

ABSTRAK

Erfia Nadia Safari. 2026. Rancang Bangun Chatbot Akademik Menggunakan Arsitektur *Retrieval-Augmented Generation* (RAG) (Studi Kasus: Prodi TIF UNIPMA). *Skripsi*. Program Studi Teknik Informatika, FT, Universitas PGRI Madiun. Pembimbing (I) Saifulloh, S.Kom., M.Kom. (II) Pratiwi Susanti, S.Kom., M.MT.

Peningkatan jumlah mahasiswa menyebabkan kebutuhan layanan informasi akademik semakin tinggi, sedangkan penyampaian informasi secara manual oleh staf administrasi belum mampu memberikan respons secara cepat dan efisien. Penelitian ini bertujuan merancang dan membangun chatbot akademik Program Studi Teknik Informatika Universitas PGRI Madiun menggunakan arsitektur *Retrieval-Augmented Generation* (RAG) serta mengevaluasi tingkat keakuratan dan kemanfaatannya. Pengembangan sistem menggunakan metode *Extreme Programming*. Sistem memanfaatkan Gemini Embedding 001 untuk proses embedding, ChromaDB sebagai *local vector database*, dan Gemini 2.5 Flash Lite sebagai model generatif. Evaluasi dilakukan menggunakan *Retrieval Augmented Generation Assessment* (RAGAS) dan *User Acceptance Testing* (UAT). Hasil pengujian menunjukkan bahwa konfigurasi *chunk* 512 dengan *overlap* 30 memberikan performa terbaik dengan nilai *Semantic Similarity* 0.9325, *Answer Relevancy* 0.7804, *Faithfulness* 0.9762, *Context Recall* 1, *Factual Corectness Precision* 0.7500, *Factual Corectness F1* 0.8229 dan *Factual Correctness Recall* 0,9529. Pengujian UAT terhadap 85 responden memperoleh nilai 88,9% dengan kategori Sangat Baik. Hasil penelitian menunjukkan bahwa chatbot mampu menyediakan informasi akademik yang relevan, akurat, dan mudah digunakan.

Kata kunci: Chatbot, *Retrieval-Augmented Generation*, Gemini, ChromaDB

ABSTRACT

Erfia Nadia Safari. 2026. *Development of an Academic Chatbot Using the Retrieval-Augmented Generation (RAG) Architecture (Case Study: Prodi TIF UNIPMA)*. Thesis. Informatics Engineering, Faculty of Engineering, Universitas PGRI Madiun. Advisors: (I) Saifulloh, S.Kom., M.Kom. (II) Pratiwi Susanti, S.Kom., M.MT.

The increasing number of students has led to a growing demand for academic information services, while manual information delivery by administrative staff has been unable to provide fast and efficient responses. This study aims to design and develop an academic chatbot for the Informatics Engineering Study Program at Universitas PGRI Madiun using the Retrieval-Augmented Generation (RAG) architecture and to evaluate its accuracy and usability. The system was developed using the Extreme Programming methodology. It utilizes Gemini Embedding 001 for the embedding process, ChromaDB as a local vector database, and Gemini 2.5 Flash Lite as the generative model. System evaluation was conducted using Retrieval-Augmented Generation Assessment (RAGAS) and User Acceptance Testing (UAT). The test results showed that a chunk size of 512 with an overlap of 30 provided the best performance, achieving a Semantic Similarity score of 0.9325, Answer Relevancy of 0.7804, Faithfulness of 0.9762, Context Recall of 1, Factual Correctness Precision of 0.7500, Factual Correctness F1 of 0.8229, and Factual Correctness Recall of 0.9529. UAT involving 85 respondents achieved a score of 88.9%, categorized as Very Good. The results demonstrate that the chatbot is capable of providing relevant, accurate, and user-friendly academic information.

Keywords: Chatbot, Retrieval-Augmented Generation, Gemini, ChromaDB