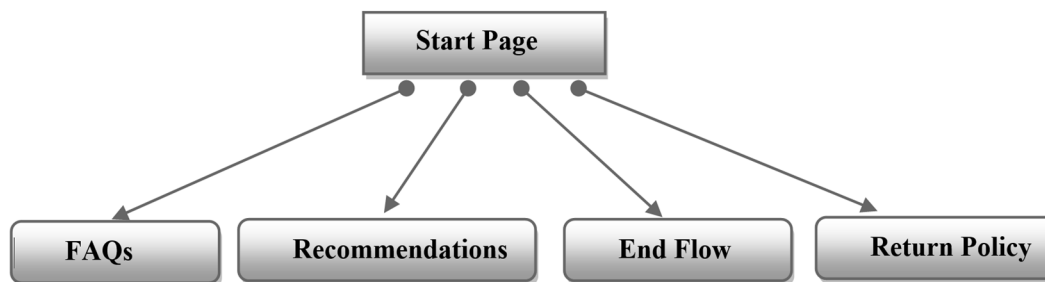


Figure 2: Flow of Conversational AI Chatbot

FAQs

FAQ stands for "Frequently Asked Questions". It is a section typically found in documents, websites, or reports that addresses common queries or concerns that customers may have regarding a specific topic or issue. The FAQ section is designed to provide concise answers to frequently encountered questions, helping to clarify information and alleviate common doubts. The flow of FAQ is depicted in Figure 3.



Figure 3: Flow of FAQs

Return Policy

A return policy is a set of guidelines defining the terms and processes under which customers can exchange or return purchased items. It covers timelines, acceptable circumstances, necessary documentation, refund options (such as cash refund etc.), and any related costs or limitations. The flow of return policy is depicted in Figure 4.

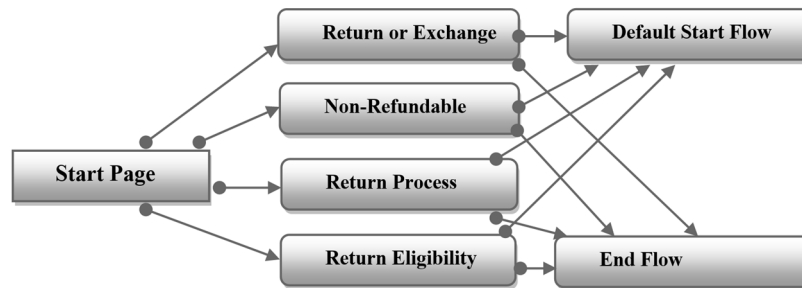


Figure 4: Flow of Return policy

Product Recommendations

Based on the customer's input, the chatbot will recommend products. Basically, the bot will use the customer's input to filter the products and display the appropriate product thereby reducing the time spent on searching for the right product. The flow of product recommendation is depicted in Figure 5.

D. Results

Our Conversational AI Chatbot is a web application which assists the customers in shopping and also provides product recommendations.

Figure 6 depicts the chatbot flow for FAQs.

