PENGEMBANGAN *VIRTUAL ASSISTANT* PADA WEBSITE PROGRAM STUDI SISTEM INFORMASI BERBASIS *RETRIEVAL AUGMENTED GENERATION* (RAG)

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ABSTRAK

Mahasiswa Program Studi Sistem Informasi Universitas Pendidikan Ganesha sering kesulitan mengakses informasi akademik spesifik dan terkini, menyebabkan ketergantungan komunikasi informal. Penelitian ini merancang, mengembangkan, dan mengevaluasi *virtual assistant* berbasis *Retrieval-Augmented Generation* (RAG) untuk akses informasi efisien dan akurat. Sistem dikembangkan dengan model Waterfall, meliputi analisis kebutuhan, perancangan, implementasi, pengujian, dan pemeliharaan. Data dikumpulkan otomatis via *scraping* dari website prodi dan RSS feed untuk memastikan informasi mutakhir. Arsitektur RAG diimplementasikan dengan LangChain, database vektor ChromaDB, dan *Large Language Model* GPT-3.5 Turbo. Efektivitas sistem dievaluasi dengan 25 pertanyaan uji menggunakan RAGAS, sedangkan pengalaman pengguna dinilai 222 responden via *User Experience Questionnaire* (UEQ). Hasil RAGAS menunjukkan kinerja sangat baik: *Context Precision* 0,85, *Context Recall* 0,87, *Faithfulness* 0,86, *Response Relevancy* 0,88. Hasil UEQ mengonfirmasi pengalaman pengguna positif, dengan *Dependability, Stimulation*, dan *Novelty* dinilai *Excellent*. Penelitian ini membuktikan *virtual assistant* RAG efektif mengatasi kesenjangan informasi dan meningkatkan layanan akademik.

Kata Kunci: *Retrieval-Augmented Generation*, *Large Language Models*, *virtual assistant*, layanan informasi, pengalaman pengguna

DEVELOPMENT OF A VIRTUAL ASSISTANT ON THE INFORMATION SYSTEMS STUDY PROGRAM WEBSITE BASED ON RETRIEVAL-AUGMENTED GENERATION (RAG)

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ABSTRACT

Students of the Information Systems Study Program at Universitas Pendidikan Ganesha often face challenges accessing specific and current academic information, relying on informal communication channels. This research designs, develops, and evaluates a virtual assistant based on Retrieval-Augmented Generation (RAG) for efficient and accurate information access. The system was developed using the Waterfall model, including requirements analysis, design, implementation, testing, and maintenance. Data is automatically gathered by scraping the study program's website and RSS feeds to ensure the information is always up to date. The RAG architecture is implemented utilizing LangChain, the ChromaDB vector database, and the GPT-3.5 Turbo Large Language Model. The system's effectiveness was evaluated using 25 test questions with the RAGAS framework, while the user experience was assessed with the User Experience Questionnaire (UEQ) involving 222 respondents. The RAGAS evaluation demonstrated excellent performance, achieving a Context Precision of 0.85, Context Recall of 0.87, Faithfulness of 0.86, and Response Relevancy of 0.88. UEQ results confirmed a positive user experience, with Dependability, Stimulation, and Novelty rated as 'Excellent'. This study proves the RAG virtual assistant effectively addresses the information gap and improves academic services.

Kata Kunci: *Retrieval-Augmented Generation, Large Language Models, virtual assistant, information services, user experience.*