

ABSTRACT

The need for academic and student-related information constitutes a crucial aspect for university students. In the Faculty of Science and Mathematics at Diponegoro University (FSM Undip), students are required to directly visit the academic services office located in the Acintya Prasada Building to obtain relevant information. This approach gives rise to several issues, including time inefficiency due to queues, the potential inability to meet the appropriate staff, and a high level of repetitive inquiries. Therefore, this study proposes an automated service solution through a performance comparison of two chatbot frameworks, namely Retrieval-Augmented Generation (RAG) and RASA. Both frameworks were implemented using the same knowledge source, consisting of seven Standard Operating Procedure (SOP) documents related to academic and student services. The evaluation was conducted using five metrics: response time, coverage, ROUGE-1, ROUGE-L, and BERTScore. The results indicate that the answer accuracy of both frameworks does not differ significantly. The RASA framework demonstrates a primary advantage in response speed, with an average performance 658 times faster than RAG; however, this advantage is accompanied by greater effort in preparing the knowledge source, particularly during the development and training of the Natural Language Understanding (NLU) component. This limitation can be addressed by utilizing the RAG framework, which offers ease in preparation and direct integration of knowledge sources from existing documents, although it requires relatively higher computational resources.

Keywords : Academic Chatbot, Retrieval Augmented Generation, RASA Framework, Framework Comparison