

Name: Shahad Alharbi

ID: 252000854

العنوان:

تطوير شات بوت ذكي لخدمة العملاء يعتمد على نماذج اللغة الكبيرة مع تحديد النية وتحليل المشاعر باستخدام RAG للاسترجاع الديناميكي للمعلومات

Title:

Developing an Intelligent Customer Support Chatbot Using Large Language Models with Intent and Emotion Analysis and Dynamic RAG-Based Knowledge Retrieval

Abstract:

This study aims to design and implement an intelligent customer support chatbot that leverages the capabilities of Large Language Models (LLMs) combined with Intent Recognition, Emotion Analysis, and a dynamic Retrieval-Augmented Generation (RAG) mechanism. The proposed system seeks to enhance the precision, contextual understanding, and relevance of automated responses within customer service environments. Intent recognition will be used to determine the user's objective, while emotion analysis will assess the user's sentiment to support more empathetic and human-like interactions. The RAG component will dynamically retrieve up-to-date and domain-specific information from external knowledge sources to ensure that the chatbot delivers accurate, reliable, and contextually grounded responses, thereby reducing hallucination issues commonly associated with LLMs. Public datasets will be utilized for model training and evaluation. The performance of the system will be assessed through metrics such as accuracy, F1-score, relevance of generated responses, and user satisfaction. This research contributes a practical framework for building scalable, intelligent conversational agents suitable for modern customer support applications.

Objectives:

- Develop a chatbot powered by LLMs capable of accurately interpreting user queries.
- Implement an intent recognition module tailored to customer support interactions.
- Integrate an emotion analysis component to enhance the chatbot's empathy and quality of responses.
- Design a dynamic RAG-based pipeline that retrieves relevant external information in real time.
- Reduce hallucinations and improve factual consistency by incorporating augmented knowledge retrieval.
- Evaluate the proposed system using standard NLP and chatbot evaluation metrics such as accuracy, F1-score, relevance, and user satisfaction.
- Compare the performance of the hybrid model with baseline chatbot systems to assess improvements.

