BelsisMIS
Intelligent Customer Support Assistant
BICSA

**Mehmet Efe Kaya, Ali Emrecan Selvili, Ege Beçin,
Yusuf Tuna Üner, Ahmet Selçuk Özdil**

Prof. Dr. Hayri Sever

ÇANKAYA UNIVERSITY, DEPARTMENT OF COMPUTER ENGINEERING

ABSTRACT

This report presents the development lifecycle of BICSA (BelsisMIS Intelligent Customer Support Assistant), a Level-0 AI-powered chatbot designed for integration with BELSİS.NET, a municipal ERP platform widely used across Turkey. The chatbot aims to modernize user support services by automating responses to common municipal queries, reducing dependence on traditional call centers, and providing 24/7 assistance through both web and mobile platforms. Developed using OpenAI's NLP model, BICSA interprets natural language queries, retrieves information from HTML-based documentation, and generates accurate, context-aware responses. The system leverages a Retrieval-Augmented Generation (RAG) architecture and complies with security standards such as TLS and KVKK.With its scalable architecture, robust security measures, and Agile development methodology, BICSA demonstrates a significant step toward digital transformation in municipal services, streamlining workflows, and improving user satisfaction.

INTRODUCTION

Municipalities in Turkey often rely on outdated support systems for their ERP platform, BELSİS.NET, resulting in slow response times, inconsistent assistance, and a high workload for support teams. This limits efficiency and user satisfaction in day-to-day municipal operations.

While some chatbot solutions have been explored, they typically lack deep integration with municipal systems and fail to handle domain-specific inquiries effectively. There remains a clear need for an intelligent, responsive, and context-aware support solution tailored to this environment.

This project introduces BICSA (BelsisMIS Intelligent Customer Support Assistant)—a Level-0 AI-powered chatbot that automates user support within the BELSİS.NET system. Using OpenAI's NLP capabilities and a Retrieval-Augmented Generation (RAG) architecture, BICSA delivers accurate responses by referencing HTML-based end-user documentation. It is accessible via both web and mobile platforms and supports secure, scalable operation.

The project's main contribution is a fully integrated chatbot that modernizes municipal support services, reduces manual workload, and enhances overall user experience. It also provides a complete design and testing framework that can serve as a blueprint for future AI-driven public sector tools.

SOLUTION

The proposed solution to the inefficiencies in municipal ERP support systems is the design of BICSA, a Level-0 AI-powered chatbot that automates responses to common user inquiries within the BELSİS.NET platform. The primary goal is to streamline support services, reduce the burden on human support staff, and deliver consistent, on-demand assistance to municipal employees through both web and mobile interfaces. BICSA is built to interpret user queries written in natural language or transcribed from speech and deliver meaningful responses sourced directly from existing end-user documentation.

The core algorithmic strategy follows a Retrieval-Augmented Generation (RAG) framework, which enables the chatbot to generate accurate responses grounded in trusted content. This approach is composed of two main conceptual components:

Retrieval: The system begins by analyzing the user's input to determine intent and extract key terms or entities. Using this information, it performs a search on a structured, pre-indexed knowledge base created from HTML documentation derived from legacy ASP files. The retrieval process incorporates both heading-level and paragraph-level matching techniques to locate relevant content. This ensures that even if the user's query is vague or phrased differently from the documentation, the system can still identify suitable information for response generation.

Generation: Once the relevant content is retrieved, the system passes it to a language model to compose a response. This generated output is not free-form but rather constrained by the retrieved content to ensure it remains factual, coherent, and traceable. The language model formulates the answer in a conversational tone while preserving technical accuracy. Where appropriate, the system includes inline references to the source documentation to guide users toward additional details or verification.

Together, these two stages enable the chatbot to deliver support that is both intelligent and grounded in reliable documentation. The system can answer frequently asked questions, guide users through task workflows step by step, and retain context across multiple user interactions. By analyzing behavior patterns and optional user feedback, the system is also designed to improve its performance over time, enabling continuous refinement and adaptability to evolving support needs.

