

ABSTRAK

Ombudsman Republik Indonesia (Ombudsman RI) merupakan lembaga negara yang berwenang mengawasi pelayanan publik berdasarkan Undang-Undang Nomor 37 Tahun 2008. Tingginya volume pengaduan, yaitu 10.846 Laporan Masyarakat pada tahun 2024, serta ketergantungan pada metode konsultasi konvensional menimbulkan kendala biaya, keterbatasan teknologi, dan pengulangan penjelasan prosedur yang menurunkan produktivitas staf. Penelitian ini mengembangkan sistem konsultasi berbasis web dengan *chatbot* AI yang diorkestrasi oleh LangGraph StateGraph sebagai *framework* utama pengelolaan alur *Retrieval-Augmented Generation* (RAG) melalui lima *node* yang saling terkoneksi untuk mendukung eksekusi pencarian konkuren, manajemen *state* percakapan, dan *routing* dinamis berbasis klasifikasi *intent*. Sistem dikembangkan menggunakan metodologi Agile dengan *framework Extreme Programming* (XP) serta dilengkapi fitur eskalasi konsultasi Zoom, Survei Kepuasan Masyarakat, dan *dashboard* admin. *Pipeline* memanfaatkan Groq Llama 3.3 70B sebagai *Large Language Model* dan ChromaDB berisi 12 dokumen *seed*. Komparasi terhadap 15 *test case* pada 11 kategori menunjukkan model berbasis LangGraph+RAG unggul dengan *pass rate* 80% dan *in-context accuracy* 82% dibandingkan Gemini tanpa RAG (60% dan 45%). *Black Box Testing* tujuh modul mencapai 100%, sedangkan *User Acceptance Testing* terhadap 41 responden memperoleh rata-rata tertimbang 4,558 dari 5,00 atau 91,16% kategori Sangat Baik.

Kata kunci: LangGraph, *chatbot* AI, RAG, Ombudsman RI, layanan publik

ABSTRACT

The Ombudsman of the Republic of Indonesia (Ombudsman RI) is a state institution authorized to supervise public services under Law Number 37 of 2008. The high volume of complaints, totaling 10,846 Public Reports in 2024, along with reliance on conventional consultation methods creates obstacles including cost, limited technological access, and repetitive procedural explanations that reduce staff productivity. This research developed a web-based consultation system with an AI chatbot orchestrated by LangGraph StateGraph as the main framework managing the Retrieval-Augmented Generation (RAG) flow through five interconnected nodes supporting concurrent search execution, conversational state management, and dynamic routing based on intent classification. The system was developed using the Agile methodology with the Extreme Programming (XP) framework and equipped with Zoom consultation escalation, a Public Satisfaction Survey, and an admin dashboard. The pipeline utilizes Groq Llama 3.3 70B as the Large Language Model and ChromaDB containing 12 seed documents. Comparison on 15 test cases across 11 categories showed that the LangGraph+RAG model outperformed with an 80% pass rate and 82% in-context accuracy compared to Gemini without RAG (60% and 45%). Black Box Testing on seven modules reached 100%, while User Acceptance Testing involving 41 respondents obtained a weighted average of 4.558 out of 5.00 or 91.16% in the Very Good category.

Keywords: *LangGraph, AI chatbot, RAG, Ombudsman RI, public service*