

Chatbot Feature Development Using Retrieval Augmented Generation (RAG)

Technology and Langchain to Support Services at SMKN 1 Tegalsari

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ABSTRACT

This study developed a chatbot feature for the SMKN 1 Tegalsari website using Retrieval-Augmented Generation (RAG) technology and the Langchain Framework to improve the accuracy and relevance of responses. The chatbot is designed to answer questions related to academics, student affairs, departments (majors), and extracurricular activities by utilizing the school's knowledge base. The research methodology includes needs analysis, architectural design, RAG-Langchain implementation, and evaluation through Human Evaluation and User Acceptance Testing (UAT).

The results of the Human Evaluation show that out of 50 questions posed by the researcher along with representatives of teachers and school administrators, the chatbot was able to provide correct and relevant answers 94% of the time. Meanwhile, User Acceptance Testing (UAT) conducted on 8 respondents showed an average satisfaction score of 4.25 out of 5 (85%), with the majority of users stating that the chatbot is easy to use (4.5/5), responsive, and provides answers that are easy to understand. A small portion of users (25%) reported display issues on mobile devices, such as cut-off elements or oversized layouts, particularly on iOS devices.

By integrating RAG and Langchain, this chatbot not only enhances the digital information services of SMKN 1 Tegalsari but also strengthens communication efficiency between the school and website visitors. This study demonstrates that an AI-based approach can be adapted to educational needs with optimal results.

Keywords: Chatbot, Retrieval Augmented Generation (RAG), Langchain Framework.