This solution addresses major limitations in traditional municipal support systems by providing rapid, accurate, and consistent assistance without human intervention. It enhances user experience, reduces operational costs, and ensures scalability as the needs of municipalities grow. As a result, BICSA not only fulfills the immediate goal of modernizing support for BELSİS.NET but also contributes to broader public sector digital transformation efforts, setting a strong foundation for future AI-driven municipal services.

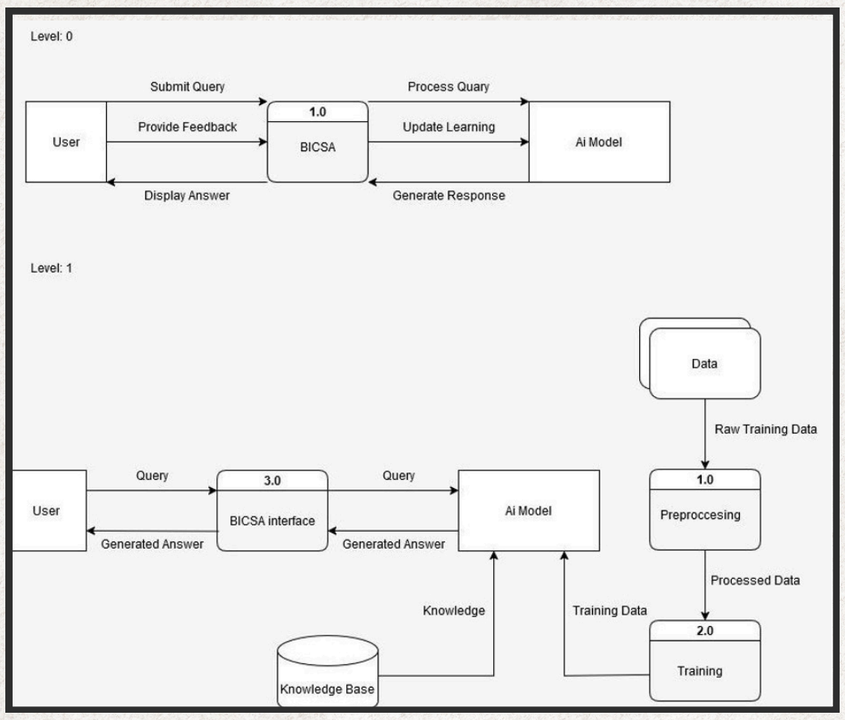

Figure 1 - Data Flow Diagram

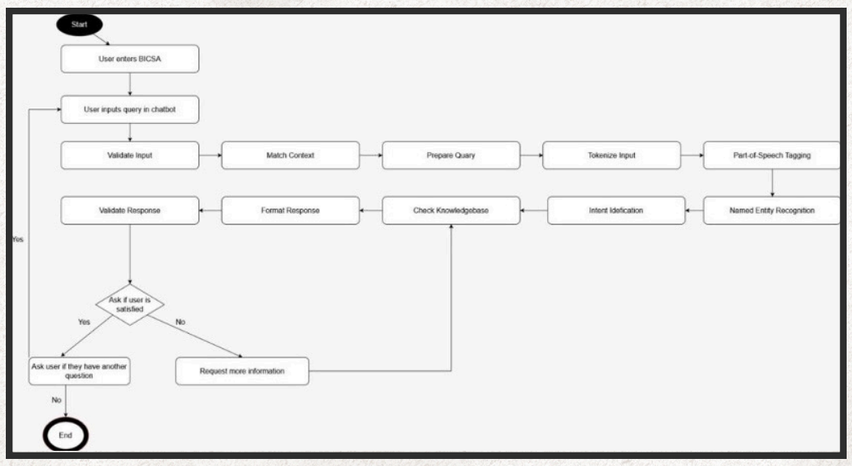

Figure 2 - Activity Diagram

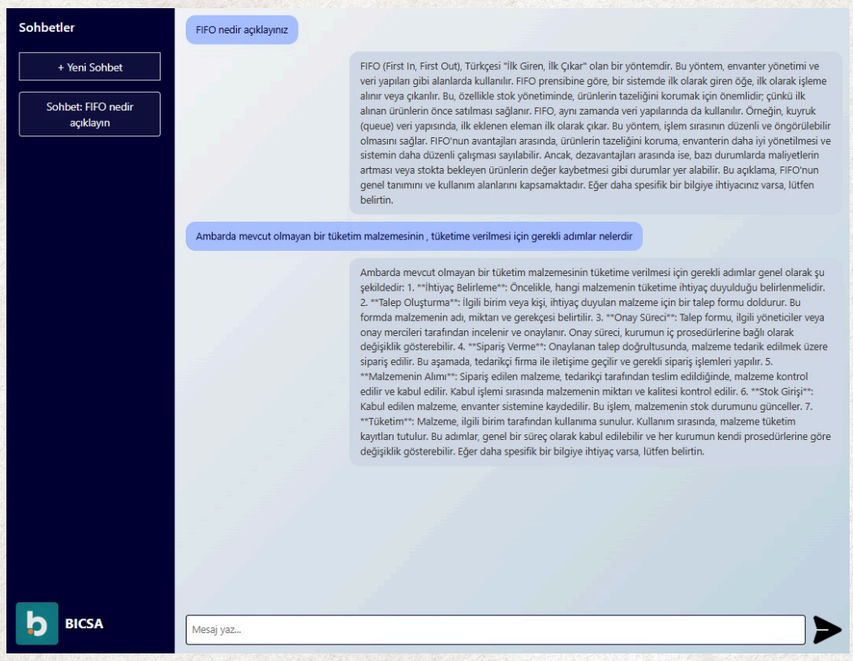

Figure 3 - Final Product

COMPANY INFO

Belsis has been operating in the information technology sector since 2000 with the aim of providing solutions for the IT needs of the public sector, private sector, and local governments. Belsis is also a technology and consultancy company that offers service and support for the solutions it develops. Since its establishment, Belsis has observed and analyzed the requests and needs of its users, developing projects by combining the results with its own experience and knowledge. With its expert staff, customer satisfaction-oriented service approach, and commitment to agile process principles, Belsis serves as a solution center with high-quality "Software Products" driven by technology. As a pioneer in the field of information systems in Turkey, Belsis has carried out IT projects for over 200 institutions and thousands of users, always aiming to achieve the highest efficiency from information technologies. Belsis maintains its position as the first, only, and leading institution in Turkey that produces, using its own resources and through co-design, all of the following applications and ensures their concurrent operation: Geographic Information Systems (GIS), Computer-Aided Design (CAD) Software, Management Information Systems (MIS) Solutions, Internet Map Server (IMS) Solutions, and Electronic Document Management Systems (EDMS), all with