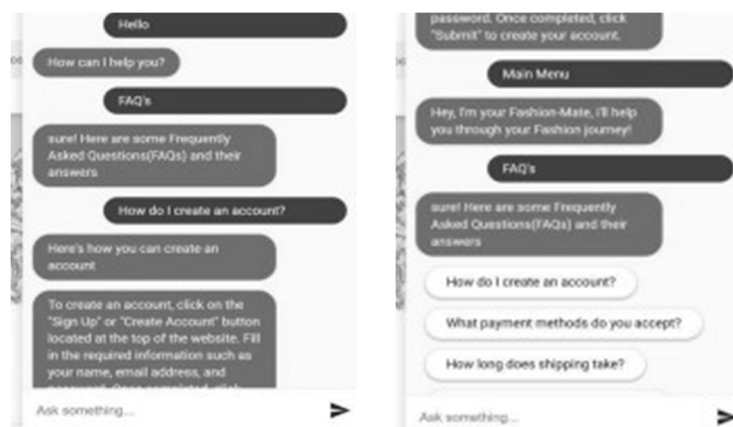


Figure 6. Chatbot flow for FAQs

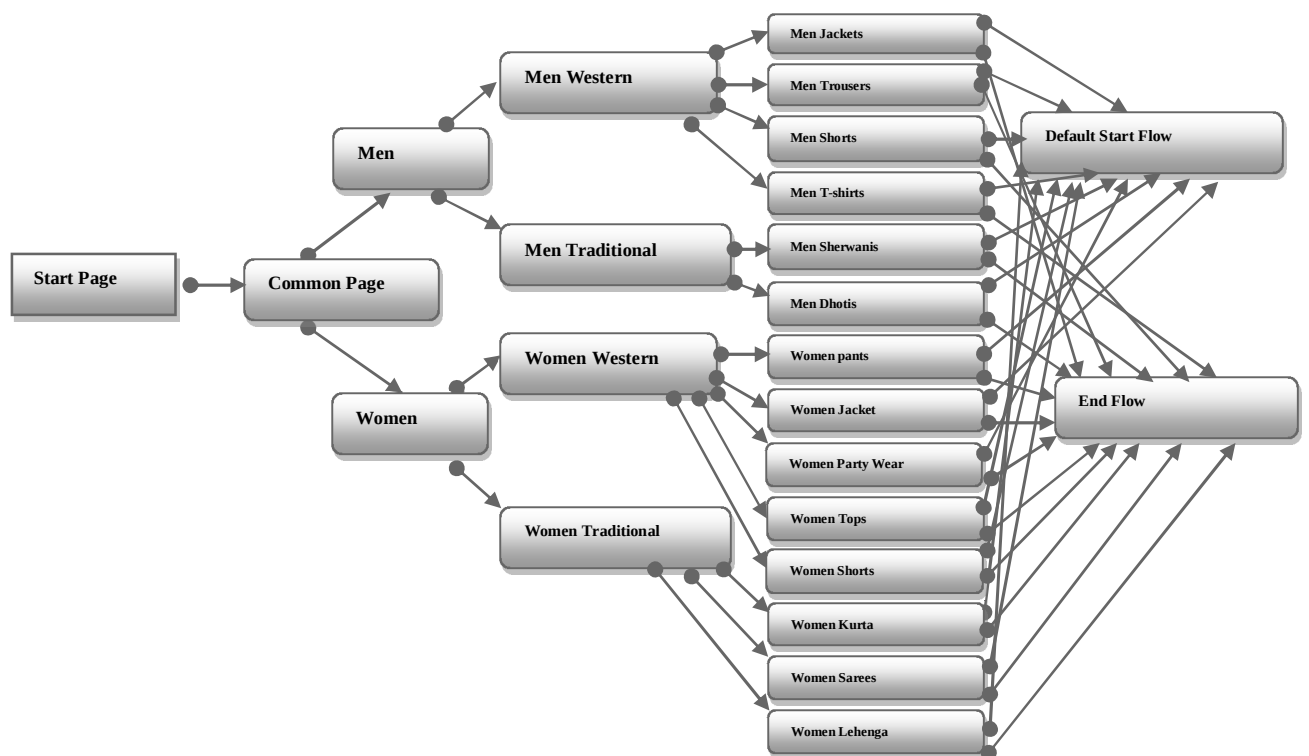


Figure 5: Flow of Product recommendation – intents mapping

Figure 7 depicts the Chatbot Flow for Return Policy

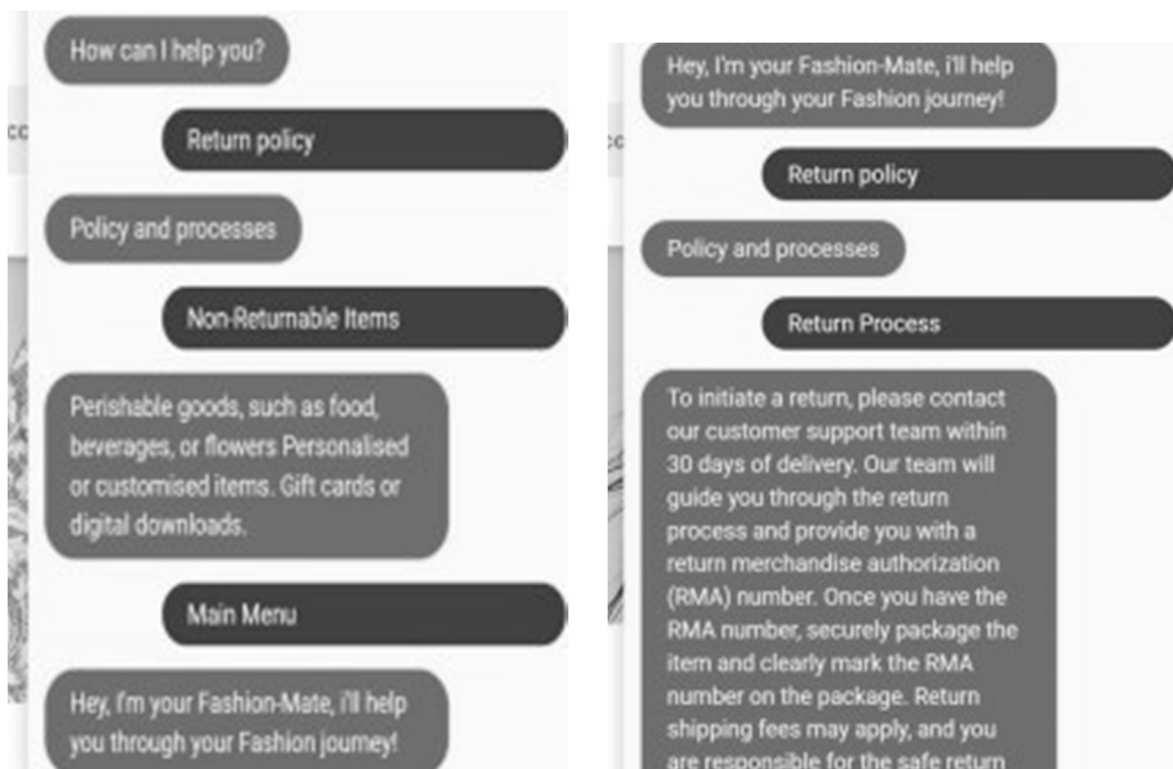


Figure 7: Chatbot Flow for Return Policy

Figure 8 depicts the Chatbot Flow for Product Recommendation

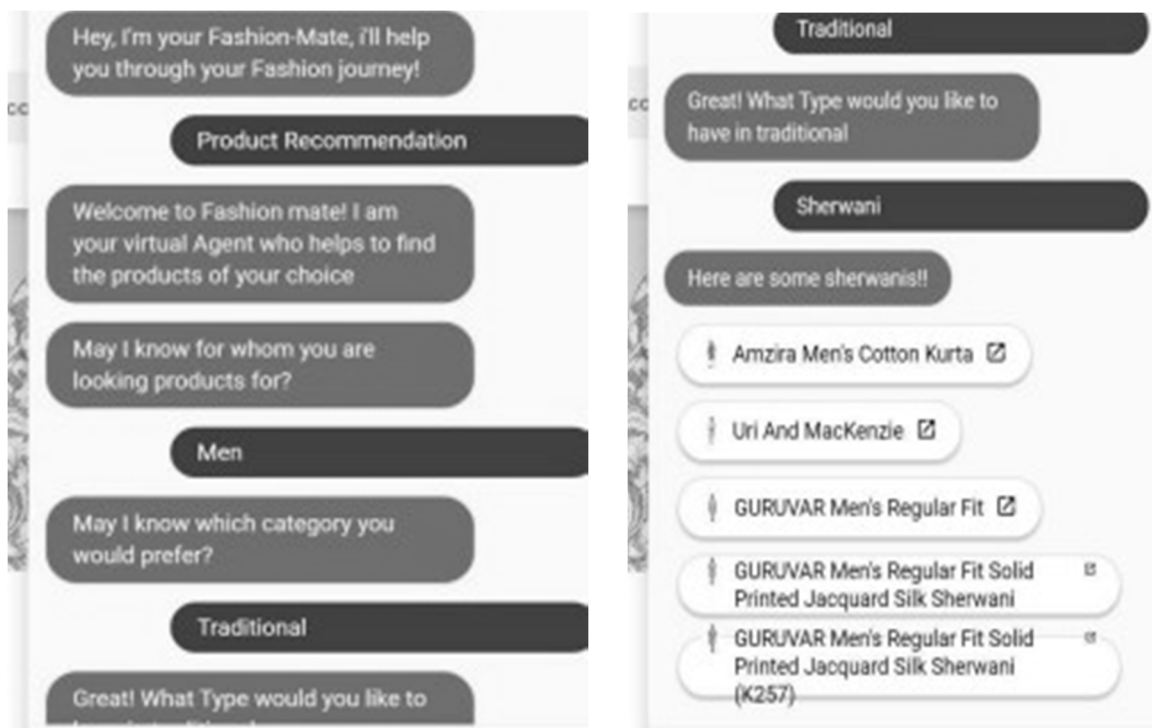


Figure 8: Chatbot Flow for Product Recommendation

IV. CONCLUSION

It is possible to improve the entire shopping experience by developing and deploying a conversational AI chatbot which has several advantages. Our research has shown the advantage of using Natural language processing and Machine Learning Techniques to speed up the shopping process, offer personalized recommendations, and assist with product inquiries. Additionally, our Conversational AI chatbot saves customer time and reduces the efforts of navigating intricate websites and browsing through vast product catalogs. Its conversational interface allows users to interact in a comfortable and intuitive manner, providing a personalized shopping experience. Customers can get immediate response to their queries. The chatbot can provide tailored promotions, discounts, and recommendations by analyzing the customer's interests and past purchases. Our work showcases the immense potential of artificial intelligence-powered chatbots in revolutionizing the way customers engage with brands and make online purchases. It has created new opportunities for convenient, customized shopping experiences, and customer satisfaction, setting the stage for further developments in the e-commerce industry.

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