

# A Book Recommendation Chatbot

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## Abstract

The overwhelming number of books available today makes it difficult for users to discover relevant titles that match their preferences. To address this, we propose a chatbot system that uses Natural Language Processing (NLP) and a content-based recommendation algorithm to suggest personalized books based on user input. Our solution improves with user interactions and provides increasingly accurate recommendations over time. The results demonstrate that the chatbot is capable of generating relevant book suggestions that align with user preferences while continuously learning to enhance its recommendations.

## 1 Introduction

In today's world, readers are faced with a vast and growing number of books, making it challenging to select titles that match their interests. This issue is exacerbated by the fact that traditional methods, such as browsing through lists or relying on personal recommendations, are often inefficient and can lead to information overload. Recommendation systems have emerged as a technological solution to this problem, helping users discover content that aligns with their preferences. These systems are widely implemented in e-commerce platforms and streaming services, including Amazon's book recommendations and Netflix's movie suggestions, which rely on algorithms like content-based filtering to personalize recommendations.

However, many existing book recommendation systems are limited in their adaptability and personalization. They often depend on predefined categories or rely heavily on user ratings and reviews, which can be biased or insufficient for generating accurate suggestions. Furthermore, these systems typically do not learn from a user's evolving preferences over time, limiting their effectiveness in providing long-term, personalized recommendations.

One area of improvement lies in integrating Natural Language Processing (NLP) with recommendation algorithms. NLP can analyze and understand user inputs more accurately, going beyond simple keyword matching by interpreting context, intent, and preferences stated in natural language. By employing NLP alongside content-based filtering (which suggests items based on shared characteristics), a more dynamic and responsive system can be built.

Several works have addressed aspects of this challenge. For example, Amazon uses a content-based recommendation system that suggests products based on user preferences and item features. Another notable example is the open-source recommendation system, LensKit, which enables researchers to experiment with different recommendation techniques. Additionally, natural language interfaces for systems like Apple’s Siri or Amazon’s Alexa are widely used for simple tasks, although their recommendation capabilities remain relatively rudimentary compared to specialized systems.

In light of this, our project aims to create a chatbot capable of recommending books by analyzing user input via NLP, querying a book database, and delivering tailored recommendations. This system will not only recommend books based on current preferences but will also adapt and improve over time based on feedback and repeated interactions. By leveraging machine learning and a modular architecture, our solution ensures flexibility and scalability while maintaining high-quality recommendations for a wide range of users.

## 2 Method and Materials

The design of our book recommendation chatbot is grounded in both user-centered and technically robust principles. The system’s architecture consists of several core components: Natural Language Processing (NLP) for understanding user input, a book database to store and retrieve book information, and a content-based recommendation algorithm that delivers personalized book suggestions. Below, we describe each of these components, the decisions that shaped their development, and why they are integral to the success of the system.

### 2.1 Natural Language Processing (NLP)

NLP plays a key role in this system by analyzing and interpreting user input, which may include vague or incomplete queries such as "recommend me a mystery novel" or "I’m looking for something like Harry Potter." To achieve

this, we utilize pre-trained NLP models capable of semantic understanding, which not only extract keywords but also interpret user intent. The decision to implement NLP allows the system to handle diverse inputs, making it more flexible compared to traditional keyword-based recommendation systems.

## **2.2 Book Database**

The system stores and categorizes a comprehensive dataset of books, including metadata such as genres, authors, ratings, and descriptions. We decided to structure the database with relational tables, allowing efficient querying and filtering based on user preferences. This decision was made to balance scalability and query speed, ensuring that the system can handle large volumes of data without significant delays. A book's metadata, such as its description and genre, is essential in matching user preferences, especially when using content-based filtering methods.

## **2.3 Recommendation Algorithm**

Our recommendation algorithm is based entirely on content-based filtering. This technique suggests books based on shared characteristics between books that the user likes and the features of other books in the database. The content-based approach was chosen to improve accuracy and flexibility, providing personalized recommendations even for users with limited history. This method also helps in ensuring that recommendations are tailored to the specific preferences expressed by the user.

## **2.4 System Learning and Feedback**

The system is designed to learn from user interactions over time. By incorporating feedback loops, the chatbot refines its recommendations based on previous suggestions that were accepted or rejected by the user. This adaptive learning capability was chosen to enhance user satisfaction and maintain relevance in long-term interactions.

## **2.5 User Interface**

A simple and intuitive chatbot interface is used for interaction. Users can input natural language queries and receive book recommendations directly within the chat. This design decision allows for seamless communication between the user and the system, providing an experience similar to asking a human for a recommendation. We opted for this interface because it aligns

with modern user expectations, where conversational agents such as Siri or Alexa have set a standard for ease of interaction.

In summary, the combination of NLP, a robust book database, and a content-based recommendation algorithm form the core of our solution. Each of these components was chosen to maximize flexibility, scalability, and accuracy in book recommendations. We believe that the integration of adaptive learning further enhances the user experience, ensuring that recommendations remain relevant over time. Additionally, the system's modular design allows for future expansions or improvements without requiring a complete overhaul.