international certifications in their respective domains. Valuing people, Belsis works with a dynamic, creative, and expert team that understands user needs and provides comprehensive solutions. Aware that change will come through people, Belsis places special emphasis on education and support. Through post-sales training and technical support activities, it ensures that its solutions are adopted quickly and easily.

RESULTS & CONCLUSION

This project aimed to build a Level-0 AI-powered chatbot to support users of the BELSİS.NET municipal ERP system by answering common questions automatically. Using natural language processing and a Retrieval-Augmented Generation (RAG) approach, the chatbot responds to user queries by referencing HTML-based end-user documentation. Throughout testing, the chatbot showed strong performance, passing all high-priority test cases except one related to follow-up question handling. It was able to provide clear, accurate, and context-aware responses in most scenarios. These results indicate that the chatbot can effectively reduce the workload of human support teams and improve the overall speed and consistency of user assistance. From this work, we learned that integrating domain-specific knowledge into AI systems can significantly enhance user support in complex platforms. Future improvements will focus on better multi-turn conversation handling, expanding FAQ coverage, and adding support for Turkish and other languages. This project demonstrates the potential of AI to transform public-sector digital services.

ACKNOWLEDGEMENT

We would like to express our sincere gratitude to Prof. Dr. Hayri Sever for his invaluable guidance, encouragement, and support throughout the course of this project. We are also deeply thankful to Evren Coşkun and Ali Can Özsoy, our supervisors from Belsis, for their continuous mentorship, technical insights, and constructive feedback that greatly contributed to the development of our work.

This project would not have been possible without the collaboration and resources provided by Belsis, whose support we gratefully acknowledge.