Module 2: Portfolio Milestone

Natural Language Processing

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*Beginning Research on Natural Language Processing and Chatbot Technology*

This project involves building a retrieval based closed domain chatbot for a fictional online bookstore. The chatbot will handle common customer service tasks such as order tracking, book recommendations and account assistance. A closed domain approach ensures focused and reliable interactions tailored to specific user needs.

The chatbot will use several NLP tools. SpaCy will handle preprocessing including tokenization and entity recognition. NLTK will assist with basic text normalization such as stemming and stop word removal. ChatterBot will manage the retrieval based response mechanism using machine learning to select the most appropriate reply from a curated set of training conversations. TextBlob will provide sentiment analysis that helps the chatbot adjust responses based on the user's emotional tone.

A retrieval based approach is preferred for its simplicity and suitability for predictable query types. Responses will be based on a predefined dataset to maintain clarity and control. In the future transformer models like those available through Hugging Face may be explored to improve conversational depth and generate more dynamic replies.

This chatbot will serve as a practical demonstration of how natural language processing tools can be applied in a customer support setting. By focusing on a closed domain scenario such as an online bookstore, the chatbot shows how structured retrieval based systems can efficiently manage frequent and repetitive queries like tracking orders, managing accounts and offering book recommendations. Using machine learning to determine responses increases scalability and adaptability as the dataset grows. This project is also designed for flexibility, allowing for future integration of more advanced generative NLP models. Adding transformer based architectures could help the chatbot generate context aware and open ended responses that enhance the user experience.

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