

ABSTRAK

Penentuan judul tugas akhir menjadi salah satu tahapan yang sering mengalami kendala bagi mahasiswa karena proses pencarian dan perbandingan penelitian terdahulu masih banyak dilakukan secara manual atau menggunakan pendekatan berbasis kata kunci. Pendekatan tersebut memiliki keterbatasan dalam memahami hubungan makna antarjudul, sehingga analisis kemiripan topik penelitian belum dapat dilakukan secara optimal. Penelitian ini bertujuan untuk merancang dan membangun TGA-AI, yaitu chatbot berbasis *Artificial Intelligence* yang dapat membantu mahasiswa dalam melakukan analisis kemiripan serta memberikan rekomendasi judul tugas akhir. Sistem dikembangkan menggunakan metode *Prototyping* dengan menerapkan pendekatan *Retrieval-Augmented Generation (RAG)*, *semantic search*, *embedding*, *cosine similarity*, dan *vector database*. Data tugas akhir diperoleh dari repositori RAMA Universitas Malikussaleh melalui protokol OAI-PMH, kemudian diproses menggunakan *PostgreSQL* sebagai basis data relasional dan *ChromaDB* sebagai penyimpanan *vector embedding*. Evaluasi sistem dilakukan melalui pengujian kualitas *Retrieval-Augmented Generation* menggunakan *TruLens*, pengujian fungsional menggunakan *Katalon Studio*, pengujian keamanan menggunakan *Burp Suite*, serta pengujian kemudahan penggunaan menggunakan *System Usability Scale (SUS)*. Hasil evaluasi *TruLens* terhadap 31 skenario pengujian menghasilkan nilai *Context Relevance* sebesar 0,7435, *Groundedness* sebesar 0,5968, dan *Answer Relevance* sebesar 0,9874. Pengujian *Katalon Studio* menunjukkan seluruh fitur utama sistem berjalan sesuai rancangan, sedangkan pengujian *Burp Suite* tidak menemukan kerentanan dengan tingkat risiko *High* maupun *Medium*. Pengujian *SUS* terhadap 50 mahasiswa memperoleh skor rata-rata sebesar 78,75 yang menunjukkan tingkat penerimaan pengguna yang baik. Berdasarkan hasil penelitian, TGA-AI mampu membantu mahasiswa dalam melakukan pencarian berbasis makna, menganalisis kemiripan judul, memperoleh rekomendasi judul alternatif, serta mendukung proses konsultasi awal dalam menentukan judul tugas akhir.

Kata kunci: *Artificial Intelligence, chatbot, Retrieval-Augmented Generation, Analisis kemiripan, rekomendasi judul, TruLens.*

ABSTRACT

Determining a final project title is one of the challenging stages for students because searching and comparing previous studies are still commonly conducted manually or through keyword-based approaches. These approaches have limitations in understanding semantic relationships between titles, resulting in less optimal analysis of research topic similarities. This study aims to design and develop TGA-AI, an Artificial Intelligence-based chatbot that assists students in analyzing title similarities and providing final project title recommendations. The system was developed using the Prototyping method by implementing Retrieval-Augmented Generation (RAG), semantic search, embedding, cosine similarity, and vector database. Final project data were obtained from the RAMA Universitas Malikussaleh repository through the OAI-PMH protocol and processed using PostgreSQL as a relational database and ChromaDB for storing vector embeddings. System evaluation was conducted through several testing methods, including Retrieval-Augmented Generation quality evaluation using TruLens, functional testing using Katalon Studio, security testing using Burp Suite, and usability testing using the System Usability Scale (SUS). The TruLens evaluation on 31 test scenarios produced scores of 0.7435 for Context Relevance, 0.5968 for Groundedness, and 0.9874 for Answer Relevance. Functional testing using Katalon Studio showed that all main system features operated according to the designed workflow, while Burp Suite testing identified no vulnerabilities with High or Medium severity levels. Usability testing involving 50 students achieved an average SUS score of 78.75, indicating good user acceptance. The results demonstrate that TGA-AI can assist students in conducting semantic searches, analyzing title similarities, obtaining alternative title recommendations, and supporting initial consultation during the final project title selection process.

Keywords: *Artificial Intelligence, Chatbot, Retrieval-Augmented Generation, Title Similarity Analysis, Title Recommendation, TruLens.*